



KIRISIA/LEROGHI PARTICIPATORY FOREST MANAGEMENT PLAN-2023-2027



APPROVAL PAGE

KIRISIA/LEROGHI PARTICIPATORY FOREST MANAGEMENT PLAN (2023-2027)

Kirisia/Leroghi Participatory Forest Management Plan (2023-2027) is hereby approved for implementation. Any amendments to this Management Plan shall be effected only through mutual agreement between Kenya Forest Service (KFS) and the Kirisia Community Forest Association.

This Management Plan shall form the basis for the subsequent Forest Management Agreement (FMA) governing forest which will be signed between Kenya Forest Service and Kirisia Community Forest Association.



A.L. Lemarkoko, 'ndc' (K)
Ag. CHIEF CONSERVATOR OF FORESTS
KENYA FOREST SERVICE

Date: 27/03/2023

PREFACE

The Forest Conservation and Management Act No. 34 of 2016 established Kenya Forest Service (KFS) with the mandate to: “*conserve, protect and manage all public forests in accordance with the provisions of this Act*”. It further stipulates that the Service shall: “*prepare and implement management plans for all public forests and, where requested, assist in preparation of management plans for community forests or private forests in consultation with the relevant owners*”. Further, Section 47 (1) states that “*Every public forest, nature reserve and provisional forest shall be managed in accordance with a management plan that complies with the requirements prescribed by Regulations made by the Cabinet Secretary;*” subsequently, Kirisia/Leroghi forest Participatory Management Plan 2023-2027 was prepared.

Kirisia/Leroghi forest covers approximately 91,944 hectares. Leroghi/Kirisia/Leroghi forest was gazetted vide Proclamation No. 2 of 1936 and declared a Central Forest vide legal Notice No.174 of 1964. It is managed by KFS through a Forest Station Manager, who is under County Forest Conservator, Samburu County, under Regional Forest Conservator – Ewaso North.

This management plan was prepared with wide consultation with stakeholders who included the forest adjacent communities through Kirisia/Leroghi Community Forest Association, Kenya Forest Service (KFS), other government agencies like Kenya Wildlife Service (KWS), National Environmental Management Authority (NEMA) and Samburu County Government. The entire process was funded of Global Environment Facility (GEF-5) through FAO in partnership with the Kenya Forest Service (KFS).

The purpose of Kirisia/Leroghi PFMP is to provide a management framework for sustainable management and conservation of the ecosystem and improvement of forest adjacent community livelihoods. The plan aims at employing a collaborative and participatory approach that takes into account the diverse interests of the people surrounding Kirisia/Leroghi forest. The vision of this plan as stipulated by the majority of the communities in the area is:

‘Leroghi Forest to be a leader in sustainable participatory management for the provision of ecosystem goods and services for the benefit of present and future generations’.

As the plan envisions a sustainably conserved forest, it is my sincere belief, that more cooperation and partnerships among all stakeholders, in the implementation of Kirisia/Leroghi PFMP (2023-2027), will strengthen and support our resolve, to protect and conserve a forest ecosystem that is an important habitat for threatened wildlife, and a critical water catchment area for the benefit of present and future generations.

A.L. Lemarkoko, ‘ndc’ (K)
Ag. Chief Conservator of Forests
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FOREWORD

Food and Agriculture Organization of the United Nations (FAO) with the Government of Kenya has secured financial resources under the Global Environment Facility (GEF) to implement a project on ***Capacity, Policy and Financial Incentives for PFM in Kirisia Forest and Integrated Rangelands Management*** in Samburu County. The main objective of the project is to restore Kirisia/Leroghi Forest and strengthen participatory governance of the critical biodiversity hotspots and water catchment areas for improved livelihoods through sustainable utilization of forest-based products and services. In line with this background, FAO and Kenya Forest Service (KFS) as the lead government executing agency in this project entered into an agreement that led to the preparation of Kirisia/Leroghi Participatory Forest Management Plan (PFMP).

The process of preparing this plan involved formation of a Local Planning Team drawn from all key stakeholders who included Kenya Forest Service (KFS), FAO, Kenya Wildlife Service, Kenya Water Towers Agency, Samburu County Government and Kirisia Community who formed Forest Associations. FAO observed that the participatory approach used as a strategy for Kirisia/Leroghi Forest Conservation was accepted by the community and the local leaders.

Kirisia forest ecosystem is a “Water Tower” that serves as a major water source for the larger population in Samburu County and the neighboring Counties. With the increase in human population and rise in poverty levels, Kirisia Forest is a victim of degradation from over exploitation to meet the daily needs of the growing human population. The Forest has faced major threats of degradation as it is depended upon as a major economic site for livestock grazing, illegal harvesting of wood for construction, fire wood and charcoal production as well as hunting and poaching of wildlife. The preparation of this plan is therefore timely, as it comes in a period when the demands on the forest are great and the opportunities for direct and indirect benefit are sizeable. The draft Forest Policy and Forest Conservation and Management Act, 2016 have ushered in a new era in forest management in Kenya, with a dispensation that allows the involvement of forest adjacent communities in their forest management.

The Constitution of Kenya, 2010, Vision 2030 and the draft Forest Policy, 2015 requires the preparation of a national strategy to increase and maintain forest and tree cover to at least 10% of the total land area; rehabilitation and restoration of degraded forest ecosystems and the establishment of a national forest resource monitoring system. The Kirisia/Leroghi Participatory Forest Management Plan will enhance the Kirisia Community Forest Associations (CFAs) to cohesively engage in conserving the forest and its biodiversity. This in turn will promote the rehabilitation of the degraded parts of the forest. The wholesome goal of the plan is to reduce the current deforestation rate on Kirisia Forest by 1.4% per year to less than 0.84% and put 45,000ha of intact forest under Forest Project Management Regime, 17,000ha under Sustainable Forest Management and 10,000ha under natural regeneration. The Ecosystem Management Plan will promote an efficient, sustainable and equitable use of forest resources.

This plan has put in place all the legal policies geared to promote the Management/Conservation of Kirisia/Leroghi Forest. It is the aspirations of FAO that by adoption and implementation of Kirisia/Leroghi Participatory Forest Management Plan, the sustainable management of the Kirisia Forest will be realized.

FAO KENYA

ACKNOWLEDGEMENT

This Participatory Forest Management Plan (PFMP) has been prepared through a participatory planning process involving several stakeholders, under the coordination of a Local Planning Team with representation from key stakeholders led by KFS, Samburu County Government and the local community through Kirisia/Leroghi Community Forest Association.

	We thank our main partner, the Kenya Forest Service led by the Chief Conservator of Forests, Mr. Julius Kamau, for bringing in an invaluable team of experts who included; Dr. Elizabeth Wambugu for her professional guidance during the entire PFMP preparation process, the FAO focal point person and the head PFM Ms. Anne Itubo for providing valuable technical assistance and guidance during the entire process of preparing this plan, the County Forest Conservator Samburu County, Mr. Charles Ochieng for guidance and coordination of the whole process; the able management plan officers Mr. John Rono, Dzimuji Kambarage and Nancy Karugi for their professionalism; the Forest Station Manager Mr. Popoti Lepamaral for his supervisory and technical information, and the surveyors Mr. Raymond Abok, Victoria Achieng and Paul Makenzi for working tirelessly in coordinating biophysical resource mapping.
	Preparation of PFMP was funded by the Global Environment Facility (GEF-5) through Food and Agriculture Organization of the United Nations Kenya (FAO). Special thanks go to the FAO Kenya representative Mr. Paul Kambaki Lalaikipiani, for the financial support and guidance.
	Our appreciation and gratitude are directed to the Samburu County Government of through the Environment officer, Mr. John Jamaica Lediipo who was always available whenever required and gave unequivocal support to the PFMP preparation process.
	We acknowledge the Kenya Wildlife Service (KWS) for positive contribution to the preparation of this plan through Mr. Wycliffe Bengo the deputy warden from county wildlife station.
	We express our gratitude to NEMA, for educating the community and participants about the different environment matters represented by Mr. Patrick P. Lekenit the Samburu County director.
	We are indebted to Kirisia/Leroghi CFA Executive Committee led by its Chairman and the entire Local Planning Team (LPT) for organizing and coordinating events relating to this plan and ensuring all allocated tasks were effectively delivered. The Kirisia/Leroghi forest adjacent community members who for providing information during the survey process, resource mapping and for providing a friendly environment during the plan preparation process.

Since it is not possible to mention each and every person or institution, we acknowledge all those who in one way or the other contributed to the preparation of this plan.

**Chairman,
Kirisia/Leroghi CFA.**

ACRONYMS AND ABBREVIATIONS

AWF	African Wildlife Foundation
CBD	Convention on Biological Diversity
CFA	Community Forest Association
CCF	Chief conservator of Foests
CIDP	Integrated Development and Plan
CITES	Convention on International Trade in Endangered Species
EIA	Environmental Impact Assessment
EMCA	Environmental Coordination and Management Act
FAO	Food & Agricultural Organization of the United Nations
FLMC	Forest Level Management Committee
FMA	Forest Management Agreement
FUGs	Forest User Groups
GEF	Global Environment Facility
GPS	Global Positioning System
KEFRI	Kenya Forest Research Institute
KFS	Kenya Forest Research Institute
KWS	Kenya Wildlife Service
KWTA	Kenya Water Towers Agency
LPT	Local Planning Team
MEAs	Multilateral Environmental Agreements
NEMA	National Environment Management Authority
NGAO	National Government Administration Officers
NMK	National Museum of Kenya
NWFP	Non-Wood Forest Products
PFM	Participatory Forest Management
REDD+	Reducing Emissions from Deforestation and Degradation
SCG	Samburu County Government
SDGs	Sustainable Development Goals

TIPs	Transition Implementation Plans
UNFCCC	United Nations Framework Convention on Climate Change
WRA	Water Resources Authority
WRUAs	Water Resource Users Associations

EXECUTIVE SUMMARY

Leroghi/Kirisia forest, more commonly known as Kirisia is a block of 91,944 hectares of gazetted forest reserve, located in the North West tip of Samburu County. Leroghi/Kirisia forest is an important national and international asset as an important habitat for wildlife, an essential water catchment for the neighbouring areas as it provides water to adjacent households, urban centres, livestock and wildlife found in thirteen ranches surrounding the forest. The Group Ranches are Barsaloi, Ngari, Lpartuk, Poro, Angatta-Nanyukie, Opiroi, Lkoloriti, Mbaringon, Lodojek, Noonkeek, Lbokoi and Shabaa.

This Participatory Forest Management Plan has been prepared for the purpose of guiding the management of Kirisia/Leroghi forest Reserve and surrounding areas. It was prepared through a consultative process led by Kenya Forest Service (KFS) as lead stakeholders and funded by Food and Agriculture Organization of the United Nations (FAO). The stakeholders included the forest adjacent communities under the auspices of three Forest blocks namely, Nailepunye, Naramat and Nkarro; line Samburu County Government, National Administration, Kenya Wildlife Service, Kenya Water Towers Agency, Kenya Forestry Research Institute, and National Environment Management Authority. The process entailed a thorough public sensitization at the grass-root level, formation of Local Planning Team (LPT) biophysical and socio-economic data collection and analysis and development of management programmes.

The PFMP envisions a Leroghi Forest that leads “in sustainable participatory management for the provision of ecosystem goods and services for the benefit of present and future generations”. The overall management goal is “to sustainably conserve, manage, restore Leroghi forest ecosystem for provision of goods and services to improve livelihoods for the community in Samburu County” In line with the vision and the overall management goal, several management programmes for each forest block have been designed to enhance the conservation of the forest on one hand and to improve community livelihoods. The programmes are;

- i. Forest Conservation and Management Programme,
- ii. Forest plantation and management programme,
- iii. Wildlife and Ecotourism Management Programme,
- iv. Water Resources Management Programme,
- v. Community Participation and Development management Programme,
- vi. Protection and Security management Programme,
- vii. Human Resources, Infrastructure and Equipment Development Management Programme
- viii. Research and Education Management Programme.

For each programme, the programme purpose, management issues, objectives and actions were formulated to guide the programme implementation. Formulation of the management programmes has taken cognizance of relevant institutional policies and legislation, Multilateral Environment Agreements (MEAs), the ecological and the diverse values of the forest, the socio-economic considerations of the area and the views and aspirations of the local communities. The programmes seek to build structures that promote involvement of key stakeholders in the management of Leroghi/Kirisia forest ecosystem.

A financial management mechanism will be prepared to enhance implementation of the Management Plan. The Forest Level Management Committee (FLMC) proposed in this plan should prepare participatory monitoring and evaluation for the plan implementation. At all

levels of planning, implementation, monitoring and evaluation, gender, equity and transparency should guide the plan.

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CHAPTER ONE

INTRODUCTION

1.1 Justification of the management plan

The Forest Conservation and Management Act No. 34 of 2016 has entrenched management plans as mandatory in management of public forests. Pursuant to the Constitution of Kenya, Chapter 5, Part 2 Article 69, public participation is inevitable in the management, protection and conservation of the environment. In forest management, this is operationalized under the participatory forest management requirement. It has been recognized that a forest reserve can be better managed through involvement of the forest adjacent communities and other stakeholders.

The objective of management plans is to enable natural resource managers, communities and other users to incorporate scientific approaches and indigenous knowledge in forest management. Consequently, the participatory management plans enhance forest conservation while supporting sustainable forest related livelihoods within rural communities.

1.2 Approach to plan preparation

Kirisia/Leroghi forest PFMP was prepared with support from Global Environment Facility (GEF-5) through FAO in partnership with the Kenya Forest Service (KFS). The process was based on participatory approaches and methodologies where key stakeholders were involved. The area covered by this management plan was identified as forest area on Kirisia/Leroghi as well as the intervention area within a radius of 5 Km.

In the year 2019 the CFAs prepared Kirisia/Leroghi ecosystem management plan covering the entire forest. In order to sign FMA between KFS and CFA, it was necessary to prepare the Kirisia/Leroghi PFMP which will act as proposal to seek support from strategic partners. This will improve forest management, conservation and sustainable utilization by the communities. The process to prepare these PFMPs was initiated through an inception meeting held at the Samburu guest house on 16th June 2021 (Plate 1).



Plate 1: Participants during a scoping workshop held at Samburu hotel on 16th June 2021

A number of sensitization barazas were held in various areas and places around the Forest that aimed at sensitization on PFM, CFA and PFMP (Plate 2, 3 & 4). It was from these barazas that a community representative's committee was selected from representatives from each forest Block. Out of the 30 CFA community representative's committee members, ten were selected from each block to form the Local planning team that would participate in the formation of the CFA and the preparation of the PFMP.



Plate 2: Elected LPT at Angata Nanyokie



Plate 3: Elected LPT members at Opiroi



Plate 4: Elected LPT members at Lorrok Lolmongo

Once the LPT had been duly elected, a workshop was organized from 15th to 16th at seasons hotel in Mararal town Samburu County so as to give them the basic training on PFM steps, techniques and tools generally used in the PFMP preparation process (Plate 5). These activities were encapsulated into four main objectives. These were;

- i. Training the LPT on PFMPs preparation,
- ii. Selection of villages for household surveys,
- iii. Identification of forest resourcesand,
- iv. Participatory resource mapping.



Plate 5: Ms Karugi presenting an overview of the PFM process

The participants were taken through the concepts of mapping and they were able to produce participatory resource maps. The LPT were then trained on the survey tools (household questionnaire and forest survey form) and how to use (Plate 6 & 7). Finally, a schedule was prepared where each LPT member was assigned duties to be undertaken during the forest resource mapping and household surveys.



Plate 6: participatory mapping by Nkarro LPT



Plate 7: Naramat LPT drafting the forest resources participatory map

The technical officers were incorporated into the various groups that would either conduct the household surveys or the forest resource mapping. The teams were given a briefs on the protocol to use to administer the household questionnaires and how to capture details in the forest resources survey form (Plate 8). Surveyors from the KFS took members through the use of the Global Positioning System (GPS).



Plate 8: KFS surveyors demonstrating the use of a GPS

Between 21st and 23rd September, 2022 the field exercises were conducted in the Forest Adjacent villages and in the Kirisia/Leroghi forest (Plate 9, 10, & 11).



Plate 9: The LPT mapping a proposed CFA community scouts' outpost



Plate 10: A LPT member administering a household survey interview



Plate 11; Resource mapping team at Ledoro view point

On 24th September 2021, the fieldwork teams convened at Seasons hotel, Maralal town, to have a recap of field experiences, discuss and agree on the way forward.

The forest teams and household survey teams presented their fieldwork experiences; positive and challenges faced. The participants were taken through the contents of a PFMP and given assignments based on the various chapters and sections of a PFMP.

Finally, a small team from the LPT (a sub-LPT), was selected to carry on with the task to prepare the Kirisia/Leroghi PFMP draft.

Preparation of the zero draft of Kirisia/Leroghi forest PFMP was done at Seasons hotel in Maralal town from 16th to 19th November 2021 (Plate 12, 13 & 14). This was a feedback workshop after data and information gathering from the field. The views of the workshop participants were incorporated in the draft plan and LPT tasked to provide more information where gaps had been identified.

During the workshop the LPT gave prescriptions of the management programmes which would address the issues identified in the conservation and utilization of Kirisia/Leroghi forest.



Plate 12: Participants drafting the management programmes on 17th November 2021 at Seasons hotel Mararal.



Plate 13: Dr. Wambugu giving inputs on how Water Resources Users Associations register and operate.



Plate 14: Participants drafting the management programmes for Naramat PFMP on 17th November 2021 at Seasons hotel Maralal-Samburu County

The sub-LPT cross-checked the various maps of the forest block, gave their views and made corrections where necessary (Plate 15). The edited maps were returned to the KFS surveyor to be updated based on the corrections made by the LPT.

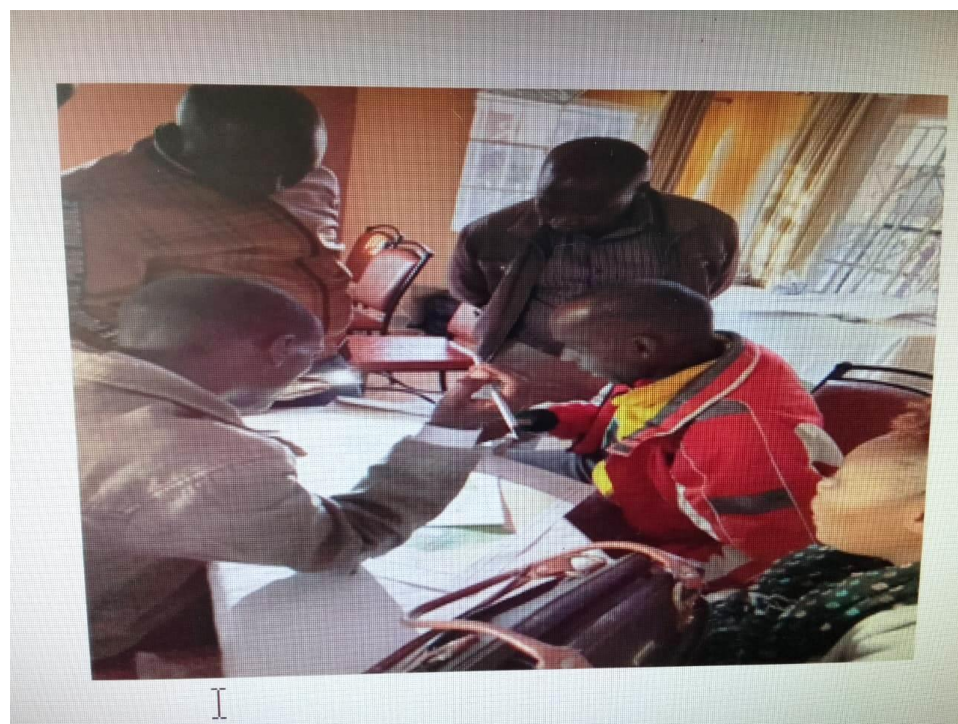


Plate 15: The LPT editing the maps and giving their recommendations

The zero draft presentation workshop took place between 28th February and 4th March 2022 at the Seasons guest house, Maralal Town (Plate 16).

The primary objective of the workshop was to present the zero draft to the LPT and other stakeholders. Their views were noted, incorporated into the zero draft to come up draft 1 (one) PFMP.



Plate 16: LPT during presentation of draft zero

A validation workshop was held in Maralal town Samburu county. During this workshop various stakeholders were invited to give their views on the Kirisia/Leroghi PFMP planned activities.

1.3 Title and duration of the plan

The plan shall be referred to as “**Kirisia/Leroghi Participatory Forest Management Plan 2023-2027**”, and it shall be implemented for five years 2023-2027 commencing from the date of approval.

1.4 Amendment/Revision of the Plan

The plan will be revised after five years but may be amended as need arises through mutual agreement by all the parties.

CHAPTER TWO

DESCRIPTION OF KIRISIA FOREST

2.1 Geographical location

Kirisia Forest is located in Samburu County, which borders Marsabit County to the North, Laikipia County to the South, Baringo County to the South-West and Turkana County to the West (Figure1). It comprises of three management units namely, Naramat, Nkarro and Nailepunyie. The forest reserve located to the North-West of Nairobi from where it can be accessed through Nairobi–Nyahururu–Mararal road which is about 360Km or through Nairobi – Nanyuki – Isiolo – Mararal road which is approximately 470Km. The forest reserve is surrounded by six group ranches, which are (Ledero, Lkiloriti, Mbarigon, Lodokejek, Nonkeek and Opiroi) within the following sublocations; Ledero, Baawa, Lkiloriti, Mbarigon, Lonkaitolia, Lodokejek, Nonkeek, Lchakwai, Lbukoi and Loltulelei.

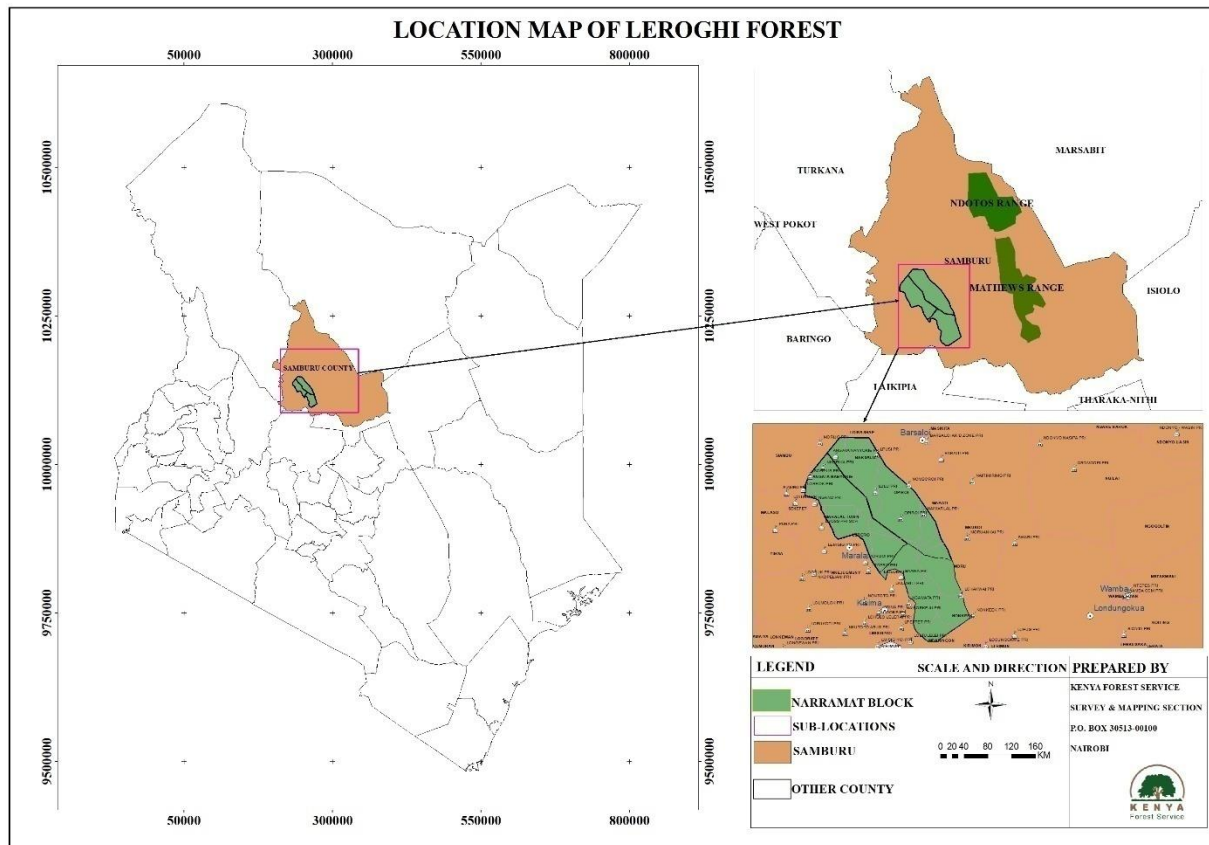


Figure 1: Location map of Kirisia/Leroghi Forest

2.2 Legal and administrative status

Kirisia Reserve is a gazetted forest that falls under the jurisdiction of the Kenya Forest Service (KFS) within the Ministry of Environment and Forestry. It is managed by Forest station Manager based at Maralal Town with support of the Kirisia Community Forest Association (CFA). Kenya Wildlife Service is also involved in the management of the forest reserve due to the wildlife found within and outside the forest. There is a KWS Station at Baawa valley and the Warden is

based in Maralal town. Leroghi/Kirisia forest was gazetted vide Proclamation No. 2 of 1936 and declared a Central Forest vide legal Notice No.174 of 1964.

In 2020, a resolution was passed to divide Kirisia into three management units namely Naramat, Nkarro and Nailepunyie. The management units would ease administration under one forest station manager in collaboration with the CFA.

2.3 Biophysical description of the forest

2.3.1 Climate

The forest lies between agro-ecological zone IV to VI. Temperatures range between 10°C – 30°C. It receives a bimodal rainfall in the range of 500 – 700mm per annum. The long rains are received between April-July whilst short rains are received between the months of October-December. Between these rainy periods, the area experiences dry spells, which at times turn into prolonged droughts.

2.3.2 Geology and soils

Granitoid gneiss makes up most of the Kirisia Forest with only part of the reserve consisting of an overlay of phenolites towards Losiolo (Losiolo phenolites). The grasslands of Northern Laikipia and onto the Leroghi plains which were formed of a great series of lava sheets, which flooded out from the Rift Valley Region, towards which the whole series thickens. Soils in the hills are of a gravelly granitic make up whereas on the lowlands to the South there is a mixture of black cotton and lateritic soil types.

2.3.3 Topography

The altitude of the forest area ranges between 1,273 to 2,625 Metres above sea level. The North facing side of the hills form steep slopes. The North/West section of the forest reserve ends close to the sheer drop, which makes up the East wall of the Great Rift Valley. The South/East side of the hills slopes gradually down to meet the shallow soil flats of Kirisia, which extend well into neighboring Laikipia County.

2.3.4 Hydrology

Kirisia Forest is an essential source of water for the adjacent forest communities, livestock and wildlife found in several ranches surrounding the forest. The general state of the forest has been dynamic and several changes for instance prolonged droughts and deforestation in the forest have greatly affected the catchment system. The hydrology of Kirisia is briefly described hereunder and illustrated in Table 1.

- i. Nailepunyie Block has three main rivers (Ngilai, Lulu and Naashuda) and several permanent and seasonal streams which all drain their waters into Ewaso Ng'iro River.
- ii. Nkarro forest block forms a water catchment area which is characterized by heavy rainfall and numerous rivers. These are; Nonkeek, Baawa, Lbukoi, Moru, Lolmoti and several streams.
- iii. Naramat has main river Seiya. Its tributaries include; Loikas, Yaimo, Tamiyoi and Loidongo'

All the rivers drain their waters into Ewaso Ng'iro river. Other water resources include boreholes and wells which are outside the forest.

Table 1: Hydrology of Kirisia Forest

Main River	Springs	Streams	Boreholes	Swamps	Villages served
Nailepunyie Block					
Ngilai	a) Nalua b) Sumunder c) Lasarmuna d) Ltungai e) Lchoroo-Lebarleta f) Lolgi	a) Naigolia b) Lolosowan c) Ltungai	a) Opiroi	a) Nampausi b) Nardea	a) Opiroi b) Ntepes c) Naimaral
Lulu	a) Latarakwai b) Ltirim	a) Sordon b) Lorrok c) Ndadapo d) Lemuny e) Lketiloni	a) Lorrok Lolmongo		a) Lorrok Lolmongo b) Tupua c) Lororoi d) Lekomom
Naashuda	a) Lempasash b) Loshoroi c) Lesaatia d) Lorobai	a) Lolpur b) Poro c) Peito d) Kesikei	a) Nkirenyei b) Nkorika c) Ntarakwai d) Soit Pus e) Angata	a) Sordon b) Naashuda	a) Nkirenye b) Nkorika c) Ntarakwai d) Soit Pus e) Angata f) Ngabai
Nkarro Block					
Nonkeek river	Lorokare Leporet Loideny Kikwal Lalmarigwet Ngabolo Moru Aibisi	Lorokare Lalmarigwet Ngabolo	Mpukani Lkiloriti Loruko Mporishoi Ngamata Lpetpet	Mpukani Lkiloriti Loruko Mporishoi Ngamata Lpetpet	Mpukani Loruko Mporishoi Ngamata Lpetpet
Baawa	Lgarwai Lbaa loltome Peto Ntimekije Lmasikirai Porokwa Kigiana		Leirr Baawa Ntim/Njangalo	Loruko Leirr Lkiloriti	Logui, Sirata , Loruko, Lesepetei Lkiloriti Leirr Lbonyiekie Ndikir
Lbukoi	Loirobi	Mparipari	Moruangai	Moruangai	Moruangai

Main River	Springs	Streams	Boreholes	Swamps	Villages served
	Ngorok Ndonyonaju Narde	Loirobi Narde			centre Lenyelenye Lailelai Soit Lturoto-owua
Moru	Reprep Lengadiyo Sigakwe Nalutu Longishu	Reprep Longewuau	Lchakwai	Lchakwai	Lchakwai Moru Kirapash
Lolmoti	Tulele Nontoroboni Lkweny Seepei Lolkono Mparpar	Tulele Mparpar			Nonkoiro Solt-ngiro Nosuchai Nonkeek
Noontoto	Lagarama Lolngeriyo Lolosowuan	Lagarama	Lchoro Rangau Leir-solar	Ledero Lchoro Rangau Leir	Lchoro Ngurumuan Naingolie Ledero Leir
Seiya	Rapa Longishu Derei	Rapa	Morijoi	Morijoi	Lkaserurai Loltulelei Lkichaki
Naramat Block					
Seiya	Loikas, Yaimo, Tamiyoi, Loidongo	Nkonyek, Lonyonyi, Eloikas	Nkorika, Shabaa, Morijoi	Lpartuk, shabaa	Maralal, Angata Nanyoike

The hydrology map below (figure 2) shows all the rivers in Kirisia/Leroghi forest

2.4 Biodiversity description

2.4.2 Flora

The forest ecosystem consists of various vegetation types. Human activities over a period of time has degraded a large portion of the Kirisia forest reserve area. The Table 2 below shows the vegetation analysis of the Kirisia forest ecosystem including the degraded areas which requires rehabilitation.

Table 2: Vegetation cover and other areas in Kirisia Forest

Vegetation type	Natural forest	Bushland	Degraded area	Plantation	Bamboo	Glades	Total
Area (Ha)	59,000	10,000	22,184.4	124	1,000	1,026	91,944.4
Proportion (%)	64.2	11	23	0.2	1.0	1.2	100

Those vegetation associations are briefly described hereunder;

a) Natural Forest

Kirisia Forest harbors a rich floral biodiversity range with vegetation that changes with altitude. Some of the dominant tree species that provide a good percentage of the vegetation in the forest vary, and include, *Afrocarpus falcatus*, (*Lpiripiriti*, Sam), *Juniperus procera* (*Ltarakwai*, Sam), *Olea africana* (*Lorien*, Sam), *Olea capensis* (*Loliontoi*, Sam), *Euclea divinorum* (*Lchingei*, Sam), *Rhamnus prinoides* (*Lkinyil*, Sam), *Rhamnus staddo* (*Lkokulai*, Sam), *Toddalia asiatica* (*Parmunyo*, Sam), *Rothea myricoides*, (*Lmakutikuti*, Sam), *Carissa spinarum*, (*Lamuriai*, Sam), *Croton megalocarpus*, (*Lmargweti*, Sam), *Acacia tortilis*, (*Ltepes*, Sam), *Balanites aegyptiaca*, (*Sarai*, Sam), *Acacia mellifera*, (*Iti*, Sam), *Acacia drepanolobium*, (*Luai*, Sam), *Rhus natalensis*, (*Lmisigiyoi*, Sam), *Acacia seyal*, (*Liarai*, Sam), among many others.

A full list of all the plant species in Kirisia forest reserve are in Annex 4.

b) Forest plantations

The earliest plantations of Eucalyptus species, *Pinus radiata*, *Pinus patula* were planted in the Angata Nanyokie area in the 1940's.

Currently forest plantations occupy an area of 127Ha at Porro comprising of *Cupressus lusitanica* and Eucalyptus species, while 23 Ha of the plantation area is unstocked. In addition, 140 Ha of grassland in the forest at Porro was identified as suitable for forest plantation development.

Felling plans have been prepared and approved in Maralal Forest Plantation Management Plan (2015-2025). The forest plantations are strategically located to provide the much-needed woody biomass to the fast-growing population in Maralal town and its environs. Table 3 shows the plantation tree species in Kirisia Forest reserve.

Table 3: Tree species in Plantation areas in Kirisia Forest

Species	Total area (Ha)	Management category
<i>Cuppressus lusitanica</i>	19.7	Sawn timber
<i>Eucalypts</i>	72.0	Poles and fuel wood
Mixed stand of <i>Eucalypts</i> and <i>Acacia mearnsii</i>	9.30	Fuel wood
Unstocked	23.0	No defined management category
Total	124.0	

2.4.2 Fauna

The forest is an important habitat for wildlife including elephant (Ltome), buffalo (Losouwan), bushbuck (Mpua), bush pig (Lguiya), giant forest hog (Lguiya), warthog (Lbitir), lion (Lngatuny), leopard (Lowuorukeri), water buck (Nchalanguthe) and wild dog (Suyian). The birds and insects are well represented including Hartlaub stouraco (Ngeuwa) possibly the most dominant species in the forest as well as Red eyed dove (Ldapdap) which mostly occurs in forest, Augar Buzzard (Lmagiro), sunbirds and lilaca roller (Lmoila).

The forest ecosystem is a habitat for nationally listed endangered species e.g., Elephants, Grevey zebra, African wild dogs, several species of cats like lions, cheetahs, spotted hyenas, Leopards, Giant Forest hogs. Some wildlife is classified as vulnerable species such as golden cats, elephant shrews and stripped hyenas which are currently very rare.

The forest is designated as an IBA with birds that are categorized as critically endangered, vulnerable, near threatened and protected species like ostrich, secretary bird, francolins, species of eagles, vultures and owls. Other animals of importance include reptiles e.g., gecko, silver back jacal, lizards and snakes.

To enhance wildlife conservation, wildlife migratory conservation corridors have been established which are as follows;

1. Kirisia forest-Nkoteiya conservancy-Kirimon National reserve corridor
2. Kirisia forest-Lpartuk to Seketet corridor
3. Kirisia forest -Maralal National sanctuary corridor
4. Kirisia forest- Maibae-Wasonyiro –West Gate-Samburu National reserve or Wasonyiro-Loisaba -Kirimon- Ol donyiro corridor
5. Kirisia-Ndots/Mathews ranges Namunyak conservancy

Wildlife species hide in small bushes within the community land and invade farms both during the day and at night. The community members suspect some tree species attract wildlife species when flowering e.g. “*Murinjo*” leading to the area being considered as a wildlife conflict hotspot.

During elephant migrations, farmers lose most of their farm produce. However, the residents continue to encroach the forest by clearing farms, settlements and livestock incursions. KWS

ranks the area as number one conflict spot in Samburu County. A problem animal control unit has been set up by KWS, Maralal to deal with the conflict issues. These human/wildlife conflicts are confirmed by the presence of elephant's dung and footprints, which are spotted along the narrow section of the corridor by the roadside.

The area from Kirisia forest reserve through Seiya River to Lokojek group ranch, Nkoteiya conservancy, to Kirimon town centre, Surandura market is a human-wildlife conflict hotspot. Residents are known to observe a curfew at night due to elephant presence. Human-elephant conflicts are over water and grazing. Spearing of elephants is a common problem and more watering points are required to reduce contacts between elephants and people. Livestock predation is a common challenge along the corridor. A predator proof "Bomas" for livestock protection from carnivores were demonstrated in the area but the uptake was poor. Several incidents are still being reported particularly from leopards and hyenas.

2.5 Other resources in Kirisia Forest Reserve

2.5.1 Non-timber forest products

The forest is rich non-wood forest resources. The community depends on the forests for these resources to support local livelihoods as highlighted below.

- Forest grazing
- Cultural ceremonies
- Traditional shrines found at Kisima, Baawa
- Religious shrines found at Losigakwe
- Honey
- Collection of wildlings or seeds used in community tree nurseries establishment
- Wild fruits, fern, nuts and berries used as food
- Medicinal herbs for curing various diseases and ailments in both human beings and livestock
- Salty water for stomach upsets
- Tree nurseries

2.5.2 Ecotourism

The forest provides pristine sites that attract could tourism. Tourism in the general Kirisia area has dropped in the last 20 years entirely due to insecurity on the road whereby gun-toting bandits stop vehicles often killing passengers, traders and any unfortunate traveller going to the North.

A few intrepid safari operators like Kimbla pass through the area en-route to Lake Turkana stopping mainly in the Pororr/Malaso areas. There is not much local interest in tourism since there have been little or no benefits. There is enormous potential for low footprint camping/hiking safaris in the forest.

Most of the potential tourist sites are located and distributed in all mangement unitsof the forest. This is illustrated in Table 4.

Table 4: Ecotourism sites in Nkarro Block

Specific name	Resource name	Status			Current or potential utilization	
Nkarro						
Baawa	Water springs, Elephants and Buffaloes	Open grassland, water springs			Camp site and recreation activities	
Nankarro	Caves and water falls	Rocks			Recreation activities	
Peto	Elephants, Buffaloes, Lions and Leopards	Open glades and water pools			Camps and recreation activities	
Ndonyio naju	Land scape view and wildlife.	Cliff			Recreation activities and camp site	
Ngabolo	Forest, wildlife and birds view,	Rock			Recreation activities and camp sites	
Lesarara	Elephants, Buffaloes, Elands and Lions	Open grassland			Camp sites	
Lolmargwet	Elephants, Buffaloes, Water bucks	Open Glades and Salt links			Picnic sites	
Lolkujita	Lions, Elephants, Buffaloes Elands	Open Glades and Rock			Camp site	
Rep-rep	Land scape viewing and Forest	Rock			Recreation activities	
Rapan	Elephants, Lions and Leopards	Open Grassland			Camp sites	
Muatat	Shrine	Hill top			Worshiping place	
Naramat						
Tamiyoi	Caves, Salt lick	Undeveloped			None	
Nailepunye						
Campsites	Unique sites	Waterfalls	Caves	Viewpoints	Picnic sites	Shrines
Lolтийani	Natural banana at	Ngilai	Naalaram	Lolтийani	Saanata	Reteti Loolkera

Specific name	Resource name	Status			Current or potential utilization	
	Ngilai					(Jesus' foot on the rock)
Barno	Rock climbing at Loltiyan	Kiyaitio	Lemuny	Lowua Oibor	Loltiyan	Loomunyi
Suen	Natural swimming pool at Ngilai River	Lasarmai	Nosulubei	Leshingetia	Ngilai	Loltiyan "Soit ya Ngai/ Nyumba ya mungu"
	Natural swimming pool at Ndadapo	Lulu	Nolwerikoi	Barno	Minchominyi	
			Ltirim	Soit Pus	Suen	
			Langata Mugie	Loole	Loosipa	

2.5.3 Infrastructure and equipment

The forest station has a variety of infrastructure and equipment, which help in the day-to-day operations as shown in Table 5. The infrastructure status at Nailepunye, Naramat, Nkarro block are as shown in Figure 3(Leroghi/Kirisia forest infrastructure).

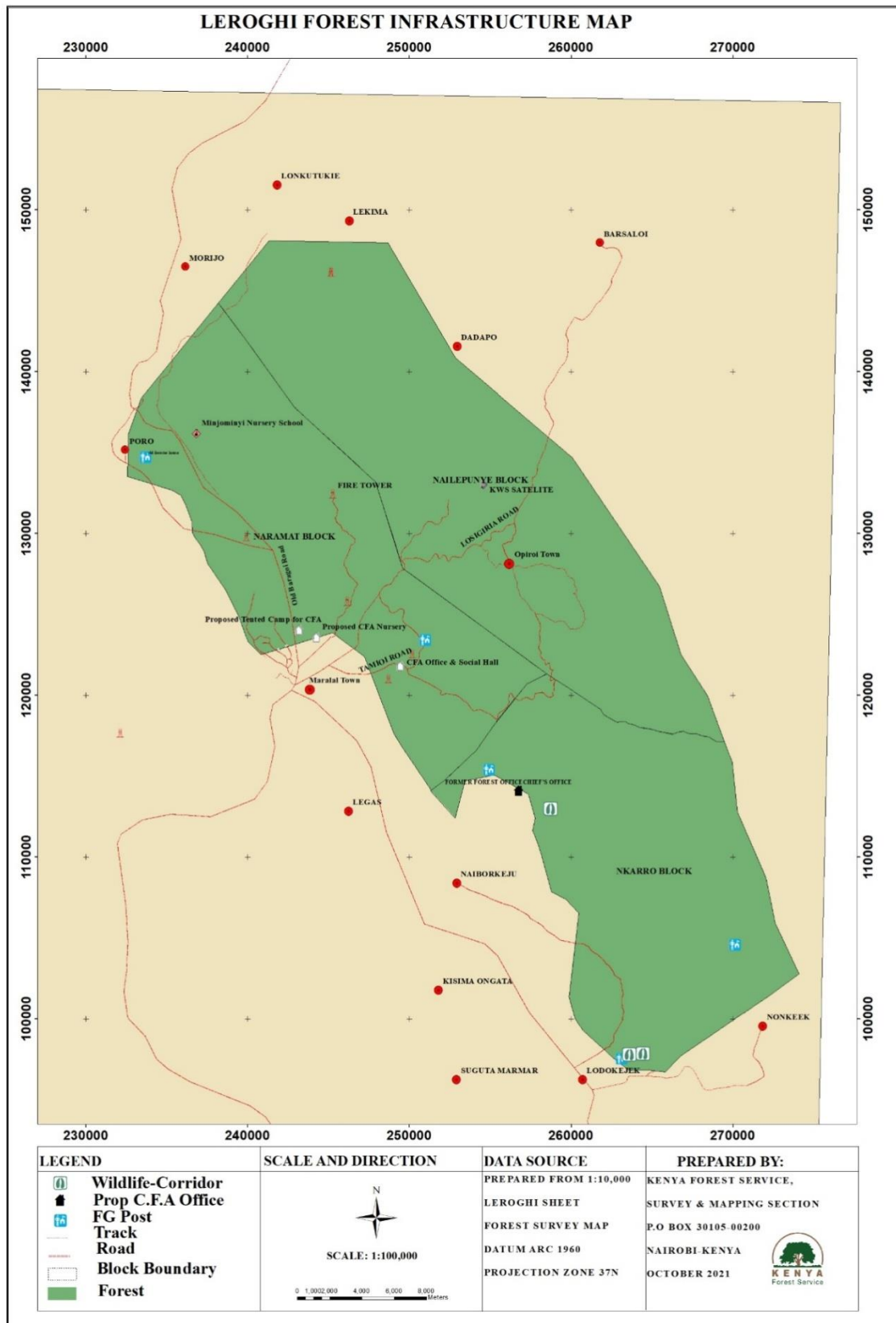


Figure 3: Infrastructure map of Kirisia/Leroghi

Table 5: Infrastructure status at Nailepunye, Naramat and Nkaro

Resource Type	Description	Unit	Quantity	Status
Nailepunye				
Access Road	Around the Forest and 1 access road	Kms	150	In poor condition
Forest scouts	Personnel to guard the forest	No	20	No active scouts
Scout outposts	These are on the forest edge in the old scout places (Ngilai and Mbarnoi)	No	3	Totally damaged
Tree Nurseries	Within the outpost areas as they have access to water. Easier distribution	No.	3	Functional. Low stocking rates
Shade net		No	3	Required
Potting bags		No	20,000	Required
Trays		No	600	Required
Fencing	Fencing Material	No	1	Required
Vehicle	1 Land cruiser	No	1	Required
Motor Bikes	2 One for each post	No	6	Required
Equipment				
Communication	Cell phones (5), Radio (10), Radio booster (1)	NNo	20	Required
Monitoring	Smart Phones, GPS (5), Binoculars (5)	No	20	Required
Camping				
Tents		No	6	Required
Sleeping Bags		No	20	Required
Uniform		No	40	Required
Naramat				
Access Road	Around the Forest and 1 access road	Km	200	In poor condition
Forest scouts	Personnel to guard the forest		20	No active scouts
Scout outposts	These are on the forest edge in the old scout places (Tamioyi and Supar)	No	3	Totally damaged
Tree Nurseries	Within the outpost areas as they have access to water. Easier distribution	No	4	Required
Shade net		No	4	
Potting bags		No	80,000	
Trays		No	800	
Fencing	Fencing Material	No		
Vehicle	1 Land cruiser	No	1	

Motor Bikes	2 One for each post	No	8	
Equipment				
Communication	Cell phones (5), Radio (10), Radio booster (1)	No	20	
Monitoring	Smart Phones, GPS (5), Binoculars (5)	No	20	
Camping				
Tents		No	6	
Sleeping Bags		No	20	
Uniform		No	40	
Nkarro				
Access Road	Around the Forest and 1 access road	KMS	150	In poor condition
Forest scouts	Personnel to guard the forest		20	No active scouts
Scout outposts	These are on the forest edge in the old scout places (Lower Moru and Baawa)	No	3	Totally damaged
Tree Nurseries	Within the outpost areas as they have access to water. Easier distribution	No	3	None
Shade net		No	3	
Potting bags		No	60,000	
Trays		No	600	
Fencing	Fencing Material	No	1	None
Vehicle	1 Land cruiser	No	1	
Motor Bikes	2 One for each post	No	6	
Equipment				
Communication	Cell phones (5), Radio (10), Radio booster (1)	No	20	
Monitoring	Smart Phones, GPS (5), Binoculars (5)	No	20	
Camping				
Tents			6	
Sleeping Bags			20	
Uniform			40	

2.5.4 Human resources

Kirisia Forest reserve has few staff to undertake the planned activities. Human resource is very key during implementation. The staffing situation currently and the optimum requirements is as shown in Table 6.

Table 6: Human resources from various institutions manning Kirisia Forest

Institution	Designation	Current	Optimum No.	Variant
KFS	Forest Manager	1	1	-0
	Ass. Forest Manager	1	3	-2
	Forest rangers	8	30	-22
	Drivers	0	3	-3
	Clerks	1	1	0
	Support staff	2	20	-18
Total		13	58	-45
KWS	Senior Warden	1	1	0
	Deputy Warden	0	1	-1
	Community Warden	0	1	-1
	Problem Animal Control (PAC) Team	12	34	-22
	Drivers	3	4	-1
	Support staff	5	7	-2
Total		21	48	-27
County	Rangers	27	100	-73
	Accountant	1	3	-2
	Senior Ranger 1	1	3	-2
	Conservancy Manager	1	3	-2
	Sub-county coordinator	1	1	0
	Driver	2	2	0
Total		33	112	-79
Community				
CFA	Chairperson	1	1	0
	Secretary	1	1	0
	Treasurer	1	1	
WRUAs	Chairperson	0	1	-1
	Secretary	0	1	-1
	Treasurer	0	1	-1
Scouts	Nailepunye	0	20	-20
	Nkaro	0	20	-20
	Naramat	0	20	-20
Tour Guides/Porters	Nailepunye	0	5	-5
	Nkaro	0	5	-5
	Naramat	0	5	-5
Total		6	93	-87

2.6 The Forest Adjacent Community (FAC)

The main community residing in the Kirisia FAC are from the Samburu tribe. The Samburu are sometimes referred to as 'The Butterfly People' due to their colourful ornaments, attire and

hairstyles. Closely related to the Maasai community, the Samburu have distinct cultures, traditions and rituals. Ethnically, the Samburu are plain Nilotes, a super linguistic branch of the “maa” peoples. These are: masaai, Lshamus, Sampur and Laikipiak. Historically, they settled in Kenya centuries ago from “woto” (the north). The Samburu are believed to have reached Kenya between four and five centuries ago with other Nilotic groups walking south from the Horn of Africa where they settled in the northern areas of Kenya (whilst the Maasai drifted south and settled in a belt stretching from Maasai Mara to Arusha).

2.7 Historical and Cultural Importance of Kirisia Forest

The name Nkarro means a female buffalo which used to dominate the area. In the year 1992 due to multipartism political issues the forest was destroyed and the situation was further worsened by the 1996 Masacre where the communities run into the forest for settlements and security. Although they settled in the grassland area this contributed to forest destruction because they relied on the forest products for provision of their livelihoods. However, since the intervention of FAO to support the CFA the forest has been regenerating.

To curb illegal activities in the forest community scouts have been assisting in forest protection and they were provided with uniforms by Young Trust.

The forest also faces the challenges of drought, logging of poles and illegal mining. The drought leads to hunger which affects the capacity of the community scouts in forest protection. To support their efforts, the County government has supported the CFA with funds and food. The illegal activities are largely contributed by the access roads across the forest. The issues therefore can be addressed by erecting fence around the forest and use designated gates to access the forest.

2.8 The Kirisia CFA formation process

Kirisia CFA was formed back then in 2010. For effective management in 2018, the forest resource management stakeholders agreed to divide the forest into three. A number of sensitization barazas were held in various areas and places around the Forest that aimed at sensitization on PFM, CFAs and PFMPs. It was from these barazas that an ad-hoc committee was selected from representatives from each forest Block. This is illustrated in Table 7.

Table 7: Election of Community representatives (Ad –Hoc committee)

Date	Site/area	Location	Sub-Location	Area/Villages Represented	Name of Representative (S)
2/4/18	Lpartuk	Maralal	Lpartuk	Lgos, Lakira, Ngano, Noomotio	Maria Lolkumeni, Jackton Letowon, Kitiko Lemasagarai, Loitaras Lekolol, Loponi Lenyarua
3/4/18	Shabaa	Maralal	Shabaa	Soitpus, Sirai, Loidongo, Shabaa	Lentuk Lenomotina, Mark Lepasuge, Ljenesi Lekupe, Eltore Leagile, Nosurum Leshornai
3/4/18	Ngari	Maralal	Ngari	Tamiyoi, Ngari,	Charles Lolkididi, Meriyan

Date	Site/area	Location	Sub-Location	Area/Villages Represented	Name of Representative (S)
				Morijoi, Lokuto, Kulapesa	Loldepe, Pitali Lekalantula, Lenkopiya Lekerpees, Douglas Leboyare
4/4/18	Ledero	Maralal	Ledero	Aban, Lchoro, Nkiloriti, Ledero	Anis Lekarsia, Geoffrey Lelesengei, Lewajelo Lentiyo, Paranes Lesosio, Alice Lolkulo
4/4/18	Baawa	Baawa	Nkiloriti	Baawa, Nkiloriti, Leirr	Lyson Lolowas, Pilot D. Lekondonyo, Michael Lekimargo, William Lekaldero, Kantiri Lematambash
4/4/18	Lodokejek	Lodokejek	Noonkeek	Lodokejek, Naiborkeju, Noonkeek	Lenamarker Lmelilan, Stephen Lentiwas, Karanton Lemurunya, Charles Lemangwa, Yitaa Leilato
5/4/18	Noonkeek	Lodokejek	Noonkeek	Noonkeek, Raragon, Nosushai, Lolua, Lchakuai, Moru, Kirapash	John Lekula, Ldimasta Lolkoki, Letipis Lengoyo, Jentina Lempei, Kulalo Lekimaroro
16/8/18	Opiroi	Opiroi	Opiroi	Lorok, Ngilai, Ntapes, Lorian, Loltiani, Opiroi	Johnbosco Lolopeta, Charles Lenguro, James Lekiyai, James Lenguro, Margaret Spankan

From the ad-hoc committee, barazas were held to select representatives from the three Blocks that would form the three 'mini' CFAs. Out of the 30 CFA ad-hoc committee members, ten were selected from each block to form the core planning team that would participate in the formation of the CFA and the preparation of the PFMP. This is illustrated in Table 8.

Table 8: Selection of the 10 out of 30 ad-hoc committee members

Date	CFA	Location	Sub-Location	Area/Villages Represented	Name of Representative (s)
25/9/18	Nkarro	Maralal	Maralal	Noonkeek, Lodokejek, Mbaringon, Lkiloriti, Ledero, Baawa	John Lekula, Ldimaster Lolkoki, Jentina Lempei, Letipis Lengoyo, William Lekaldero, Pilot Lekodonyo, Laision Lolowas, Kantiri Lematampash, Anis Lekarsia, Geoffrey Lesengei
	Naramat	Maralal	Maralal	Morijoi, Ngari, Tamiyoi,	Jackson Letowon, Lophonu Lenyarua, Maria Lolkumeni,

Date	CFA	Location	Sub-Location	Area/Villages Represented	Name of Representative (s)
				Shabaa, Agumai, Milimani, Mutaro, Lpartuk, Lakira, Ngano	Dauglas Leboyare, Richard Leslampa, Ljenesi Lekupe, Pitali Lekalantula, John Nkutat Lelesit, Antonella Leseakono, Elizabeth Loldepe
	Nailepunye	Maralal	Maralal	Opiroi, Ngilai, Lorok Lolmongo, Bakita, Naimaral, Oolbitiro, Sunoni, Angata Nanyekie, Ngirenyi, Lulu	Jame Lenguro, Bosco Lolopeta, Lpilian Leparsaiyia, Charles Lenguro, Kereto Lelemusi, Dinkisa Lolkipayangi, Lpetina Lekeete, Person Lekasuiyan, Naanu Lekeete, J Osephine Leleshep

Subsequently, barazas to elect the ‘mini’ CFA officials in were held in various sites in each Block as shown in Table 9.

Table 9: CFA election barazas

Date	Site	CFA	Location	Sub-location	Area/Ranch Represented	Name of Representative	Position held
13/5/19	Suen dam	Nailepunye	Opiroi	Opiroi	Opiroi	James Lenguro	Chairman
			Opiroi	Lorrok-lolomong	Lorrok-Lolcmongo	Sarafina Lekaite	Secretary
			Opiroi	Angata nanyukie	Nkorika	Josephine Leleshep	Treasure
			Opiroi	Angata nanyukie	Angata Nanyukie	Peterson Lekasuyian	Vice-Chairman
			Opiroi	Lorrok-lolomong	Ngilai	Charles Lenguro	Vice-secretary
14/5/19	Naiborkeju	Nkarro	Opiroi	Baawa	Baawa	Lentaaya Robert	Chairman
			Moru	Lbukoi	Noonkeek	John Lekula	Vice chairman
			Maralal	Ngari	Lendero	Joseph Lelesenge	Treasurer
			Lodokoje	Noonkee	Mbaringon	Geoffrey	secretar

Date	Site	CFA	Location	Sub-location	Area/Ranch Represented	Name of Representative	Position held
			k	k		Lekuchula	y
			Lodokoje k	Naiborkej u	Lodokejek	Josphine Lepariyio	Vice secretary
15/5/19	Allamano	Naramat	Maralal	Ngari	Ngari	Douglas Leboiyare	Chairman
			Maralal	Ngari	Shabaa	Lazarus Lekupe	Secretary
			Maralal	Town	Milimani	Antonella Leseekuno	Vice Secretary
			Porro	Porokwa	Ngano	Jackson Letewon	Vice Chairman
			Maralal	Lpartuk	Lpartuk	Gladys Lenyarua	Treasurer

A series of barazas were then held to sensitize the community on the importance of having a management plan for Kirisia Forest as highlighted in Table 10.

Table 10: Sensitization barazas on Kirisia management plan

Date	Site/area	CFA	Venue
Tuesday 11/6/2019	Noonkeek	Nkarro	Lchakuai
Thursday 13/6/2019	Baawa Ledero Lkiloriti		Ndikir
Friday 14/6/2019	Lodokoje k Mbarinkon Naiborkeju		Kiangok
Tuesday 11/6/2019	Nkorika	Nailepunye	Nkorika Primary school
Thursday 13/6/2019	NdikiElgwesi		Opiroi
Friday 14/6/2019	Lakamoru		Loltulelei nursery
Monday 10/6/2019	Sagumai Milimani Mtaru	Naramat	Ndikir Sagumai
Tuesday 12/6/2019	Poru Lakira		Ngano

Date	Site/area	CFA	Venue
	Ngano		
Tuesday 12/6/2019	Lpartuk 1 Lpartuk 2 LGOS		Compassion
Wednesday 13/6/2019	Shabaa		Nkupuruti
Wednesday 13/6/2019	Ngari Morjoi Tamiyoi		Nkupuruti ya Ngari

This was followed by application for registration by the three CFAs to the Registrar of Societies. The subdivision and boundaries of the forest ecosystem into 3 management units formed the basis of the three CFAs formation (Plate 17).



Plate 17: Unveiling of Naramat, Nailepunyie and Nkarro CFA leaders and constitutions

On May 2022, community representatives held a consultative meeting and they unanimously decided to have one CFA in the interest of fostering unity in the Kirisia FAC. The three CFAs were deregistered and one new CFA was formed under the name Kirisia. The Kirisia CFA has the various forest user groups as illustrated in Table 11.

Table 11: Forest user groups in Kirisia/Leroghi forest

No.	User group	Activity/ interest	No. of members	Male	Female	Contact person	Tel. No.
Nailepunyie Block							
1.	Opiroi bee keepers	Bee keeping	30	20	10	Philip Leswakeri	0703738239
2.	Opiroi grazing	Grazing management	70	50	20	Belion Leparsaua	
3.	Opiroi tree nursery	Nursery management	70	10	60		
4.	Lulu bee	Bee keeping	50	25	25	Christin	0719845632

No.	User group	Activity/ interest	No. of members	Male	Female	Contact person	Tel. No.
	keepers					Leleshep	
5.	Lulu grazing group	Grass management	80	70	10	Tookoi Lekeete	0707459187
6.	Lulu tree nursery	Tree nursery management	50	10	40		
7.	Lolitiyani eco-tourism	Vulture eco- tourism	30	20	10	James Lenguro	0724953021
8.	Aloe vera	Aloe vera management	30		30	Monica Leswakeri	0717246421
9.	Sweet potatoes	Sweet potato management	25	10	15	Sakiyo Lekirapiti	
10.	Saramat poultry	Poultry management	20	1	19	William Lenguro	0714872916
11.	Ltongai farm	Vegetables/ tomatoes management	28	15	13	Salena Lempee	0725636600
12.	Lorrok – Lolmongo grazing	Grazing management					
13.	Ngilai grazing	Grazing management	20	16	4	Saoka Lenolti	
14.	Naimaral grazing	Grazing management	35	17	18	Kereto Lelemusi	0706048649
15.	Ndoldol tree nursery	Tree nursery management	45	29	16	Geoffrey Lekarika	0724652141
16.	Saanata bee keepers	Bee keepers	30	20	10	William Leleshep	0724679430
17.	Barnoi grazing	Grazing	30	20	10	Philip Lohmareny	0723165079
18.	Pereito grazing	Grazing	25	20	5	Juma Lemunen	0726939832
19.	Mtarakwai grazing	Grazing	30	27	3	Taloim Lentumunai	0712478571
20.	Barno eco- tourism	Eco-tourism	40	25	15	Jackson Lekasuyan	
21.	Silango bamboo	Bamboo plantations	35	20	15	Zakayo Lekasuyan	07269333056
22.	Narapunamat poultry keeping	Poultry keeping	18	3	15	Marino Lolmarey	0710875460
23.	Naramat tree nursery	Tree nursery	28	17	11	Jackson Lolmarey	0769891982
24.	Sapai farmers	Farming	40	30	10	Ltano Lepana	0731084437

No.	User group	Activity/ interest	No. of members	Male	Female	Contact person	Tel. No.
25.	Nkabaai farmers	Farming	60	40	20	Lemayian Leaidamaa	0700605715
26.	Namayiana bee keepers	Bee keeping	27	14	13	Lengoiboni	0715511929
27.	Minshominyi grazing	Grazing	15	13	2	Sitoti Lempokpok	0706254424
Nkarro							
28.	User Groups	Activity Interest	No. Of Members	Male	Female	Youth	Contact No
29.	Nature Trails	Eco-Tourism	28	10	8	8	0723514691
30.	Nalepo	Poultry/ Tree Nursret	22	5	17		0727050778
31.	Beco	Tree Nusery	23	7	12	4	0726284895
32.	Ngamata Namelok	Tree Nursery	16	4	10	2	0726071314
33.	Lemoru	Bee keeping	17		17		0703831496
34.	Baawa Bee Keepers	Bee Keeping	17	11	6		0716393579
35.	Lollkujita	Tree nursery/ poultry	30	19	11		0784108291
	Lolmairo	poultry	14	3	7	4	0712691731
36.	Nalepo breeders	Bee keeping	2	1	1		0714938594
37.	Nchangalo Group	Craft carving	8	8			0727373928
38.	Leboma bee keepers	Bee keeping	22		17	5	0753746912
39.	Ririoi Keepers	Bee keeping	9	6	3		07119343004
40.	Lenkirsan	Sand harvest	12	3	9		0753377776
41.	Reten	Sand harvest	19	11	8		0711934304
42.	Ledero	Grazing	14	13	1		0742378820
43.	Baawa	Grazing	11	11			0700412661
44.	Lkiloriti	Grazing	11`	11			0743222998
45.	Mbaringon	Grazing	14	14			0791520374
46.	Lonkaitolia	Grazing	15	15			0713027009
47.	Lodokejek	Grazing	14	14			0723520853
48.	Nonkek	Grazing	12	12			0743337054
49.	Lchakwai	Grazing	15	15			0799638298
50.	Lbukoi	Grazing	15	15			0703297033
51.	Naretoi	TreeNursery	13	10	3		0717803877

No.	User group	Activity/ interest	No. of members	Male	Female	Contact person	Tel. No.
52.	Miyai	Poultry	10	1	9		0704063267
53.	Loruko	Fuel wood	12	12			0723962832
54.	Kjisima group	Aloe vera	25	6	9	10	072090644

CHAPTER THREE A

SOCIOECONOMIC STATUS

3.1 NKARRO FOREST MANAGEMENT UNIT

3.1.1 Overview

Data was collected through use of semi-structured questionnaires by systematic random sampling method. The questionnaires were administered to the head of a household or an adult member where the head was not available (A household consists of people who have lived in the same compound and have shared food cooked in the same pot for the last 12 months).

Results of 93 questionnaires were coded and analyzed to generate socio-economic information for Nkarro block forest adjacent communities.

- **Distribution of questionnaires**

Nkarro forest block community comprise people living around and interacting with the forest for a maximum of 5 km radius from the forest boundary. Administratively, the communities reside in 5 locations namely MaralalBaawaKisimaLbulkoi and Lodokejek Chepchoina as presented in Table 12.

Table 12: Distribution of questionnaires

Location	Sub-location	Frequency	Percent (%)
Maralal	Ledero	13	14
Baawa	Baawa	12	13
	Lkuloriti	11	12
Kisima	Mbarigon	6	6
	Lankaitolia	8	9
Lbulkoi	Lodokejek	9	10
	Noonkeek	5	5
Lodokejek	Lchakwai	5	5
	Moru	24	26
Total	10	93	100

According to the 2019 census (Table 13) total population in the ten sublocations adjacent to block was approximately 55,600, male were 22,000 (40%) and female were 33,600 (60%).

Table 13: Population distribution in Nkarro block adjacent communities

Location	Sub-location	Male	Female	Total	Total Households	Area (km ²)	Density (persons/km ²)
Mararal town	Ledero	2,000	3,000	5,000	400	9	556
Baawa	Baawa	6,000	8,000	14,000	800	12	1166

Location	Sub-location	Male	Female	Total	Total Households	Area (km ²)	Density (persons/km ²)
	Lkuloriti	1,000	1,500	2,500	300	10	250
Kisima	Mbarigon	3,000	6,000	9,000	600	10	900
	Lankaitolia	600	800	1,400	300	7	200
Lodokejek	Lodokejek	6,000	9,000	15,000	900	15	1000
	Noonkeek	2,000	3,000	5,000	700	13	70
Lbukoi	Lchakwai	800	1500	2,300	350	15	154
	Moru	600	800	1400	250	10	140
		22,000	33,600	55,600	4600	101	551

3.1.2 Demographic profile of the respondents

- Gender of the respondents**

Most (73%) of the respondents were females while 27% were males (Figure 4). Most men leave the household in the morning and either takes their livestock in the forest to graze or to goes work. Women are usually left behind to take care of the family and children. This shows little involvement of women in decision making. Continuous awareness creation is necessary to sensitize the community on the role of women in the society.

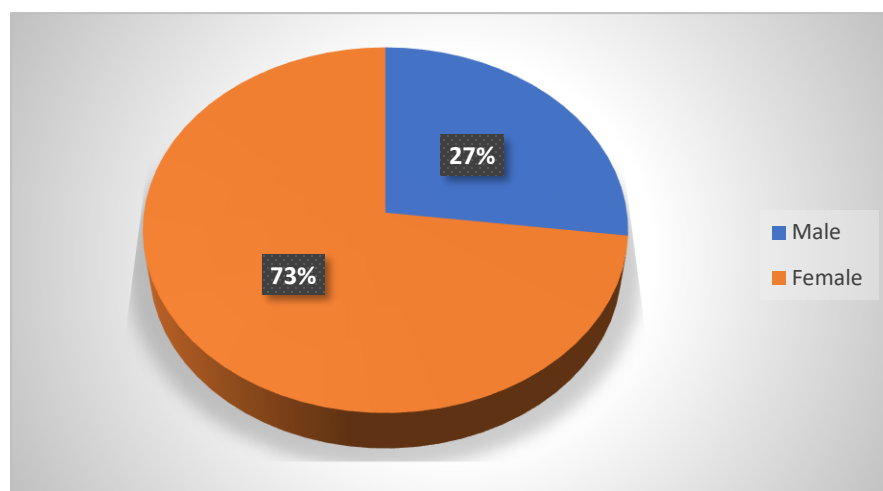


Figure 4: Gender of the respondents

- Age of the respondents**

Forty-two percent of the respondents aged between 36-50 years and 18-35 years equally, between 51-65 at 13% and above 65 at 3% as shown in Figure 5. The youth class (18-35) and the age class between 36-50 are the most active members of the society. Their willingness to as respondents indicates interest in matters forest conservation. This coupled with the availability with few elders (above 65 years) is an important indicator of adequate labour and knowledge in forest conservation.

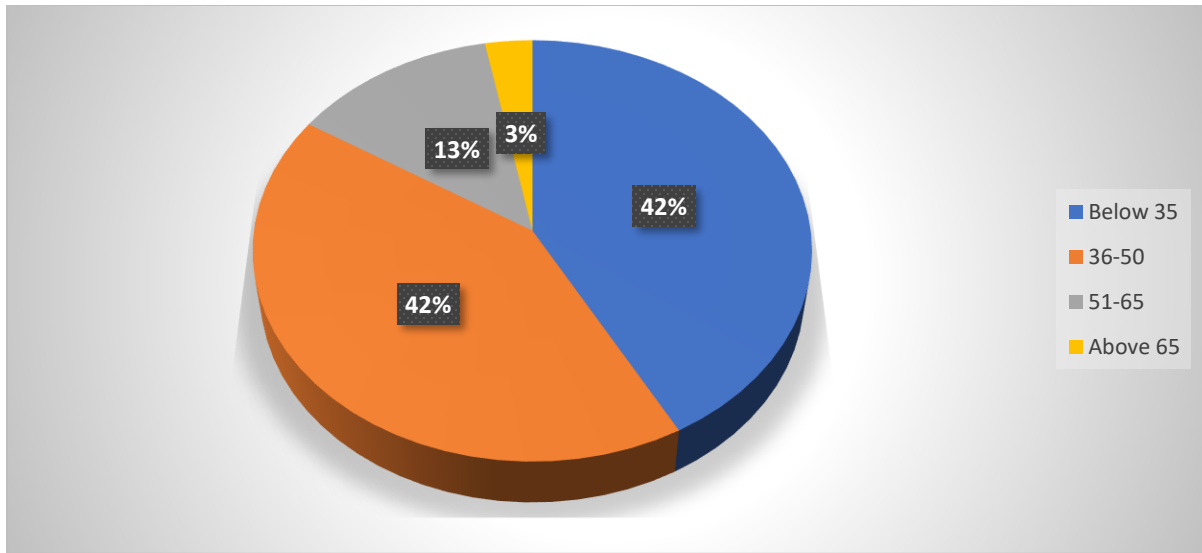


Figure 5: Age of the respondents

- **Distance from the forest boundary**

Eighty-nine percent of the households surveyed were within the 5-km radius from the forest boundary and 11% lived within 5-10km (Figure 6). One negative impact of the closeness to the forests is that illegal exploitation can easily be achieved by the some FAC members. However, one probable advantage is that those close to the forest can be trained and recruited as community scouts to help in safeguarding forest resources.

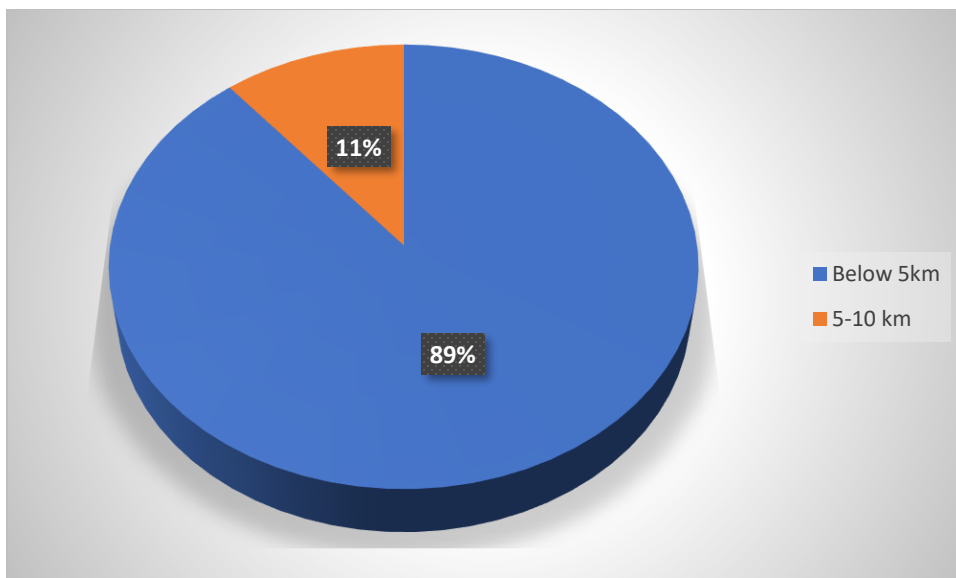


Figure 6: Distance from the forest boundary

- **Education levels**

Overall, 78% had attained informal education administered in home settings and occupations such as farming and cultural settings, 16% had primary, 2 % secondary, 2% tertiary and 1% had adult learning (Figure 7). The levels of education are relatively low in the area as most of the people value livestock and is a sign of wealth. The importance of education should be emphasized among both the parent and children. On the other hand, understanding the level of education is very crucial because it informs the best methods of communicating with the communities.

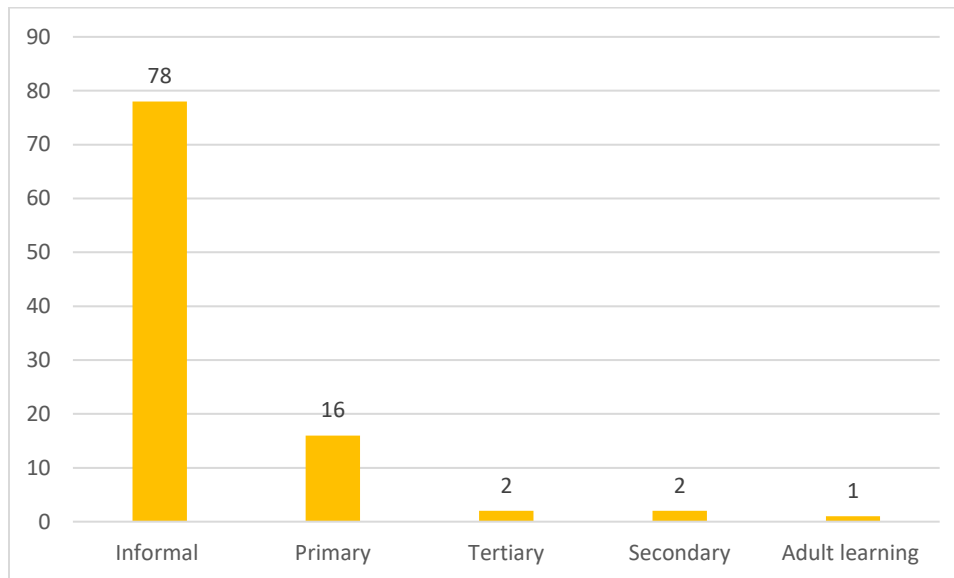


Figure 7: Education level of the respondents

- 3.2.5 Family size

From the survey, families with 6-10 members and those with 3-5 members constituted 42% and 39% respectively. Families with more 10 members were 10% and those with 1-2 members were at 9% shown in Figure 8. This indicates that most forest household are large implying a high demand for basic forest products like fuel wood, timber and herbal trees among others, resulting in more pressure on the forest.

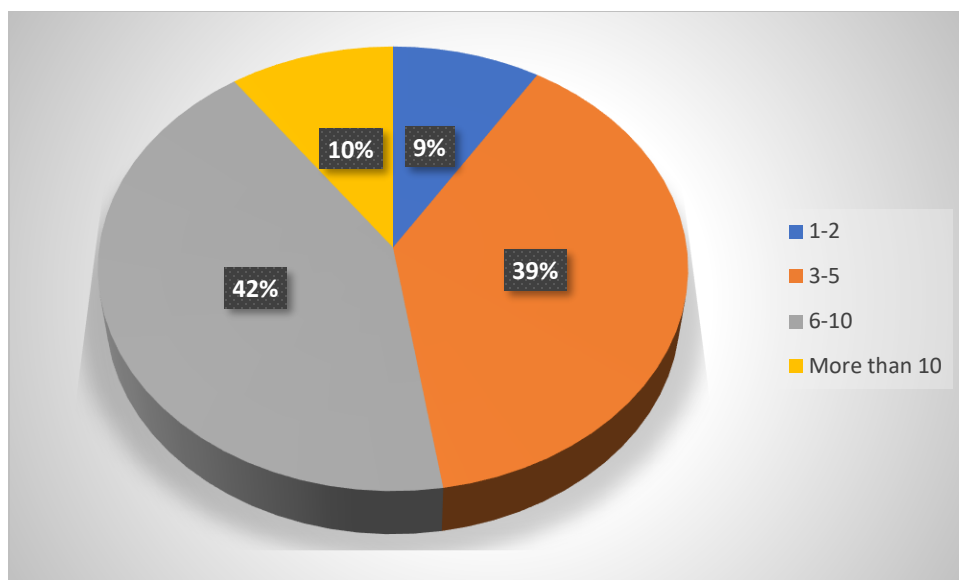


Figure 8: Family sizes

- **Household heads**

Eighty-two percent (82%) of household heads were males while 18% were females (Figure 9). This was a reflection of the tradition of the Samburu setting where men were considered to be the decision makers and family heads. This socio-cultural norm under rates the role played by women in the community. An awareness campaign is necessary to enlighten men on the importance of women's participation in forest governance is thus important.

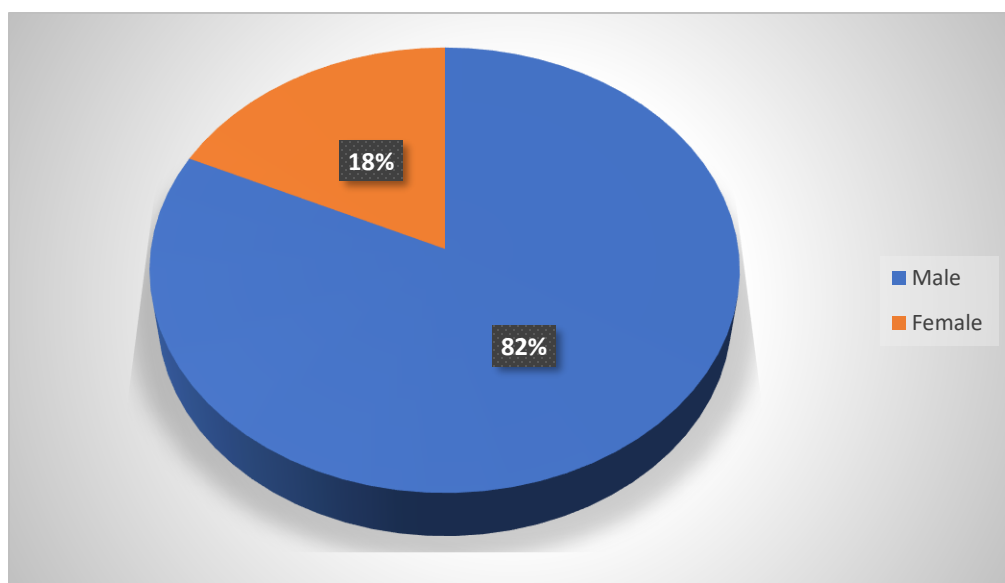


Figure 9: Household headship status

- **3.2.6 Household ownership**

From the study 95% of the population owned the houses they lived in as shown in Figure 10. About 5% were either staying in their employer's house or were renting the house as they operate their own businesses in the area especially those in Kisima town. HH ownership status shows the willingness to settle in an area for a longer period as opposed to house renting. Therefore, these communities are the right people to collaborate with in terms of participatory forest resource management.

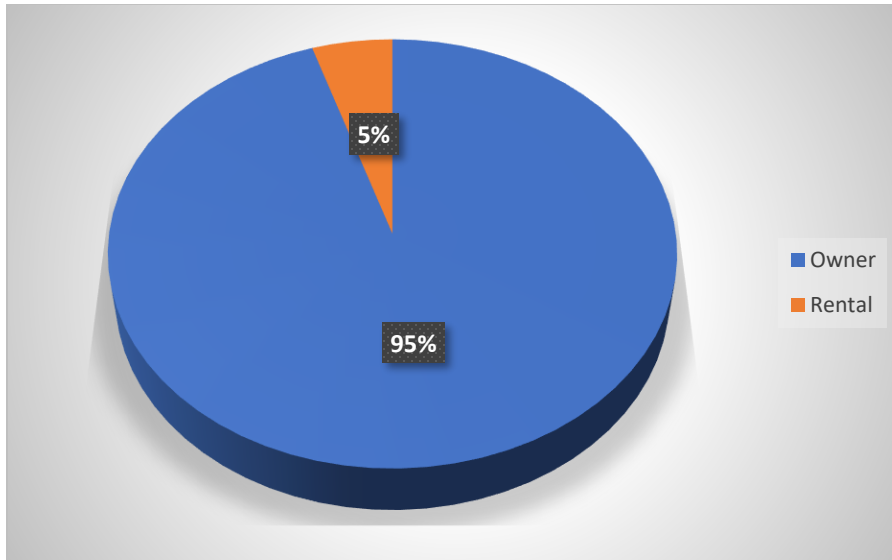


Figure 10: Household ownership status

About 91% of the respondents indicated they owned land against 9% who indicated they had no land (Figure 11). Although land is communally in the area, land demarcations were carried out and registration numbers were issued to the community. Currently those who has registration numbers are those who are said to own land. This limits the passion and interest of tree planting activities as the land ownership is not very clear.

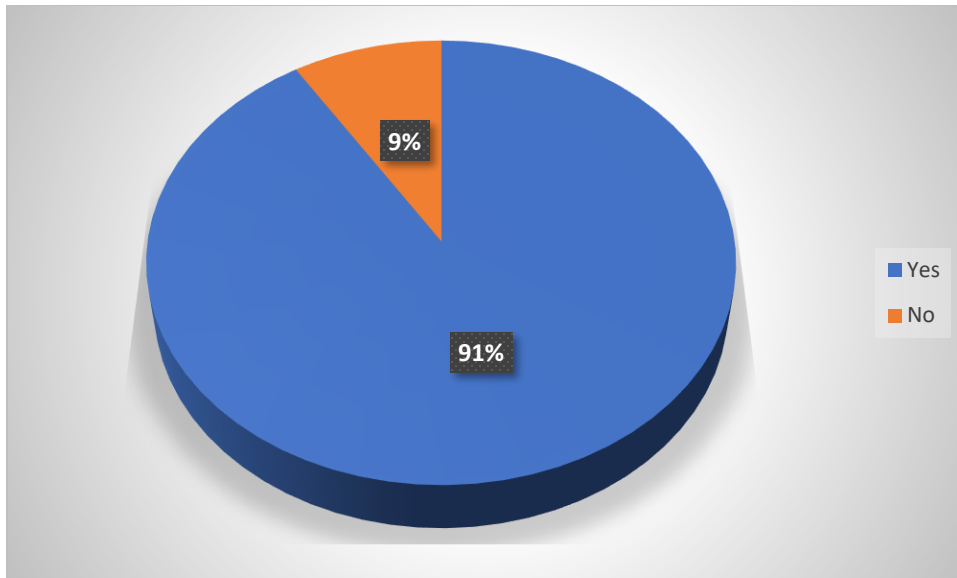


Figure 11: Land ownership

For those who had land registration numbers, 1-5 acres was the most predominant owned at 70%, 1 acre at 16%, 6-10 acres at 8% and 11-15 acres at 6% as shown in Figure 12. Land parcels are relatively big and this can be utilized for maximum productivity. Agro forestry practices should be encouraged in the area and where possible introduction of woodlots.

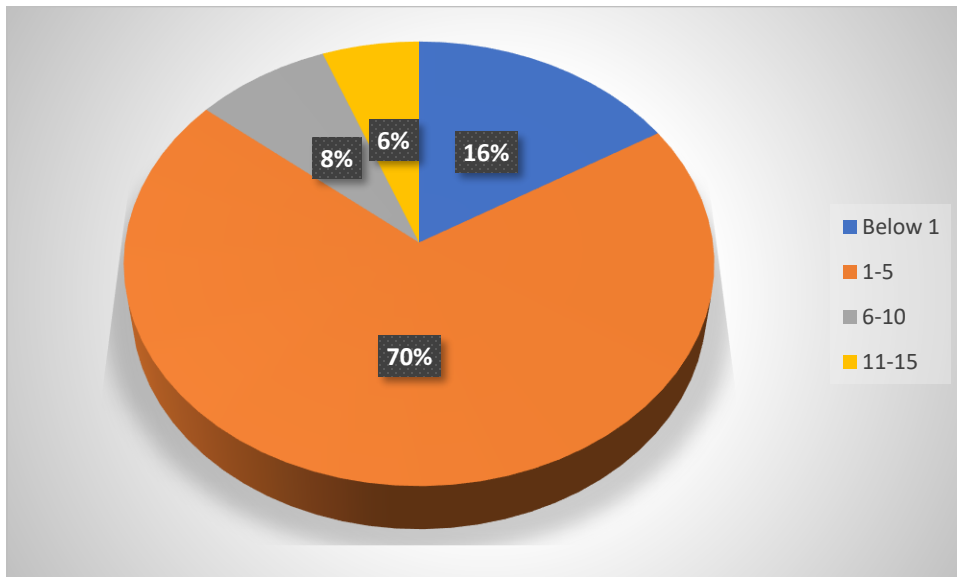


Figure 12: Sizes of land

- **3.2.7 Nature of materials used for building**

The study found out that most (61%) of the respondents used mud/wood for roofing their houses and 39% used iron sheets. About 37% used wood to construct walls, followed by mud 30% as shown in Table 14. Wood/posts was the most preferred for homestead fence due to its

availability (73%). Most of the respondents had earthen floor (80%). Use of wood for construction by most people indicated there was need to encourage on-farm tree growing to reduce over dependence on the forest for the provision of construction materials

Table 14: Materials used for building

Building materials	Frequency	Percent
Roof		
Iron sheets	32	39
Mud/wood	50	61
Total	82	100
Walls		
Mud/wood	11	13
Wood	30	37
Stones	4	5
Cement	9	11
Mud	25	30
Cow dung	3	4
Home stead fence		
Natural	4	5
Wood/posts	60	73
None	6	7
Barbed wire	3	4
Branches	9	11
Total	82	100
Floor		
Earth	66	80
Cement	16	20
Total	82	100

3.1.3 Economic and livelihood activities practiced by the FAC

- **Crop production**

About 84% of the respondents grew maize, 77% beans, 10% kales and 24% grow any crops. They grew these crops mostly for subsistence at 81%, 82% and 100% respectively (Table 15). There was a need to intensify agricultural trainings, activities and introducing drought resistance crops in the area.

Table 15: Crop grown in the area and their purposes

Crops	Frequency	%	Purposes of the crops grown					
			Subsistence		Sale		Both	
			Frequency	%	Frequency	%	Frequency	%

Crops	Frequency	%	Purposes of the crops grown					
			58	81	5	7	9	13
Maize	72	84	58	81	5	7	9	13
Beans	66	77	54	82	3	5	9	14
Kales	9	10	9	100			1	1
No farming	21	24						

- Livestock Production**

The highest (87%) number of the respondents kept cattle followed by those who kept sheep (77%), goats (44%), chicken (23%), donkeys (10%) and camels (7%). Most of the animals kept were indigenous as shown in Table 16.

Table 16: Livestock kept

Type of livestock	Frequency	Percent	Indigenous		Mixed	
			Frequency	Percent	Frequency	Percent
Cows	78	87	66	85	12	15
Sheep	69	77	63	91	6	9
Goats	39	43	33	85	6	15
Chickens	21	23	18	86	3	14
Donkeys	9	10	9	100		
Camels	6	7	6	100		

- Purposes of livestock kept**

Further, the results in Table 17 showed that cattle, sheep, goats and chicken were mainly kept for sale at 64%, 96%, 69% and 48% respectively. Cattle, and goats' main products were meat and milk. There is need to bring to sensitize the community that the manure for these animals can also be used for farming and boost farm yields.

Table 17: Purposes of the livestock kept

Type of livestock kept	Purpose of the livestock kept						Purpose of livestock Products
	Sale		Subsistence		Both		
	Frequency	%	Frequency	%	Frequency	%	
Cows	50	64	18	23	10	13	Meat, milk, dowry,
Sheep	66	96			3	4	Meat, skin, dowry,
Goats	27	69	5	13	7	18	Meat, milk,

							dowry, ancestral offerings
Chicken	10	48	8		3	14	Meat eggs
Donkeys			9	100			Transport
Camels			6	100			Transport

From the study it was noted that most of the respondents kept more ten livestock (Table 18). Although this mainly contributed by the ownership of land, their pastoralist nature and availability of land parcels, it would be paramount to encourage the community to keep fewer livestock but of the improved breeds. For example, the Sahiwal cattle breed.

Table 18: Number of livestock kept

Type of livestock kept	1-10		11-20		21-30		31-40		41-50		Above 51	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Cows	28	36	17	21	13	17	9	12	8	10	3	34
Sheep	11	16	27	39	18	26	7	10	4	5	1	1
Goats	13	33	9	23	10	26	3	8	2	5	2	5
Chickens	10	48	11	52								
Donkeys	9	100										
Camels	6	100										

- **Grazing resources**

Most of the respondents (95%) obtained their grazing resources from by forest grazing, cut and carry (39%), on-farm pasture (11%), roadside grazing/herding (2%), commercial feeds and zero grazing at (1%) each as shown in Figure 13. Key to note was that very few people in the community has other forms sources for their animals. This implies that the forest was very important to the community for their livestock development as source of livestock fodder. However on the other hand if this trend was not monitored and regulated it could lead to depletion of the grazing resources and in the long run cause forest degradation

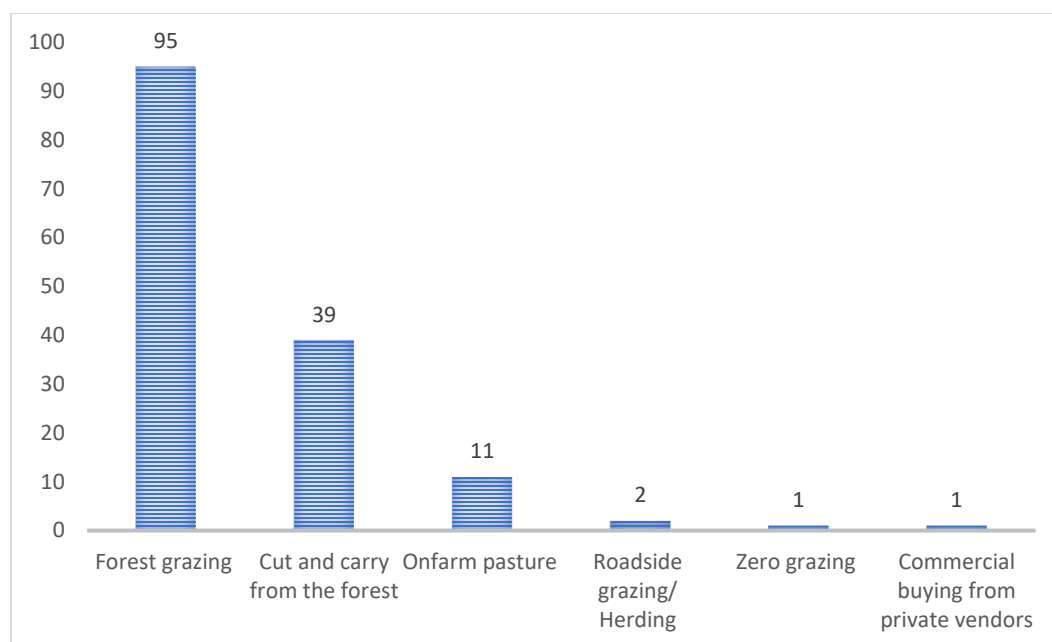


Figure 13: Sources of grazing resources

- **Sources of household Income**

The survey showed that all the respondents participated in one or a number of economic activities to earn a living. Figure 14 shows that sale of livestock was the main (85%) economic activity carried out by the FAC. This was followed by the sale of food crops at 47%. The other sources of income included; skilled labour (10%), unprocessed forest products, business enterprises at 8% each and processed forest products together with casual employment at 7% each. This community need capacity building in terms of various economic activities that they can be involved in. They should be sensitized about various value addition technologies for local produced products like honey, gum and resins. This would enable them fetch significantly higher prices for their products. Farmers should also be encouraged to scale up farming of livestock that require little space and minimal movement for example poultry farming and rabbit keeping.

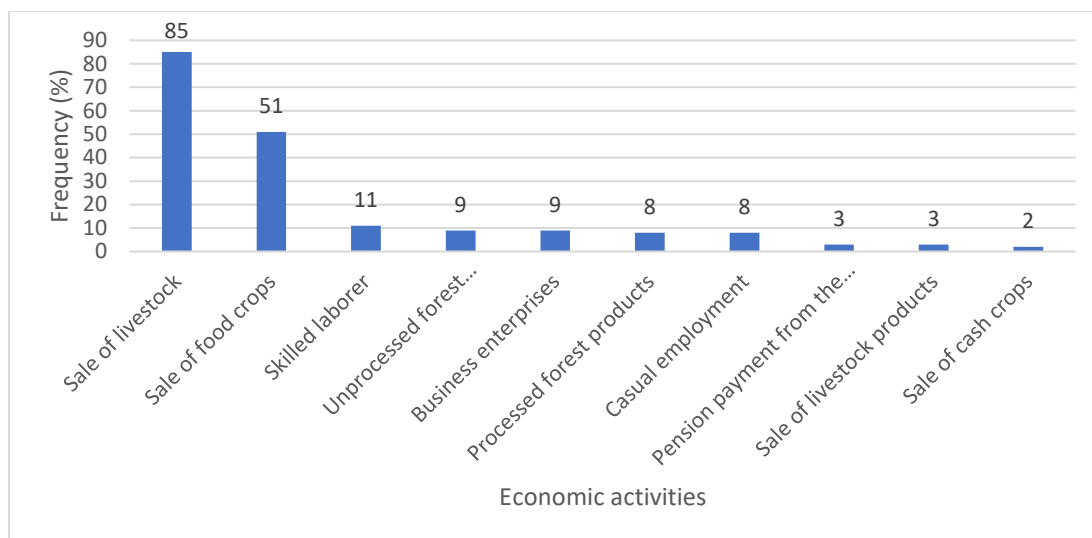


Figure 14: sources of income

3.1.3 On farm tree growing

The analysis indicated that 68% of the respondents' planted trees on their farms (Figure 15). This is encouraging because it reduces pressure on forest for products like timber, firewood and other wood products that can be exploited. This also enhances forest conservation. Awareness should be created to the community to sensitize them of the benefits of on-farm tree planting which include: increased farm value, firewood and timber production, provide wind breaks, increase in plant pollinators, provision of pleasant fragrances.

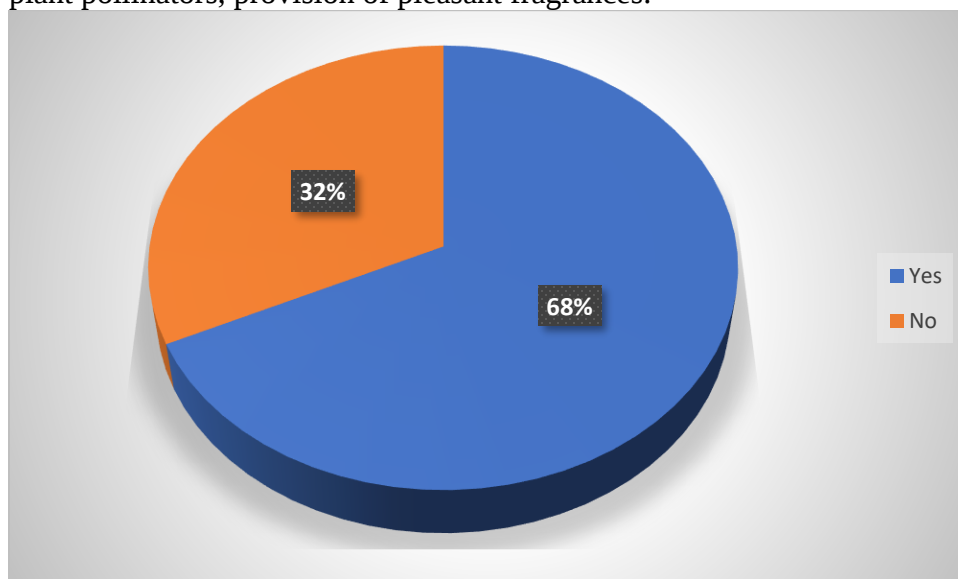


Figure 15: On farm tree growing

About (87%) of the respondents relied on natural regeneration of trees on their farms. About 43% of them indicated that they obtained seedlings from KFS nursery as shown in Table 19. In order to enhance on agro-forestry practices on-farm, the community needs to be trained on how

to establish tree nurseries so as to increase the number of seedlings available for on-farm tree growing.

Table 19: Sources of seedlings

Sources of seedlings	Frequency	Percent
Own farm through natural regeneration	52	87
KFS nursery	26	43
Forest (Wildlings)	6	10
KARI/Agricultural nurseries	5	8
Exhibitions and trade fairs	4	7
Own on-farm nursery	2	3
KEFRI nursery	2	3

- Type of trees in demand but with low supply

The findings indicated that 100% of the respondents were in need of more trees in their farms. Those who required indigenous tree species were 87%, while 13% required exotic trees species as shown in Figure 16. Therefore, community tree nurseries should be stocked with more indigenous tree seedlings.

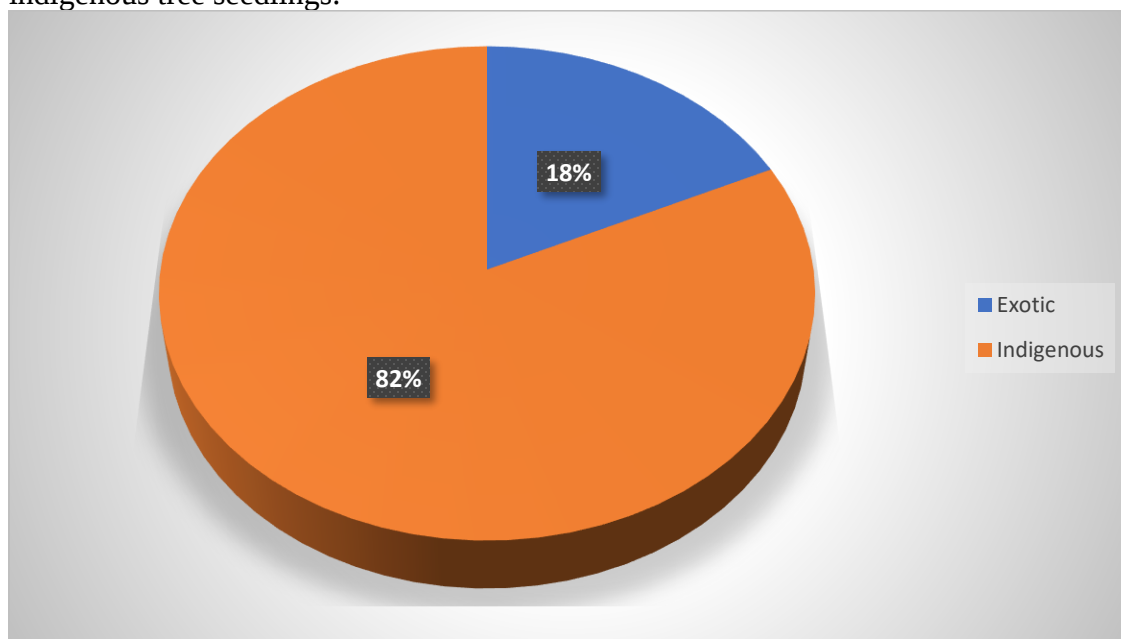


Figure 16: Tree species in demand

- **Tree establishment constraints**

Tree establishment constraints were cited as livestock damage at 67%, damage from wildlife (59%), drought (58%), pest and diseases (31%), inadequate land and inadequate labour (1%) as shown in Figure 17. The tree establishment constraints would lead to unavailability of trees on-farms rendering the forest susceptible to illegal logging hampering forest conservation efforts. It is important that the constraints get remedies so as not only to safeguard the conservation efforts

of forest but also to improve the livelihoods of the FAC through sale of tree products.

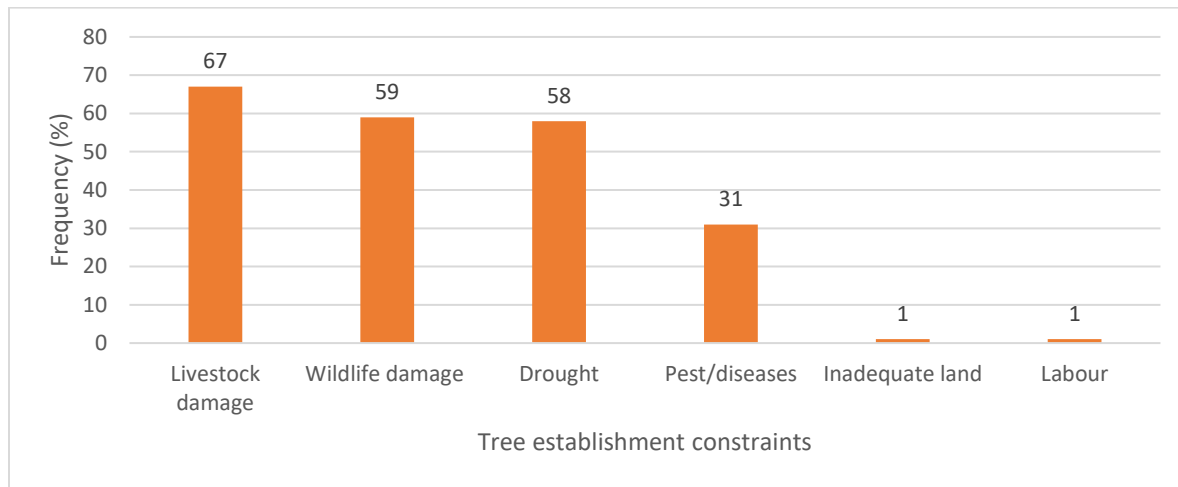


Figure 17: Tree establishment constraints

- **Remedies to tree establishment constraints**

The respondents have been practicing some remedies to ensure success and growth of the on-farm trees. They include; watering (48%), fencing of the farms (34%), application of pesticides and insecticides (10%) and water harvesting using tanks at 8% as shown in Figure 18. This shows willingness to plant trees. Adequate training should be accorded to the communities to continuously motivate them to plant more trees.

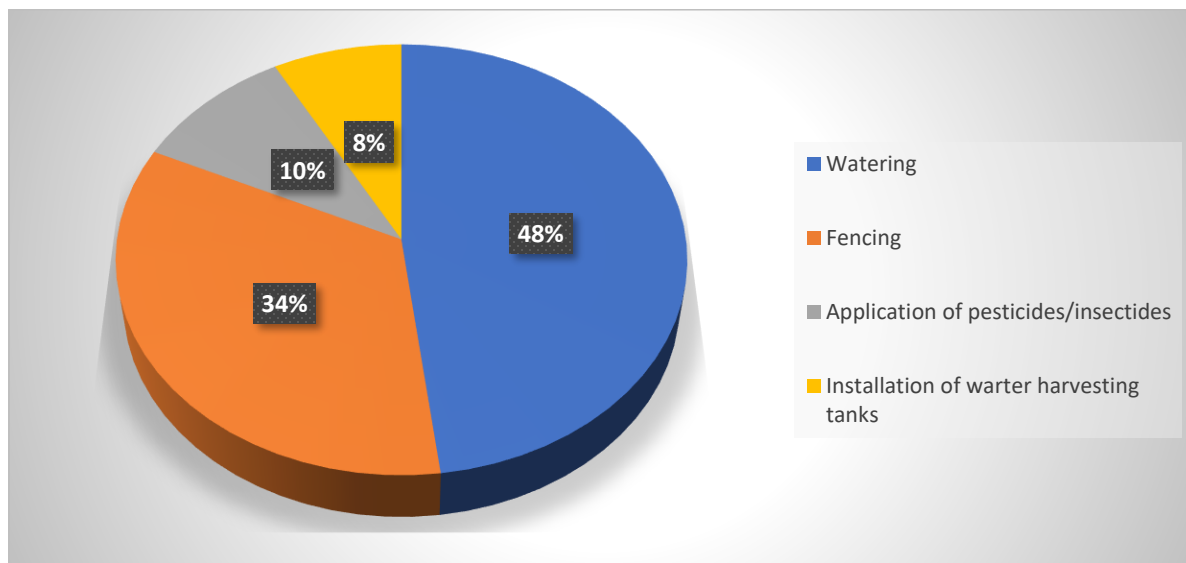


Figure 18: Remedies to tree establishment constraints

- **Purposes served by trees on farm**

From the survey, the highest percentage (77%) of the respondents planted trees for firewood, followed by charcoal production (69%) shade (68%), bee keeping (65%), live fence (58%), then soil improvements (44%), beauty (35%) and fodder for livestock (32%) as shown in Table 20. Trees not only provide tangible benefit but also provide intangible products. The community should be educated on the various purposes of trees on one's farm. Growing trees on farm is among the important steps to attaining 10% tree cover.

Table 20: Purposes served by trees on farm

Purposes served by trees on farm	Frequency	Percent
Firewood	48	77
Charcoal production	43	69
Providing shade	42	68
Bee keeping	40	65
Live fence	36	58
Soil improvement	27	44
Ornamental/beauty	22	35
Fodder for livestock	20	32

3.1.4 Interaction between the forest and the FAC

Majority of respondents used forest for firewood (97%) followed by grazing livestock (95%), traditional activities (68%), water (58%), medicinal herbs (57%) and honey (54%) as shown in Table 21.

Table 21: Products and services obtained from the forest

Products and services obtained from the forest	Frequency	Percent
Firewood	89	97
Grazing livestock	87	95
Traditional activities	63	68
Water	53	58
Medicinal herbs	52	57
Honey	50	54
Poles/posts	45	49
Charcoal	41	45
Grass/fodder	36	39
Wild fruits/vegetables	23	25
Seedlings/wildings	20	22
Religious activities	18	20
Thatch grass	10	11

Products and services obtained from the forest	Frequency	Percent
Soil/sand	3	3
Recreational activities	1	1

- **Source of Household Energy**

The results indicated that the main source of energy for the residents was firewood (93%). This was followed by charcoal (63%) solar panels (48%), LPG gas (1%) and biogas (1%) as shown in the Figure 19. The reliance on firewood and charcoal by the community implied a need to promote agroforestry in the area to reduce illegal charcoal making and firewood cutting in the forest. In efforts to enhance forest conservation the County Government had continued to promote the use of solar panels by making them available and affordable to the community.

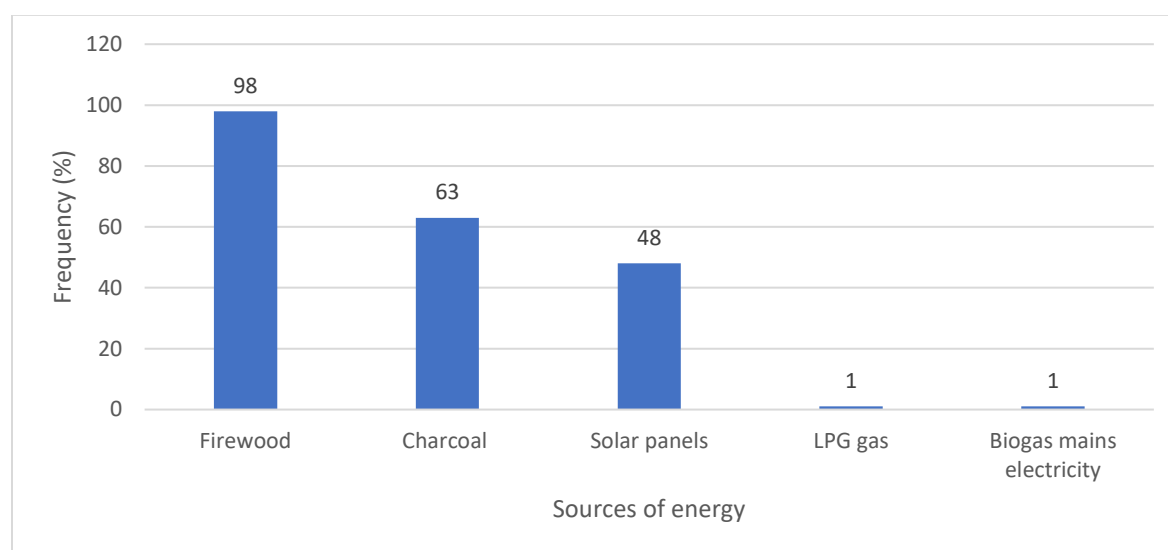


Figure 19: Energy sources

- **Types of firewood**

Dry firewood was mainly used by the respondents at 63% while dead and fallen type of firewood was also used by the respondents at 36% as shown in Figure 20. The dead and fallen firewood was mainly collected from the forest while the dry firewood was mainly from their own farms.

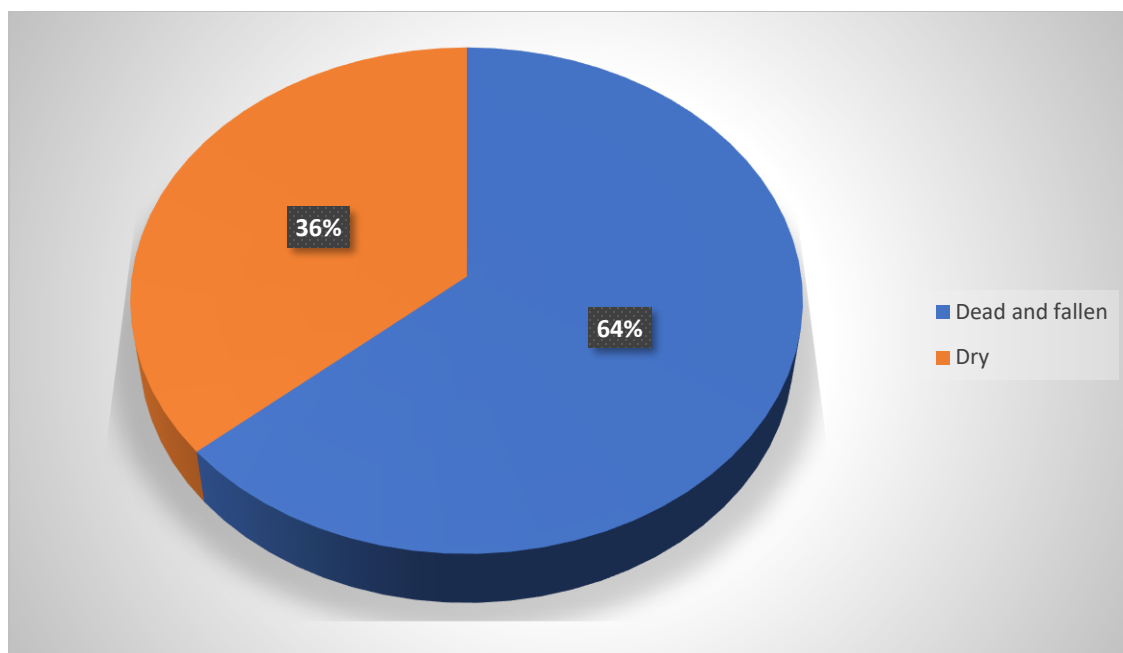


Figure 20: Types of firewood

- **Sources of water**

The survey results showed that 47% of the residents sourced water from boreholes, 43% from rivers, 13% from wells, roof water harvesting 5%, piped water and dams/pans at 2% each (Figure 21)

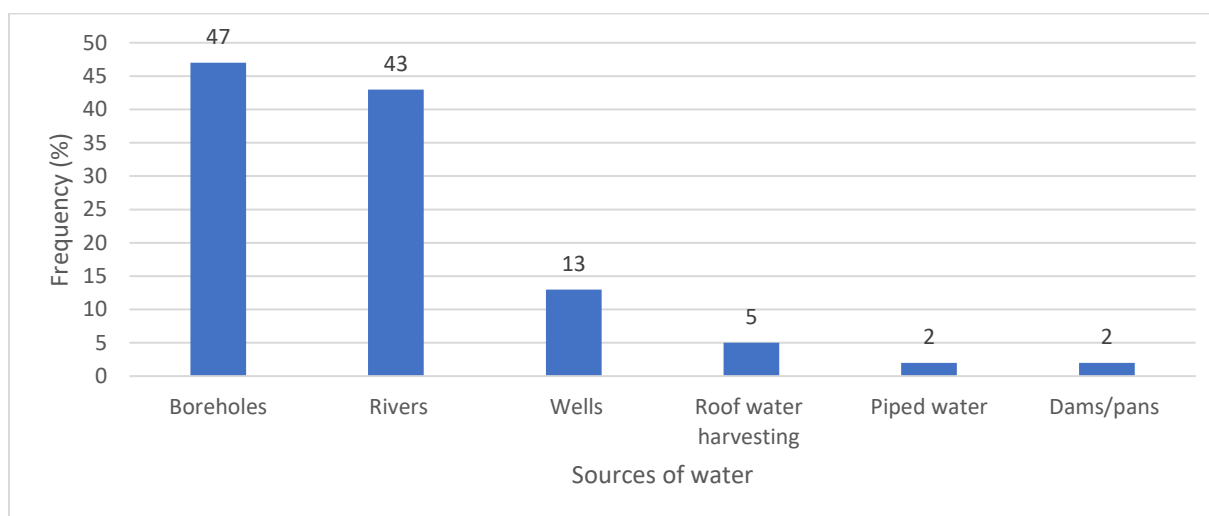


Figure 21: Sources of water

3.1.5 Community participation

The majority of the respondents (97%) stated that they had accessed/entered the forest, while 3% did not undertake any activity in the forest, as shown in Table 22. The reason for this was attributed to the fact that the community did not understand PFM.

Table 22: Participation in forest activity

Participation in forest activity	Frequency	Percent
Entered/accessed the forest	90	97
Harvested products from the forest	89	96
Participated in prayers and other cultural activities	63	68
Involved in decision making concerning forest management	51	55
Participated in fire control and prevention activities	17	18
Participated in fire fighting	11	12
Has not participated in any forest activity	3	3
Participated in tree planting	2	2
Participated in patrols and policing	2	2
Participated in eco-tourism activities	1	1

- **Community participation and awareness on forest user groups and forest use**

The participation in organizations involved in forest conservation is as shown in Table 23 which shows that 54% of the respondents were members of community-based organization involved in forest conservation. About 54% percent were aware of Nkarro CFA while 50% were members of the CFA.

Table 23: Community participation

Forest group awareness	Response	Frequency	Percent
CBO	Yes	45	54
	No	39	46
CFA aware	Yes	45	54
	No	33	39
Did not answer		6	17
CFA member	Yes	42	50
	No	15	18
Did not answer		17	32
Aware of CFA roles	Yes	42	50
	No	42	50

3.1.6 Perception of forest conservation

About (41%) agreed that the forest was important for the for the environmental services they provide as fresh air, soil and water conservation, 37% agreed that the forest if important for both environmental services and goods it provides while 22% agreed improvements in the condition of local forests were necessary for economic benefits such firewood, timber, grass and seedlings as shown in Figure 22.

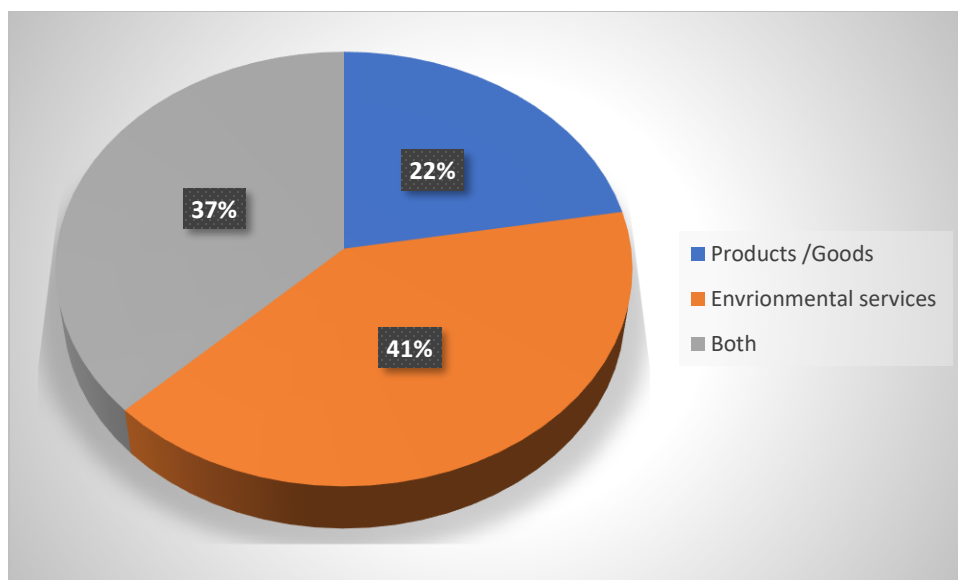


Figure 22: Community perception on importance of forest conservation

- **Community willingness to contribute to forest conservation**

The survey report showed that about 53% were willing to contribute between Kshs 1 to100 towards forest conservation as shown in Figure 23. The fact that the community was willing to contribute to forest conservation measures means that they are well aware of the tangible and intangible benefits of the forest. This indicates that any future reforestation and afforestation would be highly successful if adopted by the FAC. However, there was a small number (4%) of the respondents who were not willing to contribute to forest conservation.

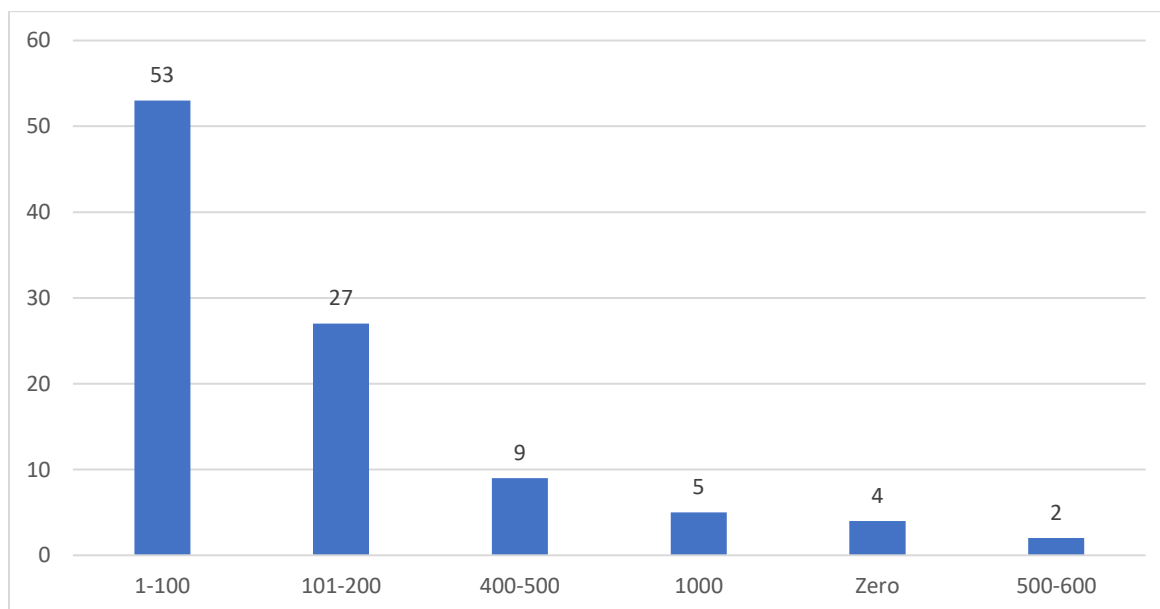


Figure 23: Community willingness to pay for forest conservation

3.1.6 Human wildlife conflicts

All (100%) of the respondents reported they had experienced human-wildlife conflicts from various animals. The main problematic animals included elephants (100%), followed by zebra (47%) as shown in Table 24. The people who border the forest are more affected by human wildlife conflicts (89%) as compared to those who live a bit far from the forest (11%).

Table 24: Problematic animals

Problematic problems	Frequency	Percent
Elephants	93	100
Zebra	46	49
Lion	20	22
Baboons/monkeys	16	17
Wild pig	16	17
Leopards	10	11
Squirrels	5	5
Bush buck	5	5
Fox	4	4
Hyena	3	3
Wild dog	2	2
Sugura	1	1

- **Problems caused by wildlife animals**

These animal species (3.12) cause damage to crops on farms bordering the Forest Reserve (57%). Elephants, lions, leopards and wild dog cause injury or death to people and attack (21%), lions, leopards, and wild dogs kill livestock in the neighboring farms (18%) and elephants cause game damage of trees (4%) as shown in Figure 24.

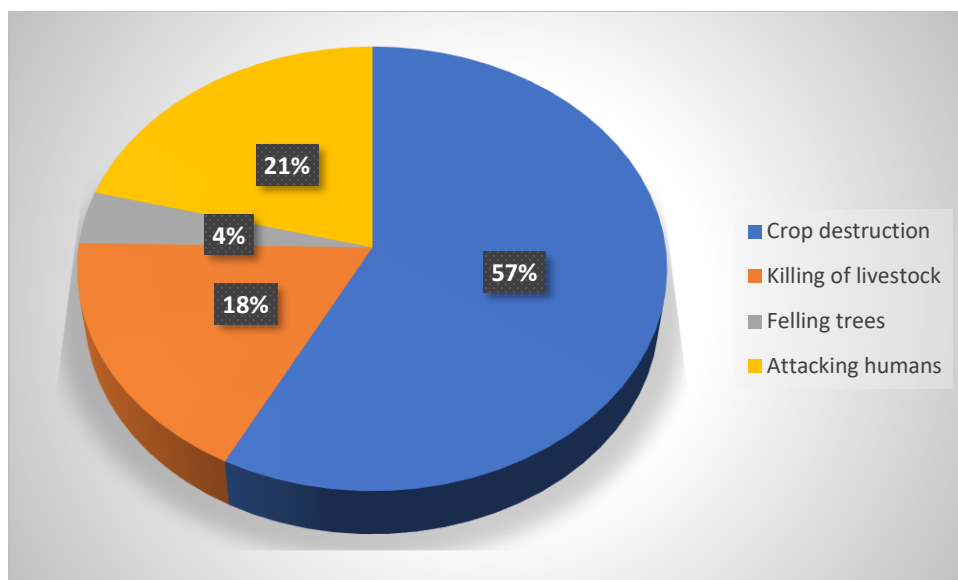


Figure 24: Problems caused

3.1.7 Forest Management constraints

Among main challenges to forest management were drought (32%), followed by inadequate resources (27%), poor management (25%) and overstocking (19%) as shown in Table 25. Among other challenges were lack of fence, lack of compensation for after human wildlife conflicts, inaccessibility, inadequate training, forest fire and inadequate tree nursery.

Table 25: Challenges to forest conservation

Challenges to forest conservation	Frequency	Percent
Drought	30	32
Inadequate resources	25	27
Poor management	23	25
Overstocking	18	19
Ignorance	17	18
Insecurity due cattle rustlers who hide in the forest together with dangerous animals in the forest like elephant, lions, and leopards.	16	17
Family responsibility that limits the time to engage in forest management	14	15
illegal logging	11	12
Others	10	11
Inadequate communication	7	8
Lack of incentives	4	4
Charcoal production	4	4

3.1.8 Suggestions to improve governance and management of the forest resources

The suggestions given by the community to improve forest governance and management of Nkarro Forest block are as shown in Table 26. Key among the suggestions is to empower forest conservation and protection (32%) while other suggestions included establishment of more tree nurseries, avoiding overstocking, Construction of fire tower, to empower scouts and sign FMA (8%).

Table 26: Suggestions to improve governance and management of the forest resources

Suggestions to improve forest conservation	Frequency	Percent
Conserve and protection	29	31
Recruit more scouts	23	25
Forest fencing	18	19
Improve cooperation between KFS and CFA	16	17
Tree planting	15	16
Conduct more training	12	13
Improve management	11	12
Create more awareness	5	5
Empower the community	4	4
Others	7	8

CHAPTER THREE B

SOCIOECONOMIC STATUS

3.2 NARAMAT FOREST MANAGEMENT UNIT

3.2.1 Overview

A socio-economic survey was undertaken where semi-structured questionnaires were administered to the Naramat FAC. This was important in understanding the interconnection between the community and the forest.

A total of one hundred and seventeen (130) questionnaires were successfully administered, data analysed and the results presented, interpreted and its implications in relation to conservation and livelihood of FAC highlighted in this Chapter.

- **Distribution of questionnaires**

Naramat FAC constitute people living around and interacting with the forest for a maximum of 5 km radius from the forest boundary. Administratively, the FAC reside in two locations of Porro and Maralal. Their distribution covers six sub locations of; Mugur, Lporokwoi, Maralal Urban, Lpartuk, Milimani and Shabaa.

3.2.2 Demographic Profile of Forest Adjacent Community

- **Population distribution in Locations and sub-locations surrounding Naramat forest block**

The current population for the people living adjacent to the Naramat forest block is 77,638 according to the National census 2019 (KNBS, 2020). The male population is 18,588 (49%) and the female population 19,157(51%) in the six sub locations, Table 27.

Table 27: Population of the Forest adjacent locations and sub-locations in Maralal

Location	Sub-Location	Male	Female	Total	Households	Area(km2)	Density (people/km2)
Maralal	Ngari	2526	2501	5027	1036	25.52	197
	Shabaa	2973	3175	6148	1279	78.59	78.23
	Milimani	2211	2257	4468	979	22.58	156.34
	Maralal town	6175	6256	12431	3311	17.52	709.52
	Lpartuk	1667	1785	3452	674	22.9	150.72
	Lkurto	1707	1700	3407	695	21.89	155.67
	Ledero	828	994	1822	406	26.63	68.43
Porro	Mugur	501	489	990	198	36.91	26.82
TOTAL		18,588	19,157	37,745	8,578	252.54	1,542.73

KNBS, 2020)

- **Distribution of respondents**

During the HH survey the questionnaires were distributed in the six locations as shown in Table 28. Most respondents are residents of Maralal location (62%) and Porro (38%) respectively. This is an indicator that pressure on the forest resources could be high in these two locations. Urgent intervention measures to minimize the negative impacts as a result of overdependence on forest resources should be prioritized. Agroforestry promotion, use of alternative energy sources and adoption of energy saving technologies should be the key agenda in all the stakeholders in forest conservation activities in this locality.

Table 28: Distribution of Respondents

Location	Frequency	%
Maralal	81	62
Porro	49	38

- **Distance from Forest boundary**

Majority of the respondents (92%) live within 5kms radius in the Naramat forest block. This scenario presents a double-edged sword in conservation work (Figure 25). The FAC proximity to the forest should be a strength in enhancing conservation work through proper sensitization, engaging those with statutory requirements as casuals to undertake rehabilitation, volunteer informers, scouts and be ambassadors in conservation. Conversely, it possesses a threat by overstretching the limited forest resources hence degrading the forest further. The stakeholders should maximize on the strength being presented here.

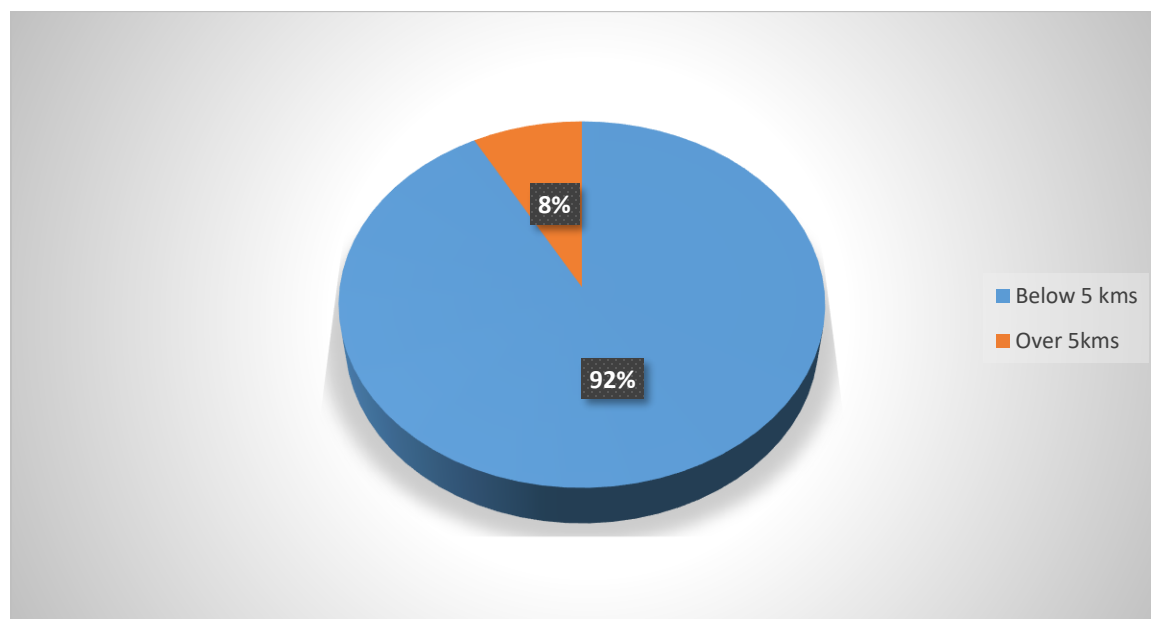


Figure 25: Distance from the forest boundary

- **Gender of the respondents**

Majority of the respondents interviewed 59% were men and 41% female (Figure 26). The FAC had been sensitized well on the socio-economic survey which was to be undertaken in their villages. The men being the household heads in this community were available to participate in the exercise. Where men were not available women took the role which is a good indicator of inclusivity in the forest adjacent community.

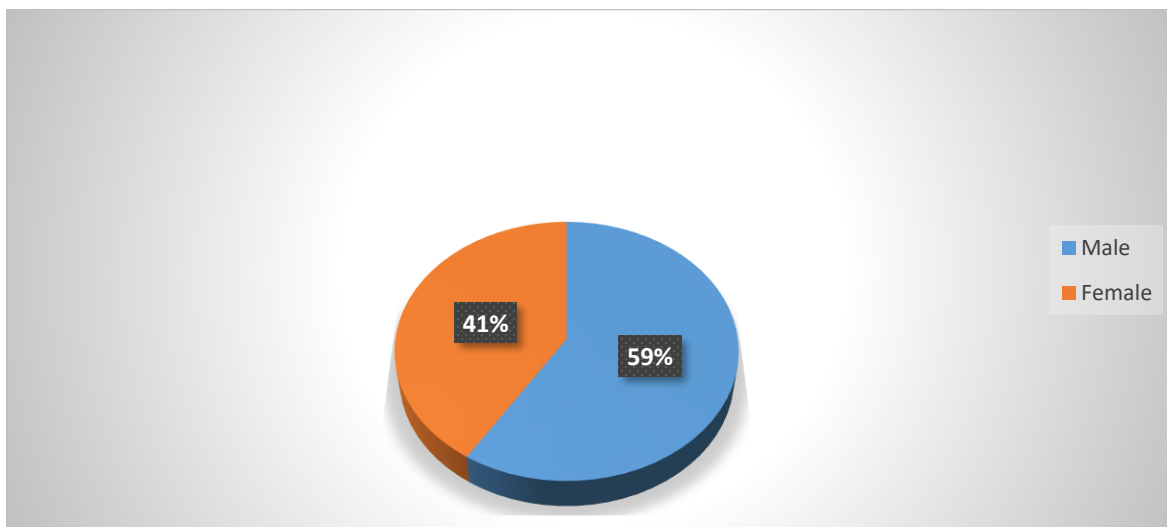


Figure 26: Gender of the respondents

- **Gender of HH head**

The survey revealed that the HH heads in this FAC are men(60%)Figure 27. Culturally men in Samburu community are the decision makers of their HH. The women headed HH (40%) either their spouses were away and had blessings to participate in the survey, widowed or single mothers. This confirms participation by both gender in the community and stakeholders should leverage on it in the conservation work.

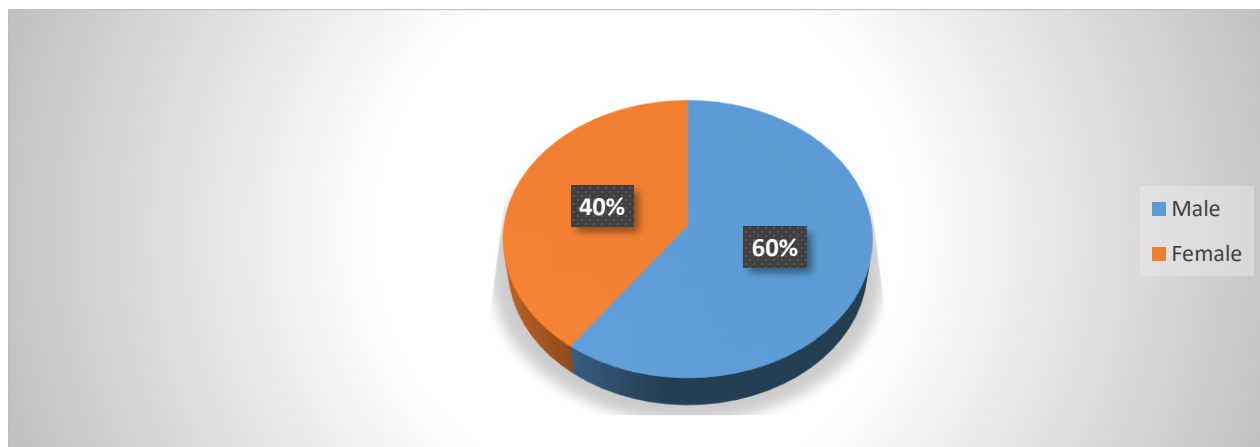


Figure 27: Gender of household head

- **Age of the respondents**

The HH survey established that the majority of the respondents were in the age bracket of 36-50 years (39%) and 18-35 years (37%) respectively, Figure 28. These age groups are actively involved in the socio-economic and conservation activities of the FAC. The conservationist should engage these members of the community to deliver the desired objectives of conservation programmes in this ecosystem. The labour will be sourced from these age groups to do seedling production, site preparation, planting, protection and maintenance of the planted areas.

The community members aged 51-59 years are 11% and over 60 years are 13%. These two age groups have a wealth of information on the trees which are valuable to the community and their availability over a period of time. Their indigenous knowledge will guide the decisions on the tree species to be used in rehabilitation of the degraded areas.

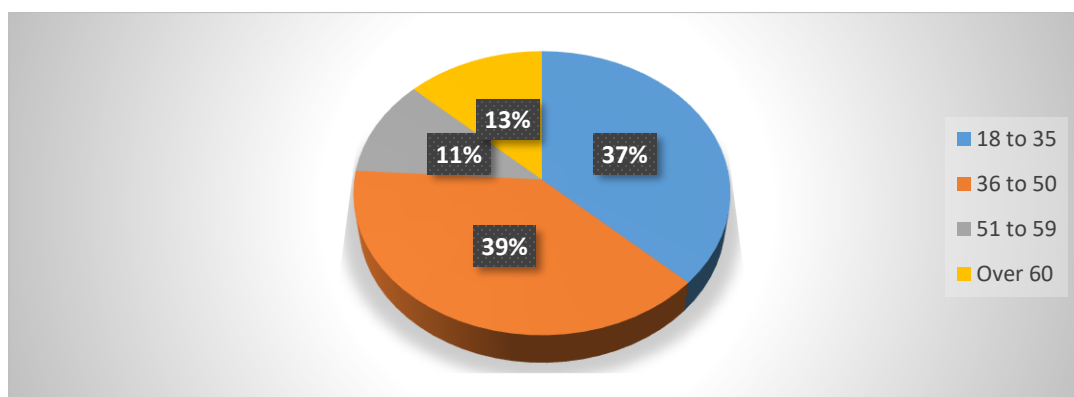


Figure 28: Age of the respondents

- **Distance of HH from forest boundary**

The FAC members reside close to the Naramat forest block due to various reasons. Majority (56%), inherited land from the parents, 40% are married in this community and 4% bought land, Figure 29. The respondents who inherited land is a positive attribute which should be utilized to enhance protection and conservation of this critical forest ecosystem. These are people who have lived with the forest and they know its importance. Their critical role in quest for a clean and safe environment cannot be overemphasized.

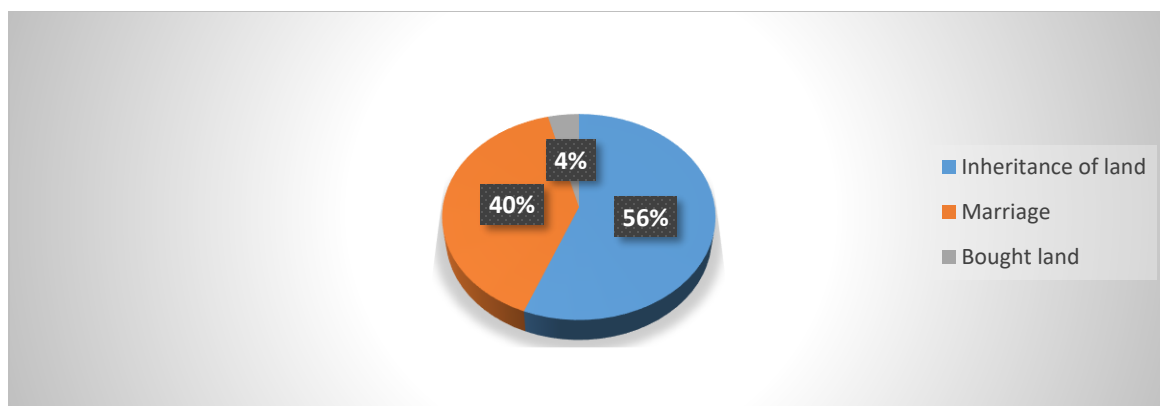


Figure 29: Reasons for moving to the area

- **Education level of the Forest Adjacent Community**

Most of the FAC members (64%) don't have formal education. Those with primary education (20%), secondary education (9%), tertiary education (4%) and adult learners (4%) respectively (Figure 30). This is attributed to limited livelihood activities to enable parents take their children to acquire formal education.

Introduction of other livelihood improvement activities is a key enabler to have more members of FAC to access formal education beyond the primary level.

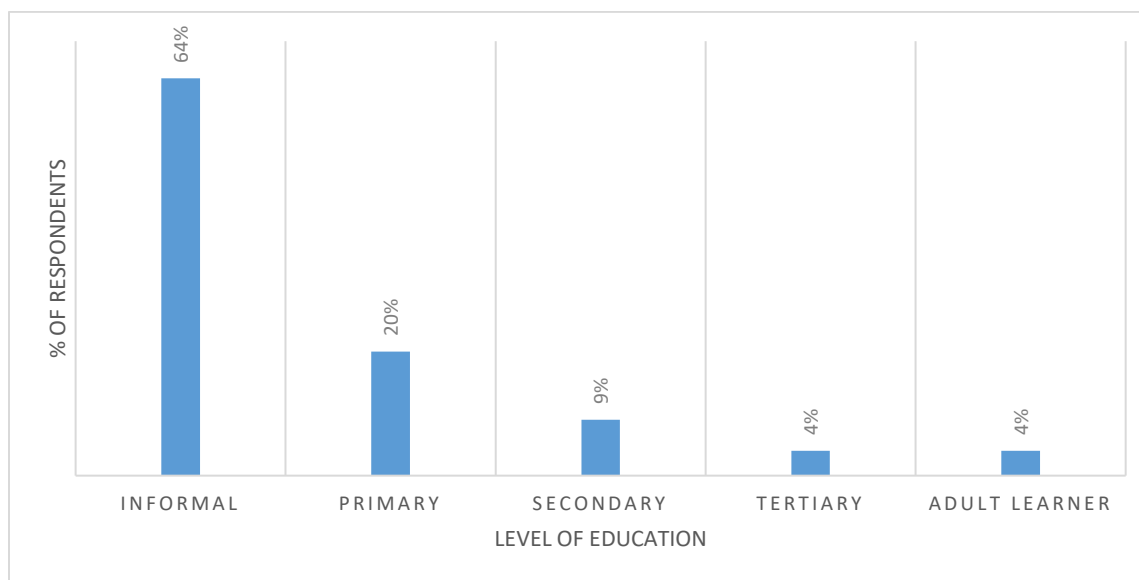


Figure 30: Education level of the respondents

- **Family size of HH in the FAC**

The survey findings show that majority of the family size is between 6-10 members (56%), 3-5 (24%), over 10 (11%) and 1-2 (9%), Figure 31. The large family size translates to increased usage of forest resources for various purposes. The increased usage will exert pressure on the

forest resources. This calls for provision of alternative fuel sources and stepping up of the protection and conservation to attain sustainability in provision of the much-needed ecosystem goods and services.

The large family size which may be a threat to the forest should be turned into an opportunity to support conservation work. Sensitization and mobilization by all the stakeholders will make the FAC members to provide the much-needed labour in conservation activities. This labour availability is a smart opportunity to meet the objectives of this plan.

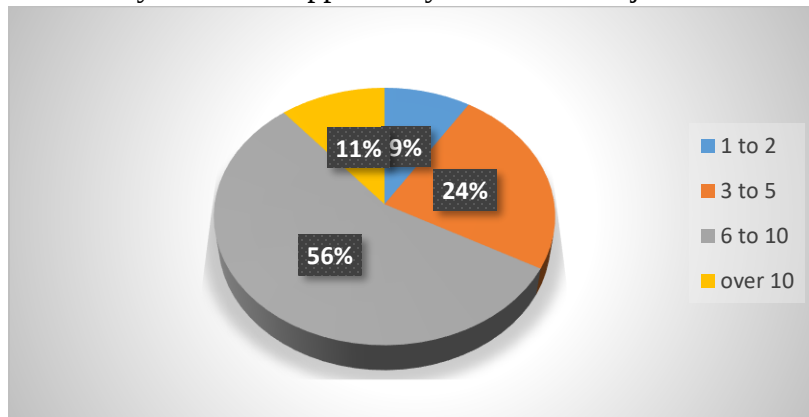


Figure 31: Family sizes

- **Household ownership**

Most of the respondents 96% own land, 3% are either employees or squatters in the farms and 1% are living in their relatives' land, figure 32. The land owners will be sensitized to grow trees in their farms to meet their needs. The net effect will be reduced pressure on the forest resources in Naramat forest block.

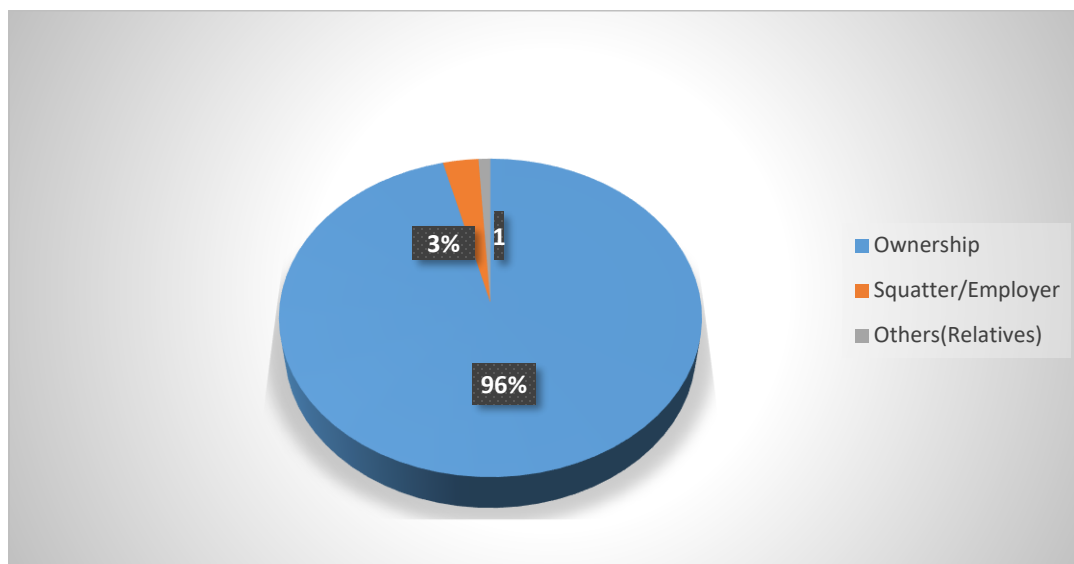


Figure 32: Household ownership

- **Farm sizes of the respondents**

The farm sizes in the FAC are predominantly small between 1-2 acres (53%), less than 1acre (33%), 3-4acres (5%), 5-6acres (3%) and over 8acres (3%). The respondents who don't own land were 3 % (Figure 33). The community should be encouraged to adopt agroforestry technologies on-farm where crops are inter-planted with trees for provision of various needs. Those who don't own land will be sensitized to use other forms energy to reduce pressure on the forest resources.

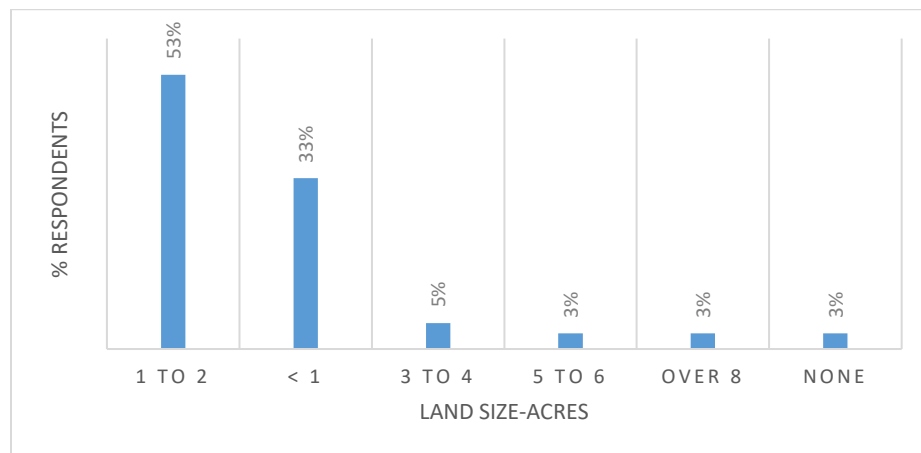


Figure 33: Farm sizes

- **Materials used in construction**

The FAC majority use wood/mud in their house roof construction (59%) and iron sheets 41%. The walls are constructed with wood 39%, mud 28%, mud/wood 15%, cement 6% and cow dung 2%. The floor in most houses is earth (90%) and cemented floor (10%). The boundary fence is constructed using wood/posts (75%), branches (9%), wire (3%) and natural live fence (3%). Those without boundary fence are 8% (Table 29). Wood is predominantly used in construction in this community. This implies that there is a lot wood requirement for various uses, hence pressure on the forest resources. The community should be sensitized to use other alternative construction material and to embrace tree growing on-farm to meet the demand for house construction material.

Table 29: Materials used in construction

Building materials	Roof	Frequency	Percent
Iron sheets		53	41
Mud/wood		77	59
			100
	Walls		
Mud/wood		20	15
Wood		50	39
Stones		8	6
Cement		13	10

Mud		36	28
Cow dung		3	2
			100
	Boundary fence		
Natural		4	3
Wood/posts		97	75
None		10	8
Wire		7	5
Branches		12	9
			100
			0
	Floor		0
Earth		117	90
Cement		13	10
			100

3.2.3 Economic and livelihood activities practiced by the FAC

- **Crops grown by the FAC**

The majority of the community members grow maize (77%) and beans (66%). The other crops grown are; potatoes (18%), kales (13%), onions (2%), bananas and tomatoes (1%). There is a section of the FAC members (23%) who don't grow any food crops, Table 30. This is an indicator that if unchecked this group is a threat to the forest ecosystem. Their inability to grow food crops and to put food on the table for their families will drive them to engage in illegalities in the forest. The stakeholders should focus on capacity building this section of community members to embrace agroforestry by growing food crops and trees on-farm. This with other interventions will reduce pressure on the forest resources and stop illegal forest activities.

Table 30: Crops grown by the respondents

Crop	Respondents (%)
Maize	77%
Beans	66%
Potatoes	18%
Kales	13%
Onions	2%
Bananas	1%
Tomatoes	1%
No crops	23%

- **Area under various crops**

From the survey (Table 31) most food crops are grown in an area of land less than 1 acre. Various crops occupy various land sizes. Maize (64%), beans (53%), potatoes (15%), Kales

(5%), onions (2%) bananas and tomatoes (1%). Mixed crop farming and diversification agroforestry techniques should be promoted to reduce effects of biting drought in this ecosystem and to improve livelihoods of the FAC.

Table 31: Area under various Crops grown

Crop	Area in acres (% respondents)			
	0.1-1	1.1-2	2.1-3	>3
Maize	64	4	1	1
Beans	53	2	0	0
Potatoes	15	1	0	0
Kales	5	0	0	0
Onions	2	0	0	0
Bananas	1	0	0	0
Tomatoes	1	0	0	0

- **Purpose of crops grown by the FAC**

The HH survey (Table 32) revealed that most FAC members grow various crops for subsistence use (maize-77%, Beans-67%, Potatoes-9%, Kales-9%, Onions-2%, Bananas-1% and tomatoes-1%). There are community members who grow crops for both subsistence and sale. A section of the FAC grow crops for sale and others don't grow any food crops at all. During capacity building the FAC members should be encouraged to improve on entrepreneurial skills and to engage in gainful agricultural activities. This will significantly reduce poverty and overall pressure on forest resources.

Table 32: Purpose of various Crops grown

Crop	Purpose of various Crops grown (% respondents)			
	Sale	Subsistence	Both	None
Maize	2	77	4	17
Beans	1	67	4	28
Potatoes	0	9	2	89
Kales	1	9	3	87
Onions	0	2	0	98
Bananas	0	1	0	99
Tomatoes	0	1	0	99

- **Livestock production**

Majority of FAC keep variety of livestock for various purposes. Top in the list is cows (88%), sheep (79%), Goats (41%), Chicken (26%), Donkeys (1%) and Camel (1%), Table 33. The breed being reared is majorly indigenous. The FAC being pastoralist should be sensitized to improve the livestock breed and variety. The improved breeds will enhance production and hence economic empowerment translating to poverty alleviation which is one of the constraints in forest conservation and management (Table 33). This will cure the forest resources from pressure as a result of poverty.

The FAC rear goats and donkeys which have been cited by the KFS as drivers of forest destruction and degradation. Browsers feed on forest leaves thus negating the health of the tree saplings, young natural regeneration and planted seedlings. Donkeys though providing much needed transport in this FAC difficult terrain; it is too being misused by forest offenders to ferry logs and charcoal from deep inside the forest areas. Proper sensitization should be done to change the mindset of the FAC on the animals which are not friendly to the forest conservation in their feeding habits.

Table 33: Livestock kept by FAC

Animals	Frequency	Percent	Indigenous		Mixed	
			Frequency	Percent	Frequency	Percent
Cows	114	88	113	87	17	13
Sheep	103	79	120	92	10	8
Goats	53	41	109	84	21	16
Chickens	26	20	108	83	17	13
Donkeys	1	1	5	100	0	0
Camels	1	1	4	100	0	0

- Income sources of the FAC

The survey showed that the respondents get income from various sources. Most income is from livestock sale (87%) and the least from crop sales and livestock products (2%) each (Table 34). The need to improve livestock quality is imperative. Diversification of income sources and value addition will too improve livelihood of the FAC.

The limited IGAs and meagre income from existing IGAs drives some members of the community to exert pressure on the limited forest resources as they seek to bridge the gap on income generation. This scenario should be changed by advocating for more viable diverse economic activities in the FAC.

Table 34: Economic activities

Income sources	Frequency	%
Sale of livestock	113	87
Sale of agricultural food crops e.g., Maize, Beans	69	53
Skilled labourers	16	12
Unprocessed forest products	13	10
Business Enterprises	12	9
Processed forest products	10	8
Casual employment	10	8
Pension payment from the government	4	3
Sale of livestock products	3	2
Sale of cash crops	3	2

3.2.4 On-farm tree propagation

Most of the respondents in the survey (76%) as shown in Figure 34 have trees growing in their farms. This is a positive indicator that tree growing is being embraced. Emphasis on tree growing promotion will hasten the attainment of more than 10% tree cover in this community.

There is a section of community members (24%) who don't grow trees in their farms. Focus should be on this group to be sensitized on the importance of growing trees for purposes of provision of goods (firewood, poles, posts, timber, and fruits), NWFP (medicinal plants, mushroom, honey), services (soil and water conservation, carbon sequestration) and the aesthetic value we get from trees.

Promotion of agroforestry shall be prioritized by all the stakeholders to fill the existing gap which is a recipe for forest destruction and degradation if not addressed like yesterday.

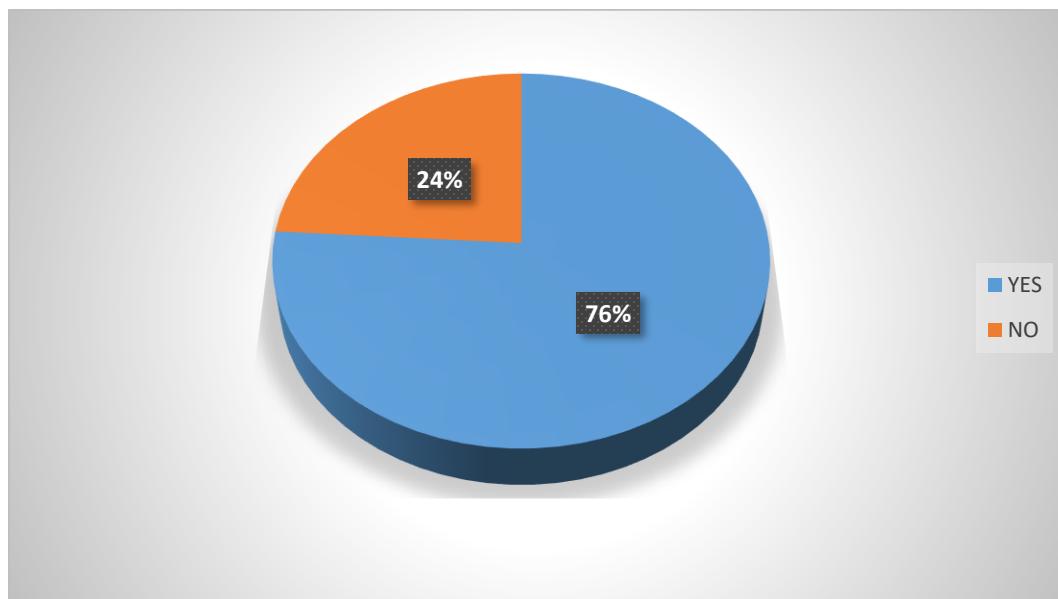


Figure 34: Tree growing by the FAC

- **Source of tree seedlings**

Most respondents (66%) source seedlings from natural regeneration in their own farms (Table 35). The other respondents get from various sources; KFS nursery (31%), own on-farm nursery (3%), private vendors, neighbours farm each (2%), roadside tree nurseries, KEFRI and KALRO nursery (1%) each.

The results from this survey are a pointer that more training on tree nursery establishment and management should be done. Urgent pulling of synergies should be done to address the gap which is existing in sourcing of high-quality viable seedlings by the members of this community. Healthy and suitable trees seedlings are a critical foundation in forestry development in any ecosystem. This should be prioritized by all the stakeholders who are supporting conservation activities.

Table 35: Sources of seedlings for propagation

Seedlings source	Frequency	%
Own farm through natural regeneration	51	66
KFS Nursery	24	31
Own on-farm nursery	4	3
Roadside/Private vendors	3	2
Neighbours' farm	3	2
Private/Roadside tree nursery	1	1
KEFRI nursery	1	1
KARI	1	1

- **Tree species in demand**

The survey showed that there is high demand of indigenous trees species (75%). The exotic tree species demand is 25% (Figure 35)

The FAC should be sensitized and be engaged in growing of appropriate tree species to meet their needs.

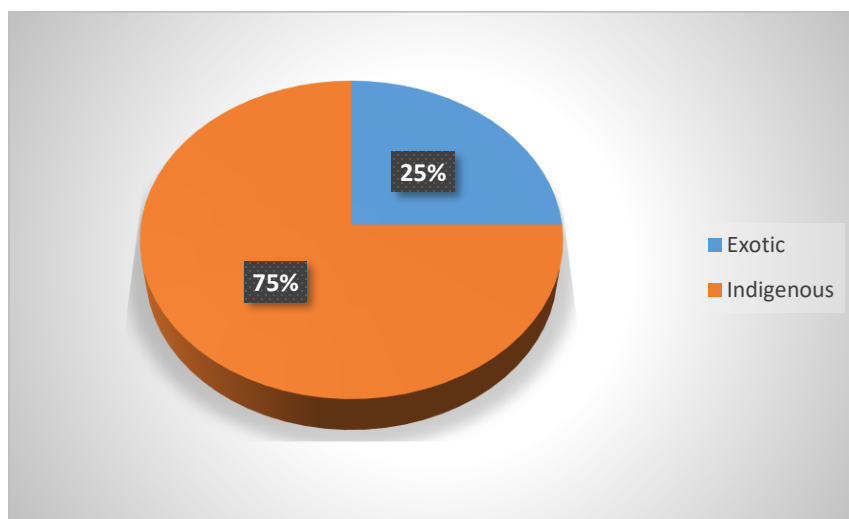


Figure 35: Trees in demand but supply is low

- **Tree establishment constraints**

In the process of tree establishment, farmers are faced with a myriad of constraints. The findings (Figure 36) show that; livestock damage accounts for (51%), wildlife damage (40%), drought (29%), pests and diseases (8%) and unavailability of labour to do preparation, planting and maintenance (5%).

These constraints should be checked to avoid unsustainable provision of forest goods and services. In the unlikely situation if corrective measures are not put in place the community

members will bridge the insufficiency gap by illegally getting the forest products from the Naramat forest block.

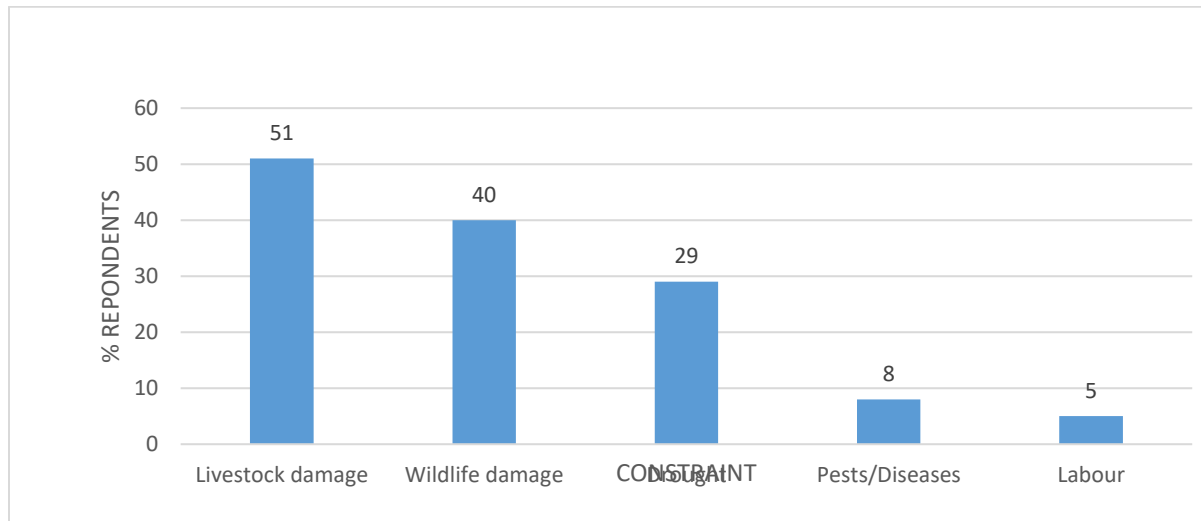


Figure 36: Tree establishment constraints

- **Remedies to tree establishment constraints**

The survey revealed that despite the constraints facing tree planting establishment, home crafted solutions have assisted in addressing the constraints. These include; watering (45%), fencing of the farms (30%), application of pesticides and insecticides (8%) and installation of water harvesting tanks at 5 % (Figure 37). These efforts are very positive and the attainment of sustainability in provision forest of goods and services will be realized if all the community members are senzitized to have local solutions to their immediate constraints in conservation efforts.

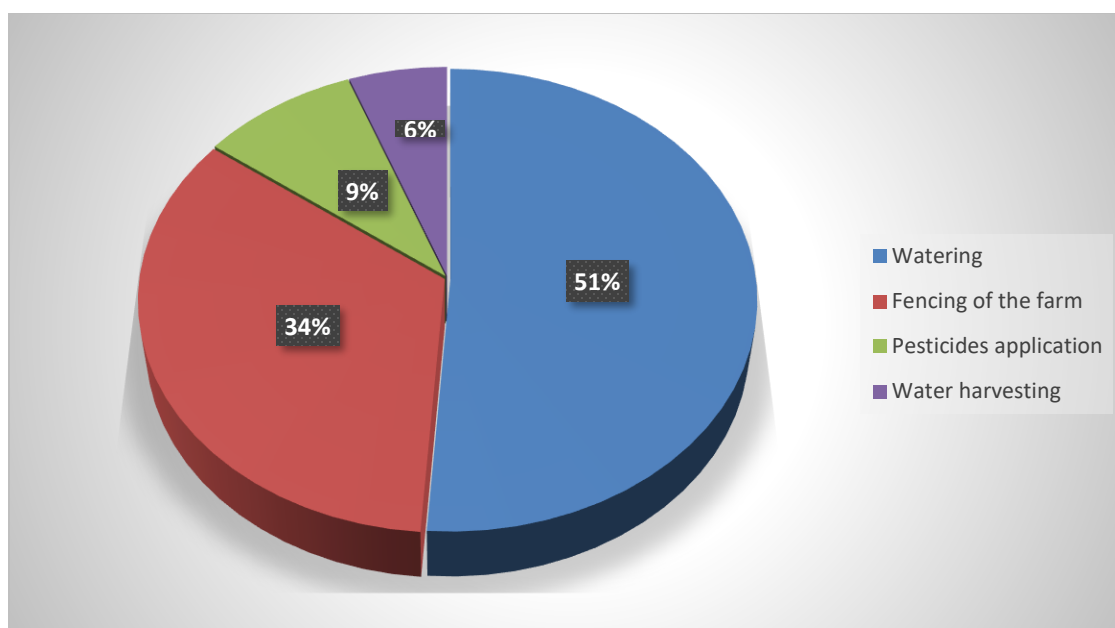


Figure 37: Remedies to tree establishment constraints

- **Purpose of on-farm trees**

The findings (Table 36) shows that the FAC plant trees on-farm for various reasons. Those planting for firewood (80%), shade (43%), charcoal (40%), bee keeping (38%), live fence (33%) Ornamental/Beauty (22%), Soil improvement (20%) and fodder for livestock (16%). There is need for sensitization of the community to espouse tree growing to meet their unlimited demand for forest goods and services.

Table 36: Purpose of on farm trees

Purpose of on farm trees	Frequency	%
Firewood	104	80
Shade	56	43
Charcoal	52	40
Bee keeping	49	38
Live fence	43	33
Ornamental/Beauty	29	22
Soil improvement	26	20
Fodder for livestock	21	16

3.2.5 Forest resource utilization

The survey indicated that firewood extraction and livestock grazing tops the list of forest resource utilization at 98% and 97% respectively (Table 37). The least utilized is recreation at (1%) which is non extractive.

This points a serious crisis going into the future if the trend on utilization is not checked by enforcing the relevant existing laws and preparing by laws at the CFA and user group level to attain sustainability.

The extractive usage of the forest resources need intervention measures to be put in place to change the story from extractive usage to non-extractive e.g promotion of ecotourism.

NWFP utilization promotion and provision of alternative sources of the forest products being from Naramat FB should be prioritized the soonest.

Table 37: Products and services obtained from the forest

Products and services obtained from the forest	Frequency	Percentage
Firewood	127	98
Charcoal	56	43
Thatch grass	12	9
Grass fodder	53	41
Honey	72	55
Seedlings/wildings	26	20
Wild fruits/vegetables	72	55
Medicinal herbs	78	60
Recreational activities	1	1
Religious activities	29	22
Traditional activities	91	70
Soil/sand	3	2
Water	77	59
Grazing livestock	126	97
Poles/posts	69	53

- **Grazing resources**

The FAC mostly rely on the forest for their grazing resources (98%). Zero grazing and own pasture (1%) each (Figure 38). This directly impacts the integrity of this forest ecosystem in a negative way.

Advocacy in the FAC should be done to embrace the uptake of alternative grazing resources and to improve on the livestock breed. Promotion of zero grazing, cut and carry, use of commercial improved feeds on livestock will reduce pressure on forest grazing. This will boost the livestock production in the FAC and the net effect will be poverty alleviation which is one of the constraints in forest conservation and management in this ecosystem.

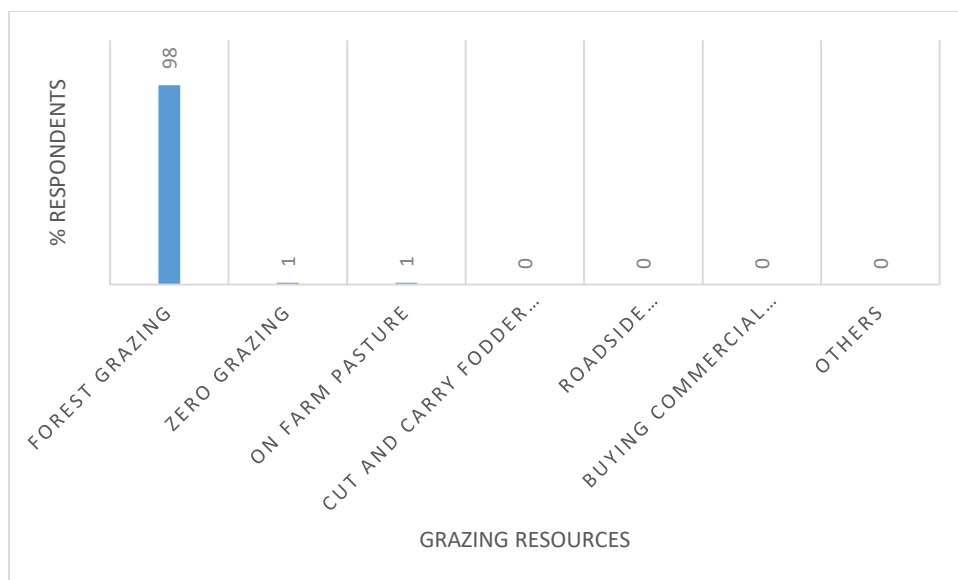


Figure 38: Grazing resources

- **Source of Household Energy**

The main source of energy is firewood from the Naramat (97%) Charcoal (60%), solar (45%), LPG (1%) and Mains electricity (1%) (Figure 39). This overreliance of the forest for firewood by the community implies that promotion of agroforestry technologies in the intervention zone is inevitable.

The other alternative energy sources like biogas should be introduced. The community have enough stock of cow dung which should be utilized to produce biogas. The biogas energy is clean energy. The stakeholders should promote this alternative energy source to save the forest resources which can be depleted if proper interventions are not put in place.

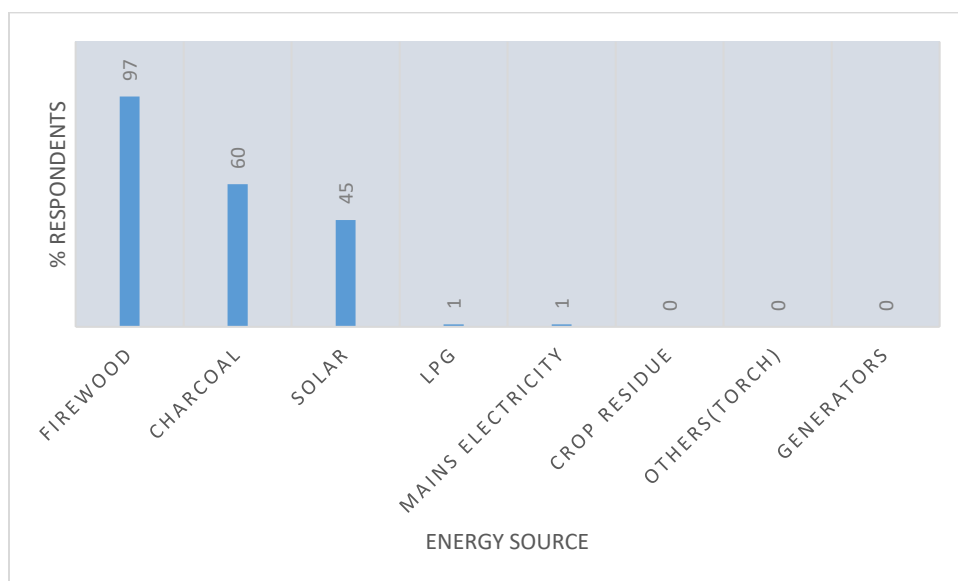


Figure 39: Sources of energy

- **Type of firewood**

Majority of the FAC members use dead, fallen firewood (60%) and dry firewood (40%) (Figure 40). The dry and fallen are sourced from the forest while the dry firewood is from community own farms.

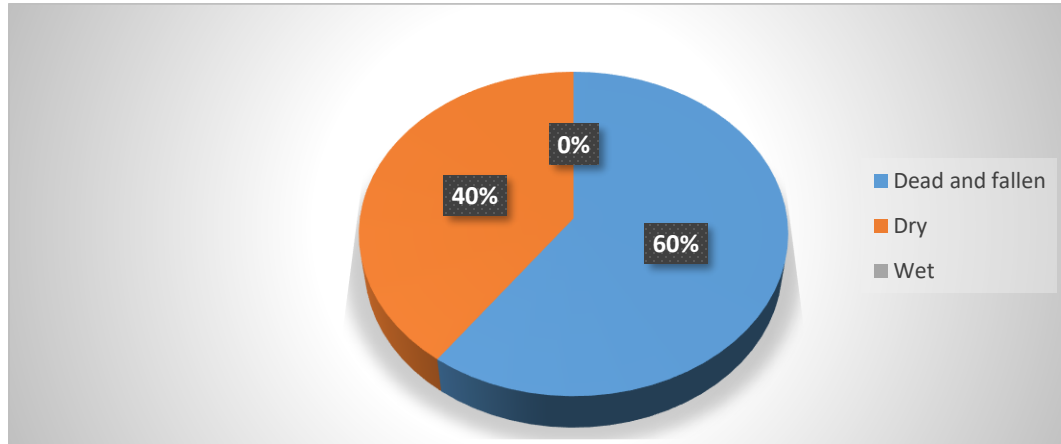


Figure 40: Types of firewood

- **Sources of water**

The survey results show that the FAC members source water from boreholes/well (47%), rivers (44%), roof harvesting (6%) Piped water is the least source (2%) (Figure 41). The water situation should be addressed by all. The FAC should be sensitized to adopt multiple sources of water to overcome the water constraint. In this survey (Table 29);41% of the FAC have constructed their house roofs with iron sheets. According to this study only 6% of FAC get their water from roof harvesting. The roof water harvesting technology has a lot of potential to reduce water scarcity. This should be tapped to resolve the water issue amongst other interventions.

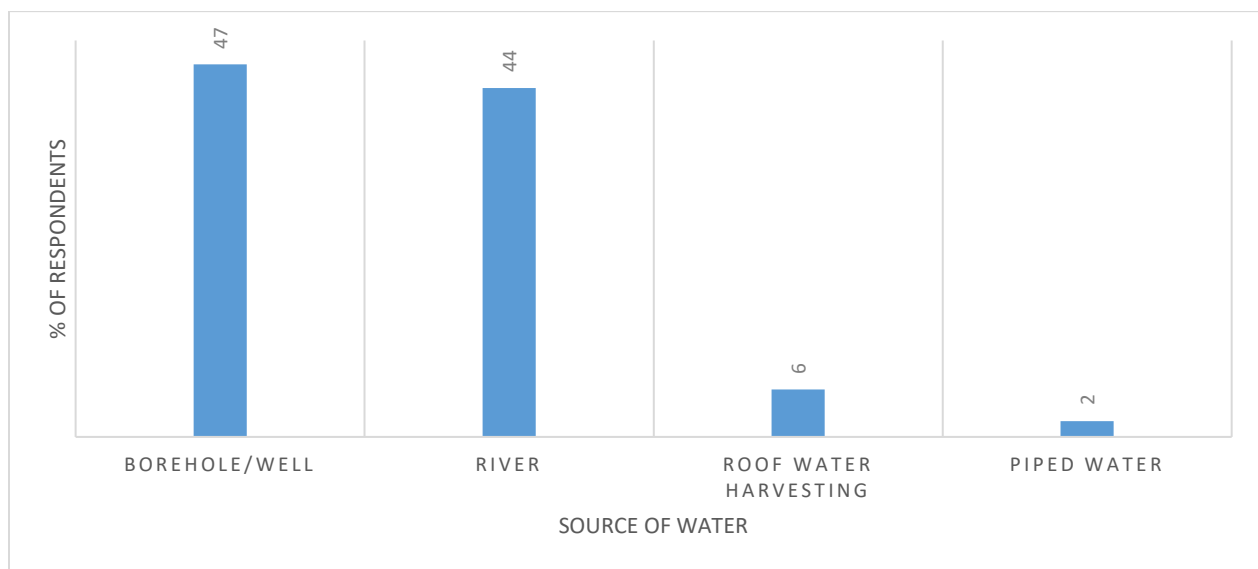


Figure 41: Sources of water

3.2.6 Community participation

In the survey on community participation, the results revealed that majority of the respondents (90%) have entered/accessed the forest and 2% haven't participated in any forest activity.

The community members enter the forest for various reasons; harvesting forest products(95%), prayers/other cultural activities(65%), decision making concerning forest management(50%), fire prevention activities (15%), fire fighting(10%), tree planting(2%),eco-tourism activities(1%) and forest patrols/policing(1%) (Table 38). This calls for more effort on the sensitization of the community on the importance of participating in conservation activities and to gain knowledge on importance of the forests. This will enhance conservation thus making the forest ecosystem to sustainably provide goods and services the community need to improve their livelihoods.

Table 38: Participation in forest activity

Participation in forest activity	Frequency	Percent
Entered/accessed the forest	117	90
Harvested products from the forest	124	95
Participated in tree planting	3	2
Participated in eco-tourism activities	1	1
Participated in patrols and policing	1	1
Participated in prayers and other cultural activities	85	65
Involved in decision making concerning forest management	65	50
Participated in fire control and prevention activities	20	15
Participated in fire fighting	13	10
Has not participated in any forest activity	3	2

- **Community awareness on Conservation organizations, CFA awareness, Membership and its roles.**

The survey showed that (50%) of the respondents are aware of a CBO involved in forest conservation,43% are not aware and 7% didn't answer this question. A sizeable portion 56% of the respondents are aware about the CFA existence, 35% are not aware and 9% didn't answer this question. Approximately half (50%) of the FAC know the roles of the CFAs and the other half,50% aren't aware of the CFA roles. On the CFA membership, the survey showed that 51% of the respondents are members,16% are not members and 33% didn't answer this question (Table 39).

This implies that more sensitization should be done to enlighten the FAC on conservation organizations, CFA existence, its roles and to rally the FAC to join CFA as members and to participate in forest conservation. This should be done by all the stakeholders so as to enhance protection, conservation and sustainable utilization of the forest resources thus improving their livelihoods.

Table 39: Community participation and awareness on forest user groups and forest use

Forest group awareness	Response	Frequency	Percent
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Forest group awareness	Response	Frequency	Percent
CBO	Yes	65	50
	No	56	43
	No answer	9	7
CFA aware	Yes	73	56
	No	46	35
	No answer	12	9
CFA member	Yes	66	51
	No	21	16
	No answer	43	33
Aware of CFA roles	Yes	65	50
	No	65	50

3.2.7 Perception on forest importance

The survey showed that (38%) of the respondents agreed that the forest was important for the provision of goods like firewood, timber, grass and posts, 33% agrees that the forest is important for both the environmental services and goods and 29% agrees that the forest provide services like fresh air, soil and water conservation (Figure 42). Generally, the FAC attaches some importance to the forests. This is a strength to be supported to enhance forest protection, conservation and sustainable utilization of the available forest resources in Naramat FB.

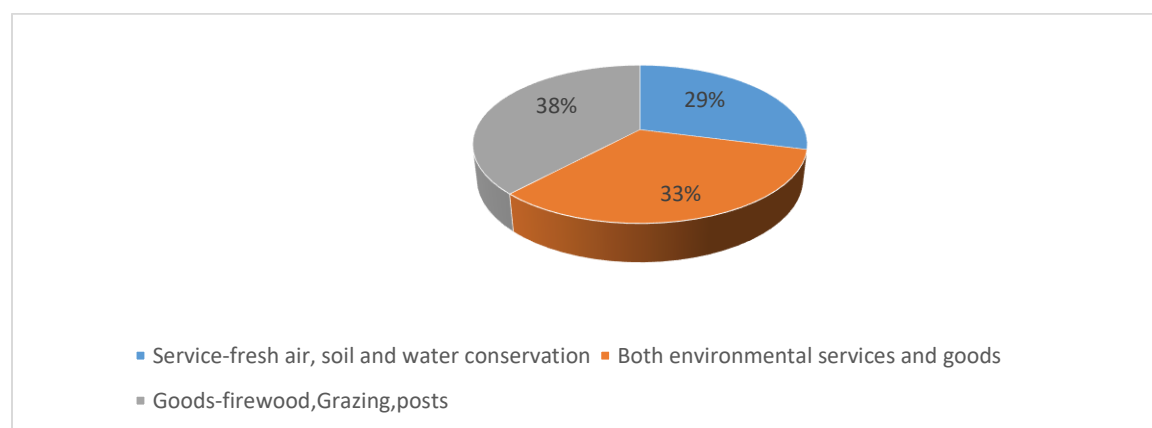


Figure 42: Importance of forest

- **Willingness to contribute for forest conservation**

The findings showed that 51% of the respondents are willing to contribute 0-100ksh for forest conservation, other members are willing to contribute; 101-200ksh (24%), 201-300ksh (16%), 401-500ksh (2%) and over 500Ksh (1%) (Figure 43).

This is a good gesture to forest conservation and it should be strengthened. More sensitization should be done in FAC to ensure all remain in the conservation journey for the betterment of livelihoods today and going into the future.

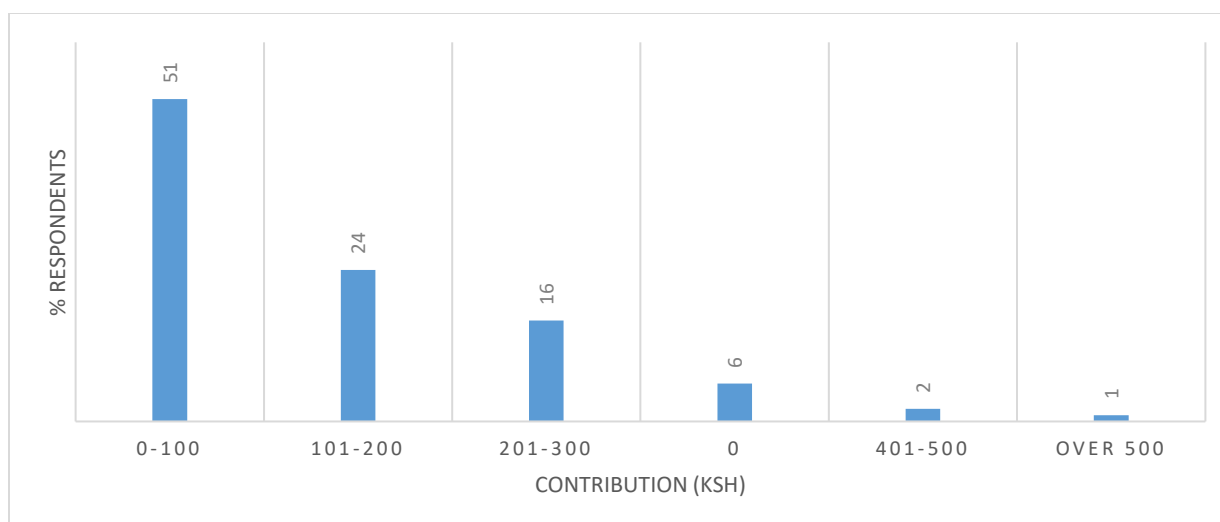


Figure 43: Willingness to contribute for forest conservation

3.2.8 Human Wildlife conflict

The survey showed that (100%) of the respondents have experienced human-wildlife conflict. The main problematic animals include elephants 100%), zebra (45%) as shown in Table 40. The least problematic wild animals are the fox at 2%. Sensitization on how to manage human/wildlife conflict should be done in the FAC.

Table 40: Problematic animals

Problematic Animals	Frequency	Percent
Elephants	130	100
Lion	20	15
Hyena	3	2
Zebra	56	45
Squirrels	4	3
Fox	3	2
Baboons/monkeys	29	22
Leopards	9	7

- **Problems caused by wild animals**

The problems facing the FAC arising from wild animals include; crop destruction (55%), livestock killing (23%), human attack/killing (20%) and trees damage (2%), (Figure 44). These issues should be addressed by the concerned organisations to minimize the human-wildlife conflicts and to enhance conservation.

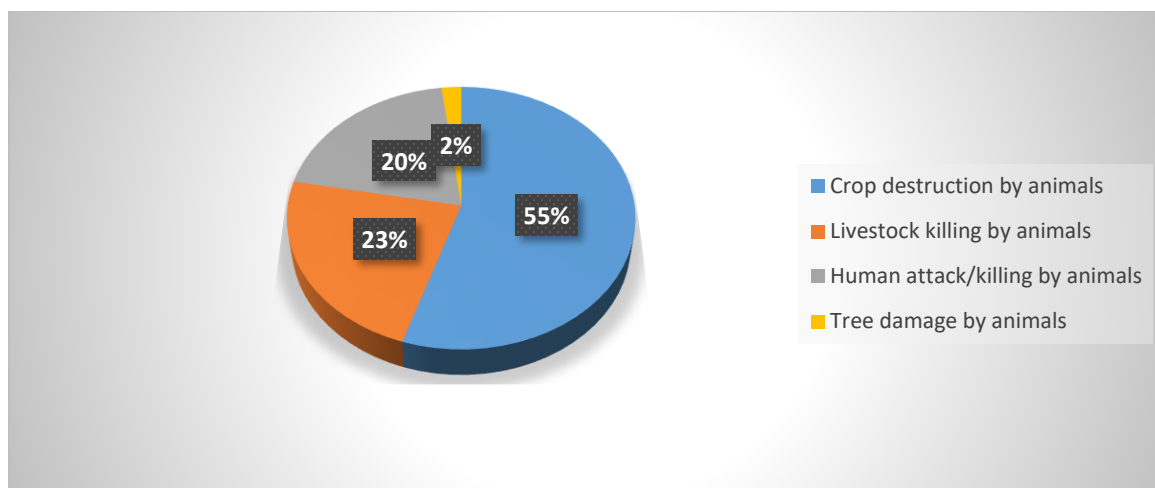


Figure 44: Problems caused by wild animals

3.2.9 Forest Management constraints

The forest management face several constraints in Naramat FB. The respondents cited; drought (30%), poor management (22%), poverty (18%), overstocking (16%), family responsibility/burden (15%), ignorance (15%) insecurity (10%), Illegal logging/Deforestation(9%) Inadequate communication(6%), Lack of financial resources(5%), Dangerous wild animals(4%), Charcoal making(3%), Lack of incentives(2%), Lack of knowledge(2%), Lack of compensation(1%), Inadequate training(1%), Lack of fence(1%), Inaccessibility(1%), Fire(1%), Lack of FMA(1%) and Inadequate tree nurseries(1%),(Table 41).The constraints need to be addressed by all the stakeholders to enhance conservation and improve livelihoods.

Table 41: Constraints in forest conservation

Constraint	Frequency	Percent
Drought	39	30
Poor management	29	22
Poverty	23	18
Overstocking	21	16
Ignorance	20	15
Family responsibility/burden	20	15
Insecurity	14	10
Illegal logging/Deforestation	12	9
Inadequate communication	8	6
Lack of financial resources	7	5
Dangerous wild animals	5	4
Charcoal making	4	3
Lack of incentives	3	2
Lack of knowledge	3	2
Lack of compensation	1	1

Constraint	Frequency	Percent
Inadequate training	1	1
Lack of fence	1	1
Inaccessibility	1	1
Fire	1	1
Lack of FMA	1	1
Inadequate tree nurseries	1	1

3.2.10 Suggestions to improve governance and management of the forest resources

The respondents suggested the following to improve governance and management of forest resources.

Majority emphasized the need to upscale protection and conservation(35%), recruitment of more scouts(30%), tree planting(20%), improvement of cooperation between KFS/FAC(20%), forest fencing(17%), conduct more trainings(15%), improvement of management(10%), empowerment of the community(10%), Create more awareness(9%), establishment of more tree nurseries(2%), construction of fire tower(1%), destocking(1%), empower scouts(1%) and signing FMA(1%), (Table 42). There should be engagement on these suggestions to ensure enhanced conservation.

Table 42: Suggestions to improve forest conservation

Suggestions to improve forest conservation	Frequency	Percent
Conserve and protection emphasis	46	35
Recruit more scouts	39	30
Tree planting	26	20
Improve cooperation between KFS and CFA	26	20
Forest fencing	22	17
Conduct more training	20	15
Empower the community	13	10
Improve management	13	10
Create more awareness	12	9
Establish more tree nurseries	3	2
Construct fire tower	1	1
Avoid overstocking	1	1
Empower scouts	1	1
Sign FMA	1	1

CHAPTER THREE C

SOCIOECONOMIC STATUS

3.3 NAILEPUNYIE FOREST MANAGEMENT UNIT

3.3.1 Background

A household survey was conducted in the FAC with a total of 77 questionnaires were successfully filled. The results of the analysis of the questionnaires administered is illustrated in this chapter, with the main highlights illustrated and their impacts on community livelihoods and sustainable forest management. The LPT members who administered the household questionnaires used systematic sampling method in their endeavor which greatly reduced bias during the sampling process.

Table 43: Population dynamics of Nailepunyie Block

Location	Sub-location	Male	Female	Total	Total Households	Area (km ²)	Density (persons/km ²)
Opiroi	Opiroi	550	950	1500	110	60	21
	Mabati	250	350	600	45	25	13
	Lorokloldongo	520	840	1360	90	78	19
Barsaloi	Lulu	300	430	730	60	30	20
	Soitnaibor	150	200	350	30	20	10
Angata	Angata nanyukie	1800	2200	4000	250	150	24
	Morijo	1200	1600	2800	180	120	22

3.3.2 General information

- Gender of respondents

The household survey indicated that 59% of respondents were male, while 41% were female (Figure 45).

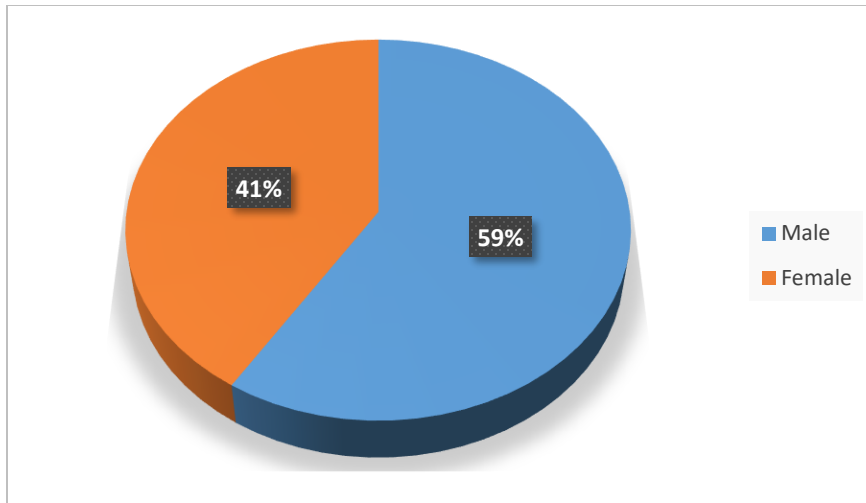


Figure 45: Gender of the respondents

- **Tribe of respondents**

From the survey results, 100% of respondents were from the Samburu tribe. The area is dominated by the tribe as the County is recognized as the ancestral home of the Samburu in Kenya.

- **Age classes of the respondents**

The survey indicated that the majority of the respondents were at the 36-60-year age bracket at 44%, followed by the (18-35) year age class at 31%. The over 60-year age class was at 25% (Figure 46). Different ages hold different environmental attitudes and perform environmental behaviors of different kinds and to varying degrees. The results could suggest that older individuals would conserve less, cause more environmental harm, and make fewer environmentally friendly choices. While the older generation was foretold about the dangers of environmental destruction in the past, it is the current young generation that is experiencing the impacts of that destruction that were projected, e.g. prolonged droughts, scarcity of forest resources (water, grazing, herbal medicines, increased conflicts over scarce resources, etc.). It is thus paramount that the younger age brackets to be sufficiently capacity built on sustainable forest resources utilization models, and mitigating measures against impacts of environmental degradation.

The key pillar for PFM is sustainable use of natural resources, for present and future generations. If left unchecked, environmental degradation would reach a tipping point where the degradation would become self-accelerating, and beyond any mitigation strategies, and this would have catastrophic consequences, not only on the environment, but on the livelihoods and quality of life of the community members.

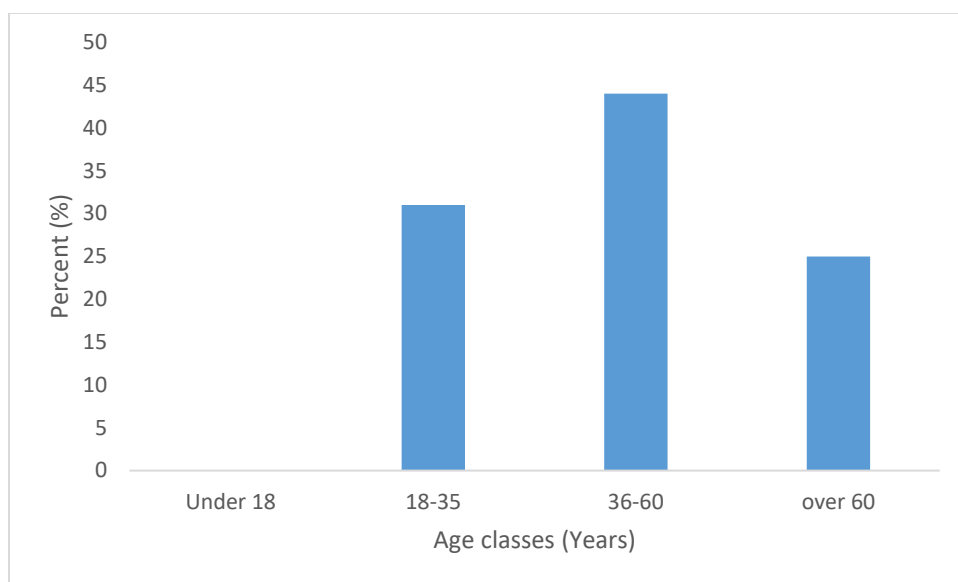


Figure 46: Age bracket of the respondents

- **Reasons for immigration**

As illustrated in the ethnicity of respondents, (who were 100% Samburu), the migration patterns in the study area appeared to be intra-migration, i.e. migration within the same geographical area.

This type of movement within the same geographical area would usually be driven by opportunities for education and economic improvements, natural disasters, civil disturbance and cultural reasons e.g., marriage. According to the survey, the majority of respondents moved within the area due to socio-cultural reasons, i.e. marriage (40%) and acquiring land as an inheritance from their parents and or relatives (32%). Quite alarmingly, 18% of respondents interviewed were squatters (Figure 44). A squatter being a person who occupies a piece of land without a legal claim to it, (no title deed or lease agreement). This basically would mean that that lack of ownership of land would make it virtually impossible for the occupants to make any long term decisions concerning any land use activities in the long run. However, land owners have complete dominion over their land assets thus have the legal authority to make choices on how to use their land. To that end, they would form valuable stakeholders as far as implementing sustainable agroforestry practices in their land, e.g. woodlots, boundary planting, tree nurseries establishment. Nailepunyie had a case of forest squatters where this would not apply. Land owners would be key in increasing tree cover outside gazetted and protected areas, i.e. in the farmlands.

Table 44: Reasons for being in the area

Reasons for immigration	Frequency	%
Marriage	31	40
Bought land	8	10
Acquired land as inheritance	24	32
Squatter	14	18

Total	77	100
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- **Education level**

According to the survey, 56% of respondents had formal education, with primary (32%), secondary (18%) and tertiary (6%) as shown in Figure 47. However, 44% of respondents had no form of formal education. The importance of education on populations cannot be overstated. Education is a powerful agent of change, improves health and livelihoods, contributes to social stability and drives long-term economic growth. Quality education is goal number four of the sustainable development goals, *“To ensure inclusive and equitable quality education and promote lifelong learning opportunities for all”*.

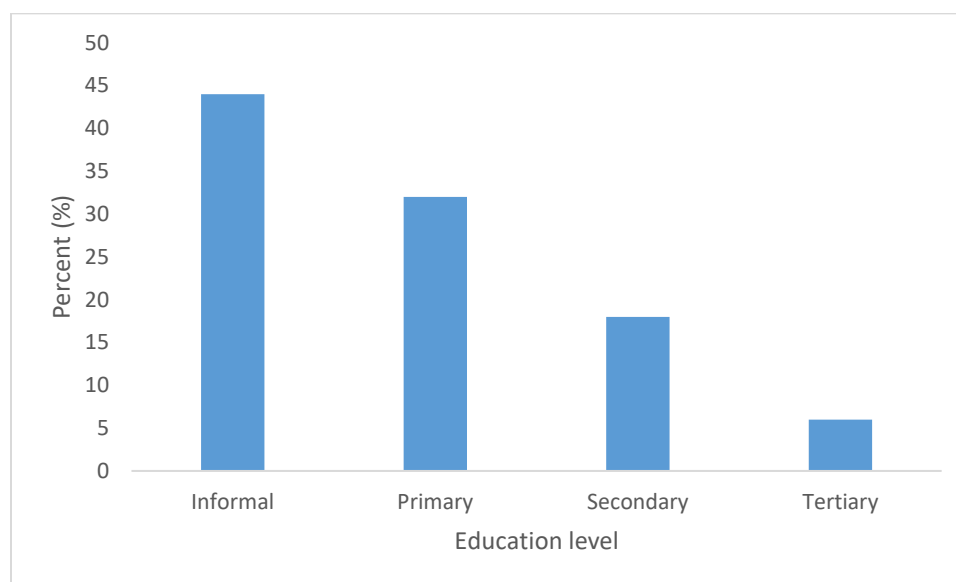


Figure 47: Education levels of respondents

The more a society is educated and informed, the easier it would be for its members to understand how their decisions and affect the environment. Education would generate knowledge and the needed skills to address environmental issues (e.g. deforestation, loss of biodiversity, global warming and climate change, etc.), alongside the actions to be taken in sustainable environmental conservation and protection.

- **The family and home**
- Family size

The survey indicated that the households had quite large numbers of residents with the majority being in the (6-10) members at 53%, with the least being in the (1-2) members at 3% (Table 45). In recent times concerns have been raised over the ever-increasing population growth and its direct and indirect impacts on resources, especially in cases whereby families depend on natural resources. Forest resources tend to be finite, and cannot be exploited unsustainably. Family sizes are a matter of personal choices;thus, it would be near impossible to dictate to community

members the number of offspring they should have. That being stated, unchecked exploitation of forest resources by community members would result in depletion of the said resources. It would then be prudent for the area stakeholders to encourage the community members to diversify their sources of needed resources away from the forest, e.g., promoting use of solar power instead of firewood use, value addition to forest resources to improve their longevity and shelf life, etc.

Table 45: Family size

Family size	Frequency	Percent (%)
1-2	5	3
3-5	12	22
6-10	38	53
More than 10	22	22
Total	77	100

- **Household ownership**

The survey indicated that 82% of respondents owned the lands their homesteads occupied, while 18% were squatters (Figure 48).

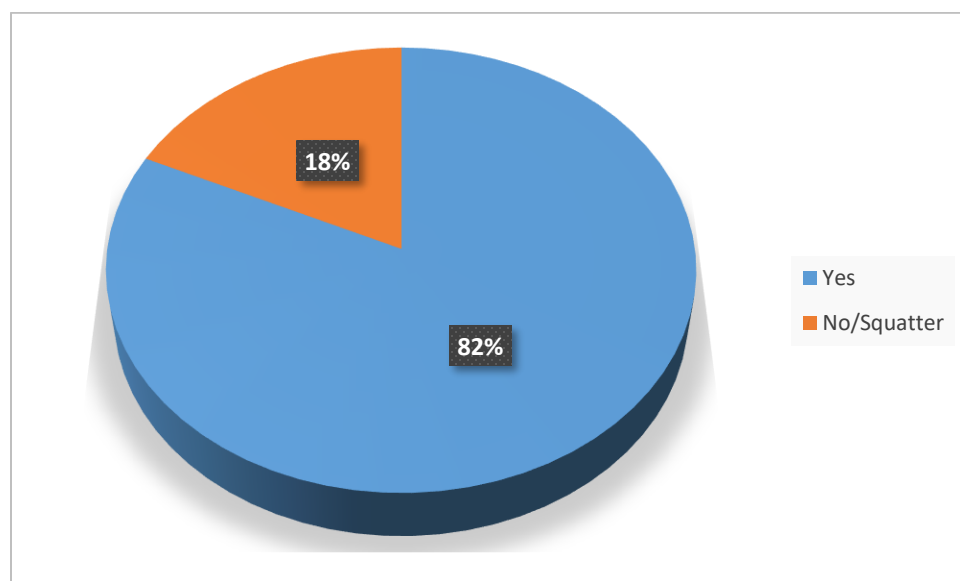


Figure 48: Land occupation status of the respondents

All the respondents' households were headed by males, as the Samburu community is patriarchal, and the oldest males tend to be the decision makers of the households.

From the respondents legally owning land, the survey indicated the majority of respondents, owned land sizes of 2.1-4 acres, (44%), followed by those owning 4.1- 6 acres (25%) as shown Table 46.

Respondents with small land holdings would generally promote agricultural practices that would enhance efficiency-based agriculture aimed at economic sustenance without really considering the positive effects of diversifying land use practices. Based on the survey, the FAC, members with large tracts of land should be encouraged to diversify their land uses to incorporate agroforestry into their holdings.

Table 46: Farm sizes of respondents

Farm sizes (acres)	Frequency	%
<2	5	6
2.1-4	34	44
4.1-6	19	25
6.1-8	0	0
Over 8	5	6
Squatter	14	18
Total	77	100

- **Household construction materials**

The survey indicated that the respondents used a wide variety of materials in the construction of their houses. When it came to roofing, the respondents used polythene (86%), wood (twigs and branches), (69%) and iron sheets (12%) in various proportions (Table 47). The use of plastics in homestead construction should be immediately discouraged for a variety of reasons,

- Plastics take years to decompose
- When degraded by sunlight or combust in fires, they release toxic substances into the air causing ambient pollution and release carcinogenic compounds into the atmosphere
- Animals may feed on plastics and when they consume them their digestive systems get blocked.

Therefore, alternative roof construction materials should be sought.

As for the other household sections, the respondents tended to use non-wood/timber construction materials, i.e.,

- a) Walls – Respondents used mud (50%), animal dung (34%), and, (25%) wood/offcuts for their construction.
- b) Boundary fence – Respondents used live fences (47%), barbed wire and posts/poles/timber (29%). However, 24% of the respondents did not have any boundary fences in their homesteads.
- c) Floors – Respondents used mud (81%), and, animal dung (34%) in various combinations and also some used cement (6%).

- d) Latrine/external bathrooms – Respondents used wood/offcuts (24%) alongside polythene (14%) in their construction. However, 62% of respondents didn't report any construction of latrines/external bathrooms.

Table 47: Household construction materials

Material(s) used	Percent (%)				
	Roof	Walls	Boundary fence	Floor	Latrine/external bathroom
Wood/timber/offcuts/twigs/ branches	69	25	16		24
Cement				6	
Mud		50		81	
Animal dung		34		34	
Iron sheets	12				
Live fence			47		
Barbed wire and posts			13		
Polythene	86				14
None			24		62

The household construction materials were used in combination with other materials. For instance, those with polythene roofs used either branches or twigs to hold the polythene in place.

3.3.3 Crop production

According to the survey, 54% of respondents practiced some form of crop production activities while 46% did not (Figure 49). The reason towards that low uptake of crop production would have been caused by the harsh climatic conditions in Samburu County that wouldn't make growing of crops an attractive venture due to livestock/game damage and the historical/cultural prestige placed on owning livestock. However, there were respondents who had taken up crop growing as a means of supplementing their food and income sources. That would only have a positive effect on the thriving of forest crops both in farmlands and gazetted forests as the pressure on grazing areas would greatly reduce.

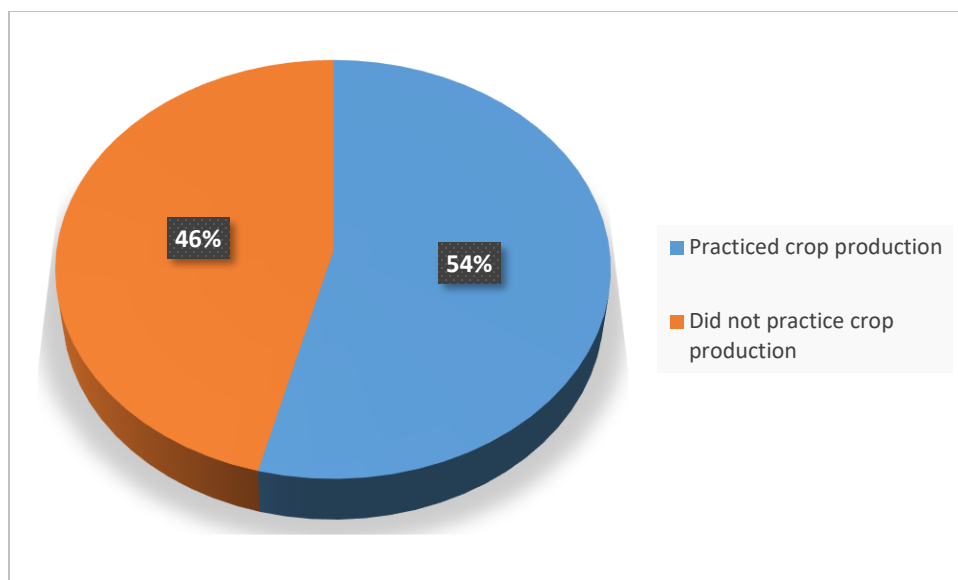


Figure 49: Respondents practicing crop production

Crops grown by the respondents

From the survey conducted, it was found out that 28% of the respondents grew maize, 44% grew beans, while 38% grew vegetables, (Sukuma, cabbage, onions) and fruits (tomatoes) as shown in Figure 50.

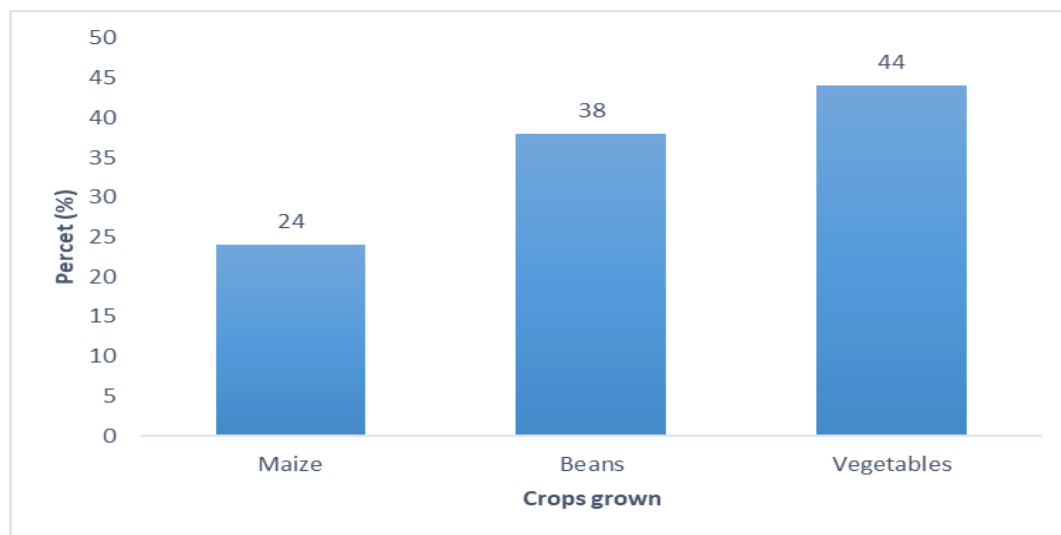


Figure 50: Crops grown by respondents practicing crop production

For the respondents practicing crop production,

- 100% grew maize for both sale and domestic consumption,
- 15% grew beans for subsistence, and 85% for both subsistence and for sale, and,
- 33% grew vegetables for subsistence, 25% for sale and 42% for both consumption and for sale (Table 48).

Table 48: Purposes of crops grown by the respondents

Purpose of crops	Maize		Beans		Vegetables	
	Frequency	%	Frequency	%	Frequency	%
Subsistence			7	15	14	33
Sale					11	25
Both	42	100	35	85	18	42

As the results of the survey indicated, it was possible to practice crop production in the FAC, which if it was to be adopted would greatly reduce the reliance on livestock products for sustenance and livelihoods, thus reduce pressure on grazing resources both in the farmlands and in the forest. Trainings on profitable crop production for the farmers is highly recommended, so as the community members could/would adopt mixed farming whereby they would grow crops alongside practicing animal husbandry.

- **Livestock production**

Based on the survey, 94% of the respondents kept livestock while 6% did not (Figure 51). This was probably due to the fact that the major economic activity in the FAC was livestock production.

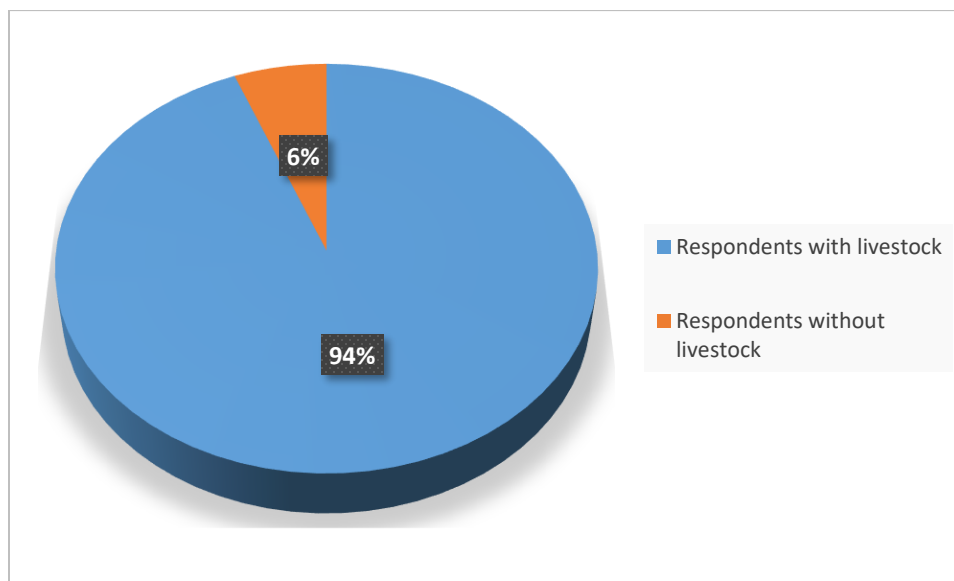


Figure 51: Respondents keeping livestock

Livestock reared

From the 94% of respondents keeping cows, the majority kept herds of between (61 - 70) animals at 21%, with most them being 96% indigenous breed and 4% exotic (Table 49).

Table 49: Cows kept by the respondents

Cows No.	Frequency	%	Breed			
			Exotic		Indigenous	
			Frequency	%	Frequency	%
1 to50	15	21	0	0	15	100
51-60	13	18	0	0	13	100
61-70	15	21	0	0	15	100
71-80	10	14	0	0	10	100
81-90	13	18	2	14	11	86
91-100	0	0	0	0	0	0
Over 100	6	8	1	17	5	83
Total	72	100	3	4	69	96

The survey showed that of the respondents keeping livestock, 92% of them reared sheep, with the most of respondents having herds of between (81-90) animals at 30% with all of them (100%) being indigenous breed as shown in Table 50.

Table 50: Sheep kept by the respondents

Sheep No.	Frequency	(%)	Breed	
			Indigenous	
			Frequency	(%)
0				
1-50	13	19	13	19
51-60	11	15	11	15
61-70	16	22	16	22
71-80	8	11	8	11
81-90	21	30	21	30
91-100	0	0	0	0
Over 100	2	3	2	3
Total	71	100	71	100

The survey showed that of the respondents keeping livestock, 92% of them reared goats, with the majority having herds of between (61-70) animals, with 100% of them being indigenous breed (Table 51).

Table 51: Goats reared by the respondents

Goats No.	Frequency	Percentage (%)	Breed	
			Indigenous	
			Frequency	(%)
0				

1 ≥50	9	12	9	12
51-60	12	17	12	17
61-70	16	22	16	22
71-80	10	14	10	14
81-90	15	21	15	21
91-100	5	7	5	7
Over 100	5	7	5	7
Total	72	100	72	100

The survey showed that of the respondents keeping livestock, 13% of them reared camels, with the most having herds of between (1-4) at 55% and between (5-8) at 45%, with all of them, 100% being indigenous breed (Table 52).

Table 52: Camels reared by the respondents

Camels No.	Frequency	(%)	Breed Indigenous	
			Frequency	(%)
1-4	9	55	9	55
5-8	8	45	8	45
Total	17		17	100

The survey indicated a preference towards large stock, with the livestock adopted by the FAC being aggressive grazers and browsers, which would exert a huge pressure on grazing resources. Adding to that, majority of the livestock reared were indigenous, which have adapted to the climatic conditions. It would be prudent to sensitize the owners to ease into adopting small stock (chickens, ducks, rabbits, etc.) slowly so as to supplement their food sources while at the same time creating markets to uplift their livelihoods away from the cows, sheep and goats that they have a cultural attachment to.

- **Livestock products**

The respondents used a wide variety of products from their livestock, including meat, milk and skins (Table 53). These products were used both for subsistence and for sale.

Table 53: Livestock products

	Frequency	Meat	Milk	Skins/wool	Fat	Blood
Cows		100	100	67	45	100
Sheep		100	45	34	100	
Goats		100	100	44	40	100
Camels		55	68	28	100	

- **Grazing resources**

The survey indicated that 100% of livestock owners grazed their herds in the forest, with 25% grazing them in group ranches (Table 52).

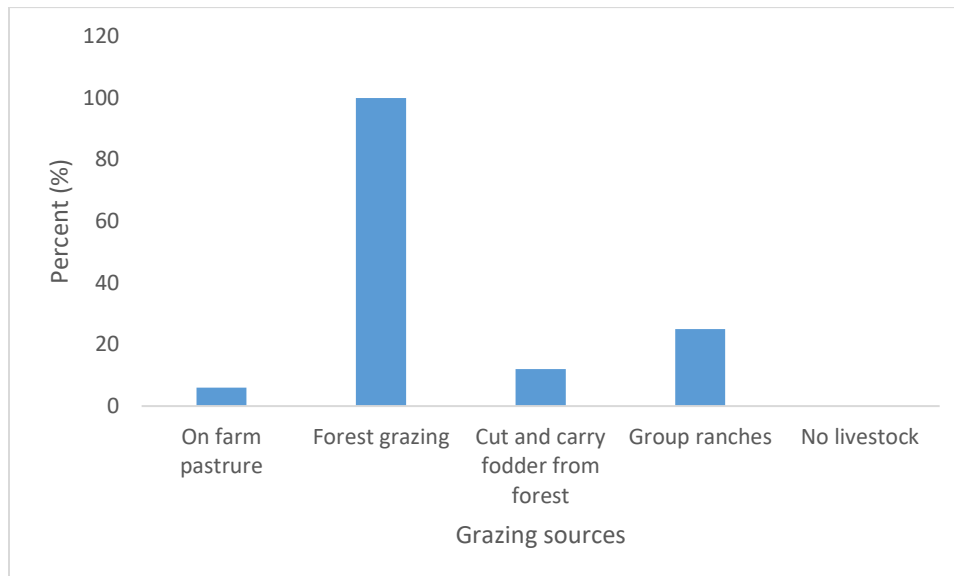


Figure 52: Grazing resources of the respondents

The survey indicated an overwhelming demand for forest grazing, which if left unchecked would lead to overgrazing, forest degradation and an increase in conflicts as the resource would become scarce. Additional grazing sites for instance fodder banks establishment in homesteads should be explored in order to reduce pressure on the forest.

- **Income sources**

The survey indicated that majority of the respondents made their living from sale of livestock (94%) and sale of livestock products (100%)(Figure 53). These livestock farmers should be linked with other markets to enhance sales and profits they could also be encouraged to take up value addition of their products to make their goods/products more attractive in the markets.

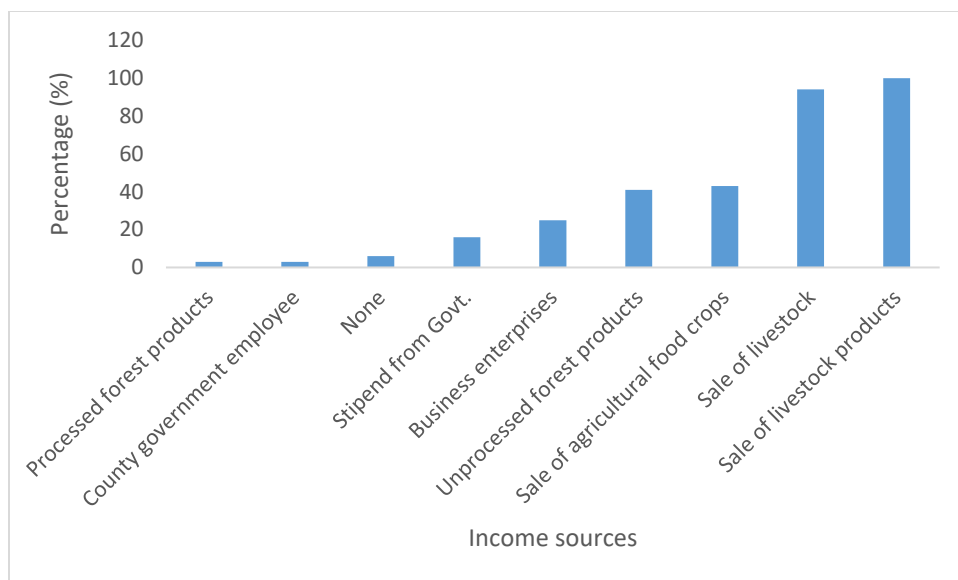


Figure 53: Income sources of the respondents

3.3.4 On farm tree growing

From the study, 78% of respondents had trees growing on their farms while 22% did not (Figure 54). This was a positive sign in the efforts to increase tree cover in households. More efforts need to be put in place in order to encourage the FAC to adopt high value trees that would not only promote environmental benefits but economic benefits as well.

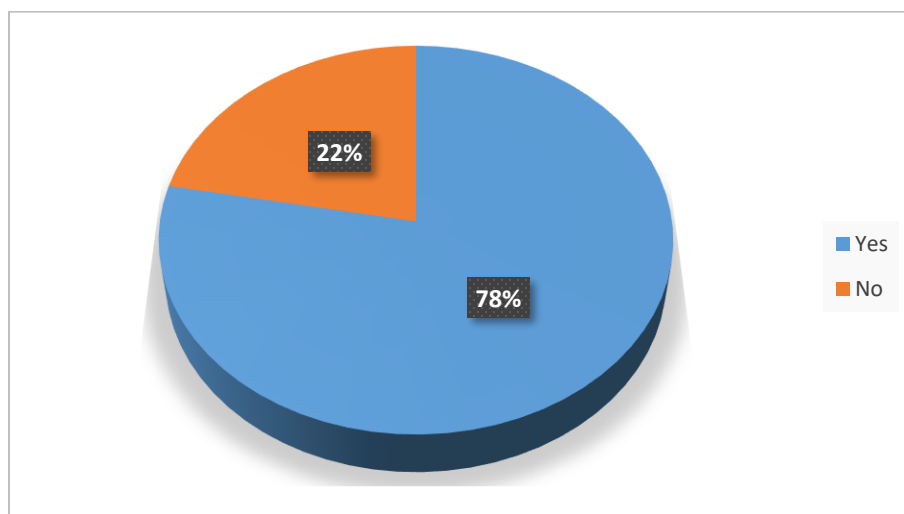


Figure 54: On farm tree growing of the respondents

- **Trees growing on farms**

The survey indicated that the most common trees species in the homesteads were, *Iti* (78%), *Ltepes* (75%), and *Louwai* (56%) as shown in Table 54.

Table 54: Tree species growing on farms

Trees growing on farms	Frequency	%
<i>Ltilimani</i>	7	9
<i>Lbukoi</i>	9	12
<i>Lngeriyo</i>	10	13
<i>Sakarantei</i>	10	13
<i>Parmunyo</i>	11	14
<i>Rangau</i>	11	14
<i>Lkormosioi</i>	12	16
<i>Sirai</i>	12	16
<i>Santaiti</i>	13	17
<i>Lmasanduku</i>	14	18
<i>Sikawai</i>	14	18
<i>Cypress</i>	15	19
<i>Lderkesi</i>	15	19
<i>Laimai</i>	17	22
<i>Lorsanjo</i>	18	23
<i>(Lororoi)</i>	19	25
<i>Raraiti</i>	19	25
<i>Lchurai</i>	22	28
<i>Lpirintai</i>	26	34
<i>Lmargweti</i>	29	37
<i>Lowai</i>	29	38
<i>Lpopongi</i>	29	38
<i>Lkiringiri</i>	34	44
<i>Louwa</i>	43	56
<i>Lchakwai</i>	45	58
<i>Ltepes</i>	58	75
<i>Iti</i>	60	78

According to the survey, 78% of respondents got their seedlings from their own farms through natural regeneration and from their neighbours' farms(Figure 55). A source of seedlings is the centrepiece of all agroforestry activities. Further to that, quality of the seedlings would be important. The community would be advised to establish their own nurseries to provide a source of seedlings to the community. This would increase tree cover in the neighbourhoods while providing an income source to the nursery operators.

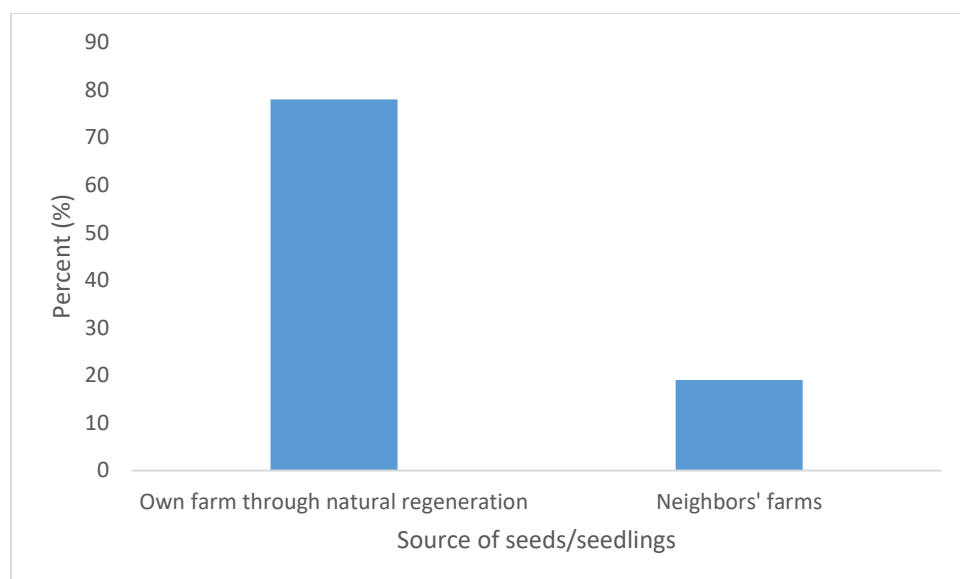


Figure 55: Source of seeds/seedlings

- **Agroforestry/niche practices**

The respondents made use of their on-farm trees for a variety of purposes as illustrated in Table 55. The majority of respondents used their on-farm trees (*Ltepes, Lchakwai, iti, lgitgir, lgilai, Ltarakwai, Lkindigai, Lkiringiri, Lngeriyo, lororoi*), for firewood purposes at 78%. This is a positive sign that most respondents had a potential ready source of their immediate fuel wood needs from their on-tree farms. Programmes should be initiated to promote the propagation of high calorific tree species in homesteads. This would go a long way in reducing pressure on the forest from firewood demand.

Table 55: Agroforestry/niche practices

What purposes do the on farm trees serve the respondent	Frequency	Percentage (%)	Examples
Cash income from sale of poles, posts and timber	10	13	<i>Ltarakwai, Lakirdingai, Lgiringiri</i>
Firewood	60	78	<i>Ltepes, Lchakwai, iti, lgitgir, lgilai, Ltarakwai, Lkindigai, Lkiringiri, Lngeriyo, lororoi,</i>
Charcoal production	10	13	<i>iti, ltepes</i>
Live fence	36	47	<i>Lchakwai, Lchurai, Ltapasi, Lowai, iti, Lkiringiri, Raraiti</i>
Providing shade	31	41	<i>Ltepes, Lchakwai, iti, Lowai, Ltarakwai,</i>
Ornamental	19	25	<i>Ltepes, Lchakwai, Parmunyo, roroi</i>
Fodder for livestock	17	22	<i>Ltepes, Lchakwai, Lororoi, Lowai</i>

Bee keeping	3	4	<i>Ntapuka</i>
Fruits	10	13	<i>Ltepes</i>
Medicinal	77	100	<i>Lorsanjo, Lkinyil, Ltilimani</i>

3.3.5 Forest resources utilization

The survey indicated that the respondents derived a number of forest products from the forest as shown in Table 56. Firewood and medicinal herbs appeared to be the most exploited resources from the forest. This could pose a potential risk of over-exploitation of firewood from the forest if not controlled and regulated by both the KFS, stakeholders and the CFA. The establishment of woodlots in individual farms should be encouraged to alleviate the pressure of firewood resources from the forest.

Table 56: Forest resources utilized by the respondents

Resources obtained from the forest	Frequency	Percentage (%)
Firewood	77	100
Grass fodder	10	31
Honey	63	81
Seedlings/wildlings	2	3
Wild fruits/vegetables	58	75
Medicinal herbs	77	100
Recreational activities	17	22
Religious activities	58	75
Traditional ceremonies	74	97
Water	30	39
Grazing livestock	77	94
Poles/posts	2	6
Precious stones e.g. granite	2	6

The survey indicated that the most exploited forest resources were water, firewood, grazing livestock and medicinal herbs, all at 100% with various degrees of frequency of extraction (Table 57). That state of affairs was alarming to the extent that there is a real danger of over-exploitation of those resources. The key stakeholders should collaborate in ways to ensure resources' uses is sustainable through control of access into the forest. The CFA would be instrumental in that through the registration of members into Forest User Groups (FUGs) as a means of knowing the amount/level of resources resource utilization by persons legally allowed to extract the said resources. A well-functioning CFA would enable to restrict the numbers of persons accessing forest resources and that would enhance sustainable use of forest resources.

Table 57: Frequency of resource utilization

Resource	(%)						
	Dail	Weekl	Monthl	Seasonall	Yearl	When	When

Resource	(%)						
	y	y	y	y	y	availabl e	neede d
Firewood	77	13	10				
Grass fodder	34	18		48			
Honey			21	67		12	
Seedlings/ wildlings				100			
Wild fruits/ vegetables				58		42	
Medicinal herbs	12		46				42
Recreational activities	29	44	27				
Religious activities		80	15	5			
Traditional ceremonies					100		
Water	94	6					
Grazing livestock	88			12			
Poles/posts					100		
Precious stones e.g. granite				100			

- **Energy situation**

The survey indicated that 100% of respondents used firewood as their main source of energy, mainly used for cooking and warming the house (Table 58). The survey also indicated that 31% of the respondents used solar panels for their secondary energy needs, mainly for lighting, powering electronics, etc. It is a positive outcome that respondents had taken up solar energy, as it is renewable and doesn't pollute the environment unlike firewood and charcoal that emit noxious fumes and greenhouse gases (carbon dioxide and black carbon) when subjected to combustion.

Table 58: Energy sources of the respondents

Sources of energy of the respondent	Frequency	Percentage (%)	Uses/purposes
Firewood	77	100	Cooking, warming house
Charcoal	17	22	Warming house
Solar panels/ D-light	24	31	Lighting, powering electronics, charging phones

- **Types of firewood used**

The survey indicated that the majority of respondents, (97%) used dry firewood while (84%) used dead and fallen firewood (Table 59). These firewood types have the following benefits, Improves storage capability, (no moulding or degradation), Increase in energy density, i.e., a higher calorific value, Decrease in transport weight, Reduction in ash and smoke emissions,

Unlike wet firewood which has the following disadvantages, It would be harder for the wood to catch fire/combust, Fires from wet firewood tend to release a lot of smoke, The fire makes hissing noises as excess moisture gets burnt off, Less heat is produced, The fuel won't burn cleanly thus more pollutants would be released into the atmosphere.

Therefore, the trend of using dry and dead and fallen firewood should be encouraged to reduce air pollution from greenhouse gases.

Table 59: Type of firewood used

Types of firewood used	Frequency	Percentage (%)	Main source
Dead and fallen	65	84	Forest, homestead
Dry	75	97	Homestead, forest

- **Water situation**

Table 60: Sources of water of the respondents

Sources of water	Frequency	Percentage (%)
Fetching from the river	75	97
Well	19	25
Roof water harvesting	12	16
Borehole	17	22
Dams/pan	7	9

The survey indicated that 97% of the respondents sourced their water requirements from the river, followed by from wells at 25%(Table 60).

- **Distance from water sources**

- a) **The river**

Table 61: Distance from the homesteads to the river

Approximate distance from the river to the household (Km)	Frequency	Percentage (%)
0-0.4	2	3
0.5-0.9	5	6
1.0 - 1.4	23	31
1.5-1.9	0	0
2.0-2.4	23	31
2.5-2.9	5	7
3.0-3.4	0	0
3.5-3.9	0	0

Over 4	17	22
Total	75	100

b) The borehole

Table 62: Distance from the homesteads to the borehole

Approximate distance of the water source to the household (Km)	Frequency	Percentage (%)
0-0.4	17	100
Total	17	100

c) The well

Table 63: Distance from the homesteads to the well

Approximate distance of the water source to the household (Km)	Frequency	Percentage (%)
1.0-1.4	6	32
2.0-2.4	3	15
2.5-2.9		
3.0-3.4	4	21
3.5-3.9		
Over 4	6	32
Total	19	100

d) Roof water harvesting

Table 64: Distance from the homesteads to roof water harvesting apparatus

Approximate distance of the water source to the household (Km)	Frequency	Percentage (%)
0-0.4	12	100
0.5-0.9		
1.0-1.4		
1.5-1.9		
2.0-2.4		
2.5-2.9		
3.0-3.4		
3.5-3.9		
Over 4		
Total	12	100

e) Dams/pans

Table 65: Distance from the homesteads to the dam/pans

Approximate distance of the water source to the household (Km)	Frequency	Percentage (%)
0-0.4		
0.5-0.9		
1.0-1.4	2	33
1.5-1.9		
2.0-2.4		
2.5-2.9		
3.0-3.4		
3.5-3.9		
Over 4	5	67
Total	7	100

The survey indicated that while the respondents had a wide variety of water sources, they faced a huge challenge in the distances they had to travel in order to access those water resources (Table 61,62,63,64 & 65). Time spent travelling back and forth to water sources could be better used in other productive activities. It is therefore imperative that the community be given apparatus and equipment for water collection and storage near their homesteads, e.g. piping, storage tanks, etc. The fact that water as a commodity was hard to acquire, many homesteads would give priority to essential services like cooking, drinking and for livestock sustenance. If water would be sufficient, many farmers would not have a problem with using their water reserves in seedling propagation and nursery establishment.

3.3.6 PFM activities

The survey indicated that the respondents participated in a wide variety of PFM activities as illustrated in table 66. All the respondents had accessed the forest (100%) and they all had harvested forest products from the forest. The survey indicated a strong relationship between the community and the forest, thus there was a need to regulate the extraction of forest resources sustainably. This would be possible through community sensitization on PFM and more so the role of CFAs in ensuring forest resources were extracted alongside forest conservation.

Table 66: PFM activities

PFM activities in the past 12 months	Frequency	Percentage (%)
Entered/accessed the forest	77	100
Harvested forest products	77	100
Participated in eco-tourism	7	10
Participated in prayers and other cultural activities	72	94
Participated in patrols and policing	29	38

Involved in decision making concerning forest mgt.	34	44
Participated in fire control and prevention	34	44
Participated in firefighting	36	47

3.3.7 Participation in organizations involved in environmental conservation

The survey indicated that 63% of the respondents were members of organizations involved in environmental conservation, with 95% of those being members of the Nailepunyie (Table 67). This bodes well in terms of a willing community ready to promote activities that would help in environmental conservation. It would also make it easier for donors and other stakeholders to disseminate vital information about PFM through those group rather than going from person to person.

The respondents who didn't belong to any organization involved in environmental conservation gave various reasons for that status, which were, not aware (54%), no interest (23%) and drought at 9%.

Table 67: Participation in organizations involved in environmental conservation

a) Does the respondent or someone in his/her family belong to a forest user group or any community-based organization involved in forest conservation	YES	Frequency	Percentage (%)
		48	63
	NO	29	37
b) If the answer for (a) is "NO", is the respondent aware of the Nailepunyie Community Forest Association	YES	7	25
	NO	22	75
c) If the answer for (a) is "YES", is the respondent a member of the CFA	YES	47	95
	NO	2	5
d) If the answer for (c) is "YES", is the respondent aware of the roles and obligations of Community Forest Associations?	YES	47	100
	NO	0	0

- **Perception on the importance of forests**

The survey indicated that the majority of respondents (41%), agreed that forests were equally important in the goods they provided. It also showed that 34% of respondents perceived forest to be important in the environmental services they provided (Figure 56). Finally, 25% of respondents thought forests were important through the goods they provided.

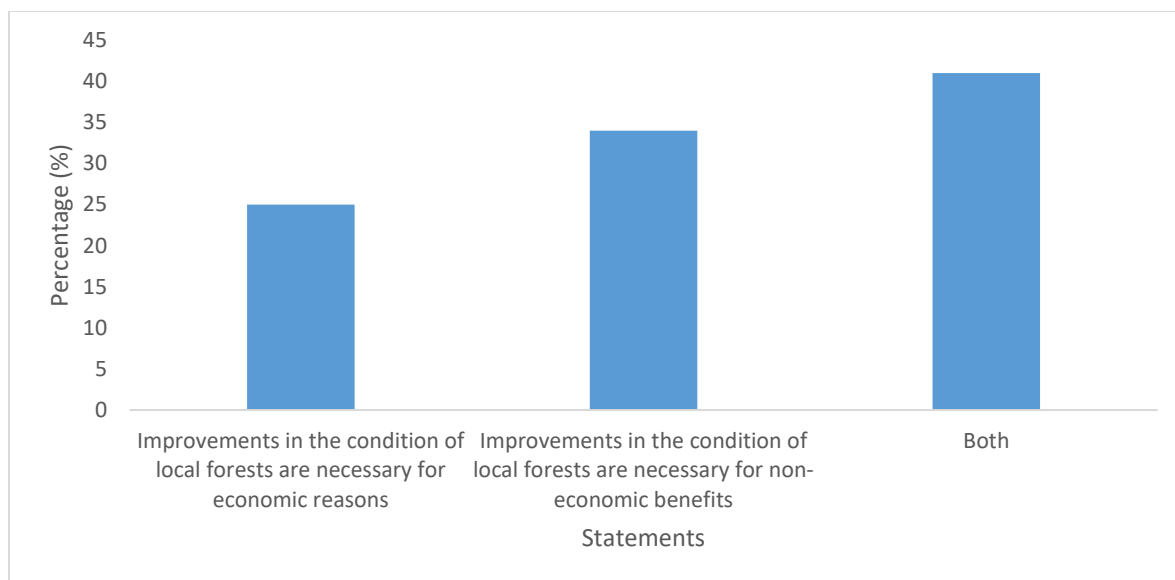


Figure 56: Perception on the importance of forests:

- **Human wildlife conflicts**

The survey indicated that 94% of respondents experienced human wildlife conflicts (HWC) to various degrees (Figure 57).

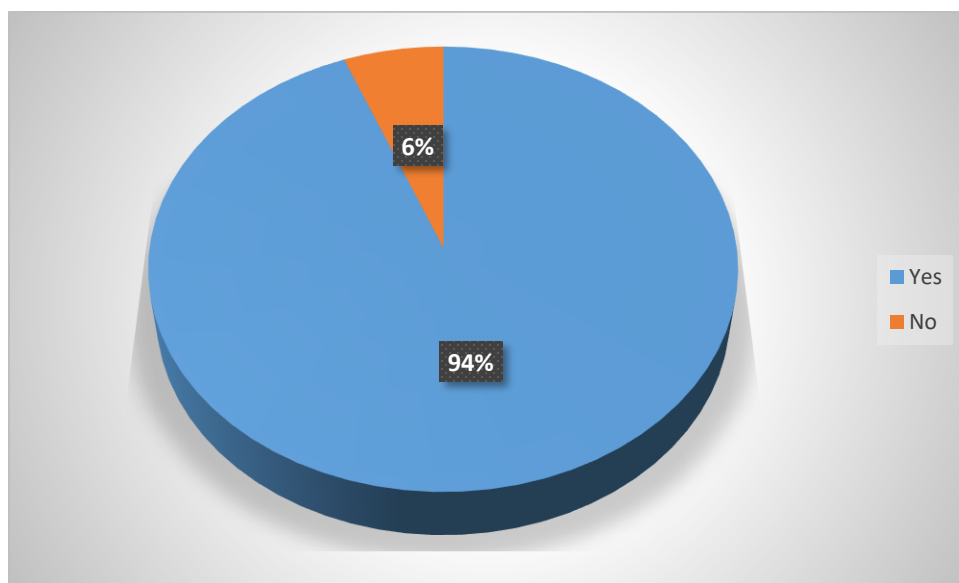


Figure 57: Human-wildlife Experiences of respondents

The survey indicated that the major problem animals were wild dogs (75%) followed by leopards (69%) and hyena (63%) as shown in Table 68. The relevant authority should be engaged in order to address that challenge since if it would continue unabated, it would cause the productivity of livestock to drop due to losses of the animals through wildlife attacks.

Table 68: Problem animals

Main animals	problem	Frequency	Percentage (%)	Economic significance
Elephant		34	44	Destroy crops/farms, fences and trees, kill people
Hyena		49	63	Eat livestock
Snakes		15	19	Snake bites
Lions		29	38	Attack cows, goats and sheep
Leopards		53	69	preys on goats
Wild dogs		56	75	Prey an livestock
Cheater		19	25	Prey an livestock
Wild dogs		8	10	Kill livestock
Monkeys		10	13	Destroy crops

- **Problems faced in conserving trees in Nailepunyie FAC**

From the survey, the major challenge in conserving trees were poaching (59%), forest fires (59%), charcoal production (44%), encroachment (41%) overgrazing (41%) and drought (34%) as shown in Figure 58.

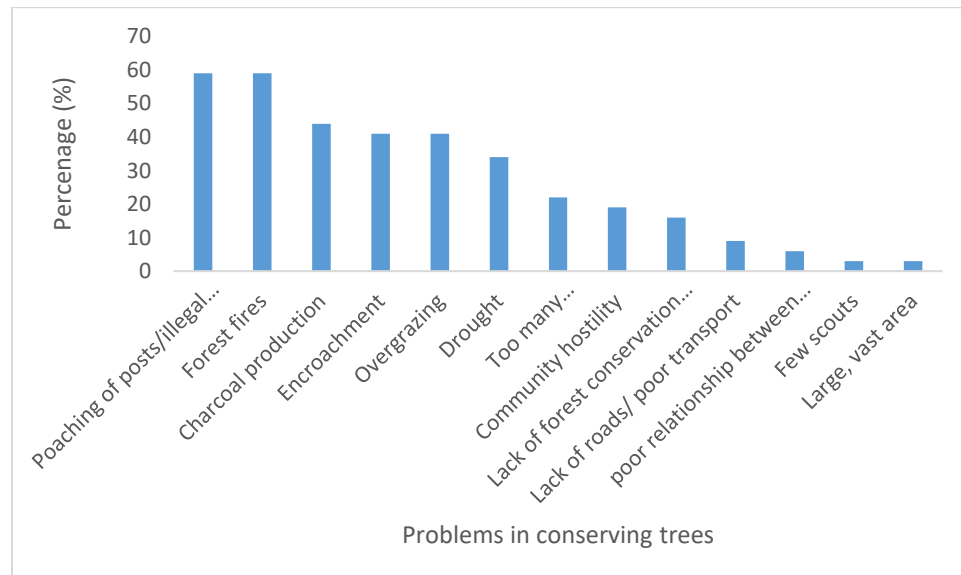


Figure 58: Problems faced in conserving trees

The respondents also had suggestions to improve forest management and governance, and these were, recruiting more scouts (44%), strengthening CFAs (41%), additional outposts (31%), evict squatters (28%), community sensitization (28%), use of village elders, (25%) and involving community in forest management, (16%) as shown in Figure 59.

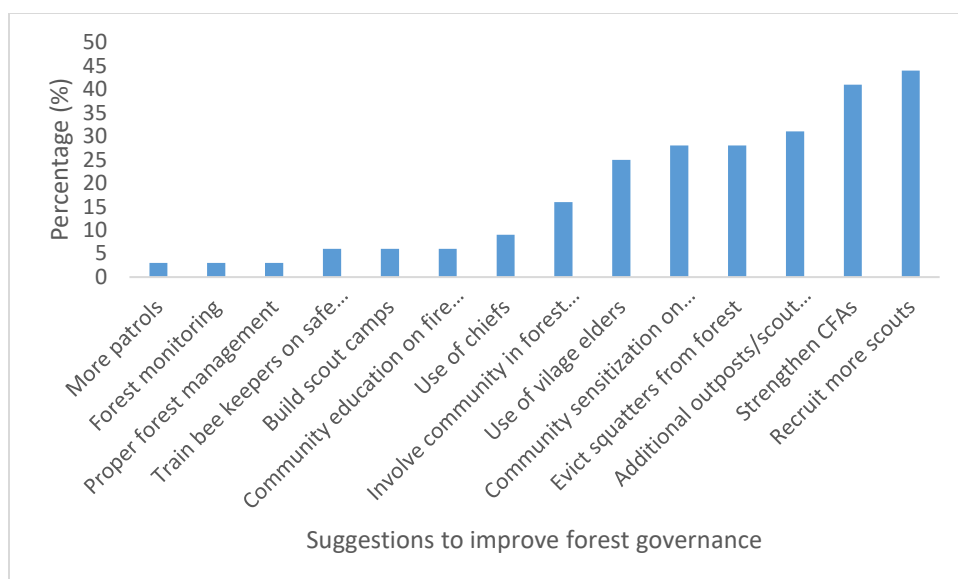


Figure 59: Suggestions on improvement of forest management and governance

3.4 STAKEHOLDER ANALYSIS

The ecosystem has diverse stakeholders undertaking various activities that can be tapped to enhance conservation and livelihoods of the forest adjacent community. The main stakeholders who need to participate in the implementation of this plan are KFS, CFAs and Samburu County Government. The lead stakeholders identified are shown in Table 69.

Table 69: List of stakeholders

Stakeholders' organization	Roles and responsibilities
KFS	- Protect the forest - Enforce the law - Creation of awareness - Forest rehabilitation and tree planting - Implementation and coordination - Protect wildlife in forest
KWS	- Anti poaching - Research - Coordination of wildlife issues - Policy formulation and implementation
Samburu County Govt (Department of Agriculture2)	- Enforcement of law - Awareness creation - Agro forestry - Supervision and coordination - Improvement of livelihoods - Soil and water conservation

Stakeholders' organization	• Roles and responsibilities
WRA	• Water conservation • Awareness creation • Rehabilitation of forest • Protection and conservation of water catchments areas
NEMA	• Undertake out on E.I.A to proposed development projects • Environment auditing • Law enforcement • Environmental planning and coordination and supervision
AWF	• Environmental education • Livelihoods improvement for local people • Instruction supports and building • Research
Ministry of Interior and Coordination of National Government	• Law enforcement • Coordination and supervision • Provision of security • Awareness creation
Dept of livestock production (Samburu County Govt.)	• Awareness creation • Livelihood improvement • Education provision
Suyian Trust	• Awareness creation • Protection and conservation • Implementation of planned activities

CHAPTER FOUR

PLANNING CONSIDERATIONS

4.1 Policy and legal frameworks

The management, conservation and protection of forests in Kenya is based on several policies and legislations articulated by different government sectors. The preparation, planning and implementation process of this PFMP takes cognizance of the various policies and legislations, whose objectives have a direct impact on the sustainable, management and utilization of Leroghi/Kirisia forest ecosystem. These policies and laws as well as some other national, regional and international agreements are briefly analyzed hereunder.

4.1.1 The Constitution of Kenya, 2010

The Constitution of Kenya, 2010 provides for environmental management in Chapter 5 under Article 69 section (1) which requires the State to:

- (a) ensure sustainable exploitation, utilization and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits;
- (b) Work to achieve and maintain a tree cover of at least 10% of the land area of Kenya; The development and implementation of the Leroghi/Kirisia PFMP will contribute to the achievement of the 10% tree cover especially in Samburu, which is a low tree cover County.
- (c) Protect and enhance intellectual property in, and indigenous knowledge of, biodiversity and genetic resources of the communities.
- (d) encourage public participation in the management, protection and conservation of the environment;
- (e) protect genetic resources and biological diversity;

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

The Act is a culmination of an amendment done on the Environmental Management and Co-Ordination Act of 1999, to conform to the Constitution of Kenya, 2010 and other relevant laws. The National Environment Management Authority (NEMA) is the lead implementing agency for EMCA. It is mandated among other functions to; promote environmental education, public awareness and public participation in environmental management; encourage incentives for voluntary environmental conservation practices and work with other lead agencies to issue guidelines and prescribe measures for the attainment of at least 10% tree cover of the land area of Kenya (Section 9).

The Amended Act has included the role of County governments in forest management through formation of a County Environment Committee in Section 29. The committee will be in charge of proper management of the environment within the county for which it is appointed (Section 30), including forestry functions such as provision of extension services to individuals and communities in their jurisdiction.

Section 48 provides for the protection of forests and requires consideration of the traditional interests of the forest adjacent communities before any actions are taken in respect to forests or mountain areas. The Act provides for environmental protection through; Environmental Impact Assessments, Environmental audit and monitoring; and Environmental restoration orders,

conservation orders, and easements (Parts VI, VII & IX). Therefore, EIAs will be done for all qualifying projects during implementation of this plan.

4.1.3 The Forest Conservation and Management Act, 2016

The Forest Conservation and Management Act No. 34 of 2016 gives effect to Article 69 of the Constitution with regard to sustainable management of forest resources. Under Section 3, this Act shall apply to all forests on public, community and private lands.

The functions of Kenya Forest Service under Section 8 paragraph (b) and (e) stipulate that the Service shall;

(b) Prepare and implement management plans for all public forests and, where requested, assist in preparation of management plans for community forests or private forests in consultation with the relevant owners;

(e) Assist county governments to build capacity in forestry and forest management in the counties;

Pursuant to the Act, the guiding principles under Section 4 paragraph (b) shall be public participation and community involvement in the management of forests. Section 47 Sub section (1), (2), (3) and (6) Management plans are a requirement for the management of community forests;

(3) Every County government shall be responsible for the preparation of a management plan with respect to forests in the country.

(4) A community that owns a community forest may prepare a management plan for the community forest or it may request the relevant county government to prepare a management plan for the community forest

(5) The Chief Conservator of Forests and relevant county governments shall supervise the implementation of forest management plans for public forests in the case of the state forest like Kirisia/Leroghi and community and private forests in the relevant county in the case of the County government.

Further, the Forest Conservation and Management Act, 2016 provides for community participation in forest management through registration of Community Forest Associations (Section 48). Sub section (1), (2), (4). Section 49 (1) describes the obligations of a CFA which include; Protect, conserve and manage the forest or part of the forest in accordance with an approved management agreement entered into with the Service and the provisions of the management plan for the forest. The forest adjacent community of Leroghi/Kirisia forest has established Kirisia CFAs to conserve the resources within the forest and beyond.

4.1.4 The Water Act, 2016

This Act provides for the regulation, management and development of water resources and water and sewerage services in line with the Constitution of Kenya, 2010. Primarily, the Constitution acknowledges access to clean and safe water as a basic human right (Section 63) and assigns the responsibility for water supply and sanitation service provision to County governments (Sections 69 and 77). The Act gives priority to the use of abstracted water for domestic purposes over irrigation and other uses (Section 8). The Act establishes the Water Resources Authority (WRA), among other institutions. The objective of the new WRA is to protect, conserve, control and regulate management and use of water resources through the establishment of a national water resource strategy. Section 29 of the Act provides for establishment of Water Resource Users Associations (WRUAs), which are community-based associations for collective management of water resources and resolution of conflicts concerning the use of water resources. The Act provides for the formation of Basin Water Resource Committees (BWRC), which may contract

WRUAs as agents to perform certain duties in water resource management. Leroghi/Kirisia is a source of many rivers and springs such as Nontoto, Loikas, Nankarro and Yiamo and sustainable use of water through implementation of the water Act will lead to improved livelihoods of the communities.

4.1.5 The Agriculture and Food Authority Act, No. 13 of 2013

The Act provides for the respective roles of the National and County governments in agriculture and related matters in line with the provisions of the Fourth schedule of the Constitution. The Act has provisions for the implementation of the Crops Act and the Fisheries Act, under the established Authority. The law has provisions for the prescription/ prohibition of land-use systems to control soil erosion and deforestation, as well as to protect catchment areas from degradation that is key to conservation of Kirisia/Leroghi forest ecosystem. The Act also provides for the afforestation or reforestation of land (Section 23). Development of agricultural and forestry sectors are therefore crucial to Kenya's overall socio-economic development geared toward attaining Vision 2030. There are many areas in the forest and in the intervention zone that are prone soil erosion and therefore the implementation of this plan and strict adherence to the Agriculture and Food Authority Act will lead to improved agricultural and forest productivity. The forest has also enough water for fish production and hence awareness creation through this Act will result in improved livelihood and nutrition.

4.1.6 The Agriculture (Farm Forestry) Rules, 2009

The rules were gazetted in 2009 and provide that, every person owning or occupying an agricultural land shall establish and maintain a minimum of 10 percent of the land under farm forestry to preserve and sustain the environment. The rules provide that the species of trees or varieties planted shall not have adverse effects on water sources, crops, livestock, and soil fertility and shall not be of invasive nature.

The rules further state that, "No agricultural landowner or occupier shall grow or maintain any Eucalyptus species in wetlands and riparian areas". These rules will enhance farm forestry practices in the farms adjacent to Leroghi/Kirisia forest, which form the intervention or buffer zone of the forest as the farmers will be encouraged to practise agroforestry that may lead high farm productivity. Under these rules, the Director of Agriculture can issue land preservation orders to land owners that may prohibit the clearing of vegetation or grazing of livestock in vulnerable ecosystems, require the afforestation of land to reclaim areas threatened with degradation or demand the use of farming techniques compatible with the conservation requirements.

4.1.7 The Wildlife Conservation and Management Act, 2013

The Wildlife conservation and management Act, 2013 provides restructured governance of wildlife resources in accordance with the Constitution of Kenya, 2010. The main implementing body for the Act is the Kenya Wildlife Service (KWS), which is charged with managing and conserving wildlife resources within National parks, wildlife conservation areas and sanctuaries in Kenya. The institution is also responsible for protecting forests within its jurisdiction and supporting the conservation, rehabilitation and protection of forests and water catchments that are significant wildlife habitats.

County governments are included through management of National reserves (Section 35) and the County Wildlife Conservation and Compensation committees (Section 18). These committees are required under the law to establish wildlife user rights, oversee implementation of management plans on community and private lands, oversee equitable benefit sharing of wildlife

resources and review compensation claims, among other functions. Cases of human /Wildlife conflicts are many in this area and implementation of this Act will reduce such incidences. Its implementation will also lead to biodiversity conservation and thus improve eco-tourism potential of Kirisia forest.

Section 22 (3) requires that interests of communities regarding bio prospecting are protected through equitable benefit sharing. Article 76 (4) of the Act requires that a minimum of five per cent of the benefits from national parks are allocated to local communities neighbouring a park. Moreover, private investors of conservancies are required to provide benefits such as infrastructure, education and social amenities (Section 76, 5). This is important to the FAC around Kirisia as it has thirteen conservancies. These have been accorded the right to practice wildlife conservation and management as a form of gainful land use, provided that the wildlife is maintained in a healthy, natural and secure state and the land is suitable for that practice (Section 70). To facilitate conflict resolution and cooperative management of wildlife, the Act establishes Community Wildlife Associations within specific geographical regions (Section 40, 2).

4.1.8 The Climate Change Act, 2016

The Act is a comprehensive law for enhanced resilience to climate change and low carbon climate development. The Act gives effect to Article 42 and 70 of the Constitution on the right to a clean and healthy environment, and Article 69 on the obligations of the state with regard to the environment. The Act aims to;

- Mainstream climate change responses into development planning, decision making and implementation;
- Build resilience and enhance adaptive capacity to the impacts of climate change;
- Facilitate capacity development for public participation in climate change responses;
- Mainstream the principle of sustainable development into the planning for and decision making on climate change response; and
- Integrate climate change into the exercise of power and functions of all levels of governance, and to enhance cooperative climate change governance between national government and county governments
- Section 24 sub-section (1) explicitly provides for public participation in the development of strategies, laws and policies related to climate change. This is by undertaking public awareness and conducting public consultations.

This PFMP has taken into account the climate actions that shall enhance adaptation and mitigation against the effects of climate changes that include extreme temperatures and erratic rainfall patterns by the communities.

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

The Act brings about amendments to the Land Act, 2012, Land Registration Act, 2012 and the National Land Commission Act, 2012. These Acts are amended to give effect to Articles 68 (c) (i) and 67(2) (e) of the Constitution and to provide for the sustainable and productive management of land resources. The National Land Commission established under Article 67 of the Constitution is tasked with the management of public land on behalf of the National and County governments (Section 8). Section 12 provides that public land within forests and wildlife reserves, mangroves and wetlands or their buffer zones as well as environmentally sensitive areas will be allocated, for purposes of conservation. Section 19 (2) provides for the conservation of land based natural resources by requiring the commission to prescribe rules and regulations that may contain;

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

4.1.10 The National Government Co-ordination Act, No. 1 of 2013

The Act establishes an administrative and institutional framework for co-ordination of National government functions at the National and County levels. The key role of the Ministry of Interior is to enforce law and order and disseminate National Government policies. In the conservation and management of forests, the Ministry has been useful in promoting participatory forest management through community mobilization for awareness creation on forestry and conservation issues, conflict resolution among the diverse stakeholders. They also play an important role in awareness creation through barazas, field days and tree planting in public forests and private lands. This Act has proved to be useful when dealing with forestry and boundary tree planting disputes outside gazetted forests and use of resources on public land for local community development.

4.1.11 The County Government Act, 2012

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

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

The County Government Act section 108 provides for the County Integrated Development Plan (CIDP), which outlines the county's development goals covering a period of five years. The development of this plan has recognised the role and right to information of citizens in Samburu County and they have been involved throughout the process.

4.1.13 The Societies Act Cap 108, (Revised in 2012)

Societies in Kenya are registered under this Act. The function of the Registrar of Societies, provided for under the Act is to maintain a public register and to receive documents that societies are obliged to file. These are principally applications for registration, incorporation, changes to the registered office, and alterations to the registered rules/constitution among others. The Registrar has powers of inspection to ascertain that Societies are complying with the Act. The CFA is encouraged to comply with the requirements of this Act as it is a pre-requisite before entering into a Forest Management Agreement (FMA) with the Kenya Forest Service. The Registrar of Societies is responsible for monitoring activities of the CFAs. Capacity building of the CFAs formed in Leroghi/Kirisia will done on these requirements to ensure they deliver on their objective of forest management and conservation.

4.2 Links to Multilateral Environmental Agreements (MEAs)

4.2.1 Convention on Biological Diversity (CBD)

This Convention aims to conserve biological diversity, sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. Kenya ratified the convention on 26 July 1994. The country has undertaken activities that are consistent with the goals of the Convention, and has developed a national strategy for the conservation of biological diversity and established a system for protecting endangered species both in the protected and dispersal areas. The plan recognizes that Leroghi/Kirisia is rich in biodiversity and has put in adequate measures for their protection.

4.2.2 United Nations Framework Convention on Climate Change (UNFCCC)

The ultimate objective of UNFCCC is the “stabilization of the greenhouse gas concentration in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.” Kenya ratified the convention on 30th August 1994. The PFMP will contribute to the implementation of the Convention by increasing carbon storage and sink, through the rehabilitation of degraded forest areas and the conservation of indigenous forest cover. Reducing Emissions from Deforestation and Degradation (REDD+) is a proposed mechanism under the UNFCCC to slow the loss of forest in order to mitigate against climate change, address rural poverty, and preserve biodiversity. It embraces all the degraded areas in natural forests and promotes conservation of trees of special concern. REDD+ provides an opportunity for the stakeholders of the forest ecosystem to ensure that the natural forest continues to serve as natural sinks.

4.2.3 Convention on International Trade in Endangered Species (CITES)

The Convention on International Trade in Endangered Species (CITES) of Wild Fauna and Flora is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. The plan provides for protection and continuous monitoring of rare and endangered plant species within the forest reserve.

4.2.4 Sustainable Development Goals (SDGs)

Forests cover 30 per cent of the Earth’s surface and in addition to providing food security and shelter, forests are key to combating climate change, protecting biodiversity and the homes of the indigenous population. Thirteen million hectares of forests are being lost every year while the persistent degradation of drylands has led to the desertification of 3.6 billion hectares. In Kirisia, like many other forests, deforestation and desertification –from human activities and climate change – pose major challenges to sustainable development. This has affected the lives and livelihoods of many people in the fight against poverty. Efforts are being made to manage forests and combat desertification through Sustainable Development Goals (SDGs) (2016-2030). These are universal in embodying a shared common global vision of progress towards a safe, just and sustainable space for all human beings to thrive on the planet. This plan addresses the following SDGs:

- i. Goal 1. End poverty in all its forms everywhere.
- ii. Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture.
- iii. Goal 7. Ensure access to affordable, sustainable, and reliable modern energy services for all.
- iv. Goal 13. Take urgent action to combat climate change and its impacts.

- v. Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forest, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

4.2.5 Global Forest Goals

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

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

These goals are reflected in the various management programmes Leroghi/Kirisia PFMPs there is correlation on the management of the forest. Therefore, the implementation of the various activities outlined in the PFMP will directly contribute to the success of the Global Forest Goals.

4.3 Links to National Planning Process

This plan is in tandem with other planning processes at the national and county levels through various development blue prints which include the following;

4.3.1 Kenya Vision 2030

Vision 2030 aims at making Kenya a newly industrializing middle-income country providing high quality life for all its citizens by the year 2030. The vision is based on three pillars namely: Economic pillar, Social pillar and the Political pillar.

Economic pillar deals with providing prosperity of all Kenyans through an economic development programme aimed at achieving an average Gross Domestic Product of 10% per annum. The Social pillar aims at building a just and a cohesive society with a clean and a cohesive environment whereas, the political pillar aims at realizing a democratic political system founded on issue-based politics that respects the rule of law and protects the rights and freedom of every individual in the Kenyan society.

4.4.2 Flagship Projects for the Environment

Some of the flagship environmental projects relevant to Kirisia forest are:

- The water catchment management initiative- Rehabilitating the water towers.
- The Wildlife Corridors and Migratory Routes Initiative- reclaiming all wildlife corridors and migratory routes which directly affects Kirisia forest ecosystem due to the various migratory corridors from and to neighbouring forests and conservancies
- The Land Cover and Land Use Mapping Initiative – Comprehensive mapping of all land use pattern in Kenya
- Clean and healthy environment for every citizen.
- Sustainable utilization of natural resources
- Increase forest cover up to 10% by 2030
- Control of invasive species to restore degraded areas

4.3.2 The National Forest Programme (2016-2030)

The National Forest Programme (NFP) is a strategic national framework to guide forest sector development in Kenya. The NFP takes over from the Kenya Forest Master Plan (KFMP, 1994). Chapter 5, Section 5.7 of the NFP addresses forestry in a devolved system, taking cognizance of the shared responsibility of the National and County governments in meeting the national target of 10% forest cover. The NFP outlines several strategies under eight (8) clusters for forestry development in Kenya. One of the strategies under the Natural forest management and conservation cluster is to, “Promote participatory forest management through CFAs and other natural Resource based community organizations”. Community participation is also captured in the strategy, “Improve Community and special interest groups’ participation in decision making in the forest sector dissemination networks” under the Forest Governance Cluster. Reference has been done to the NFP during programme development in the PFMP.

4.3.3 KFS Strategic Plan (2018 -2022)

To enhance the realization of Vision 2030 goals in the Forest Sector and increase the national tree cover to at least 10% of the Country’s total land area as stipulated in the Constitution, the Service has developed a Strategic Plan (2018-2022). Kenya Forest Service has a national mandate “to provide for the development and sustainable management, including conservation and rational utilization of all forest resources for socioeconomic development of the Country and connected purposes”.

It recognizes the community and other stakeholders’ participation in forest management. The strategic plan also links poverty with forest degradation and proposes mobilization, awareness creation and participation in forest management. The strategic plan supports livelihood improvement activities. Programmes to implement the KFS strategic plan are spread across all counties in the country and this PFMP is expected to play a key role towards realization of the KFS strategic objectives including rehabilitation of 20% of degraded area in Kirisia forest, which is approximately 20,200 Hectares.

4.3.4 Transition Implementation Plan (TIPS) for Samburu County (2015-2020)

Transition Implementation Plans (TIPs) transfer identified devolved forestry functions that were previously implemented by KFS to the county governments. The implementation of County functions is in line with the fourth schedule of the Constitution of Kenya, 2010. The TIPs provide a framework for the county governments to work with the National government towards attainment of 10% forest cover. The devolved forestry functions under County Government (Part 2) Clause 10 paragraph (b) is forestry including farm forestry extension services. This includes

forests and game reserves formerly managed by local authorities, excluding public forests managed by KFS, KWS and private forests. The National government is mandated to conduct capacity building and provide technical assistance. The strategic activities for implementation of Leroghi/Kirisia forest by the county government include;

- Formulation of county level specific laws and legislation
- Development and implementation of County forest management plans
- Promotion of tree planting and increasing tree cover in community, private and county lands
- Provision of forestry extension services to the forest adjacent farmlands and in the county as a whole
- Management of county forests
- Development of charcoal industry (promotion/use) within county forests and private farms.

4.4 Rationale for management planning

4.4.1 Value of the forest reserve

The forest ecosystem provides a variety of products and services to both the community members as well as to the environment, livestock and wildlife as shown in Figure 60 and Figure 61.

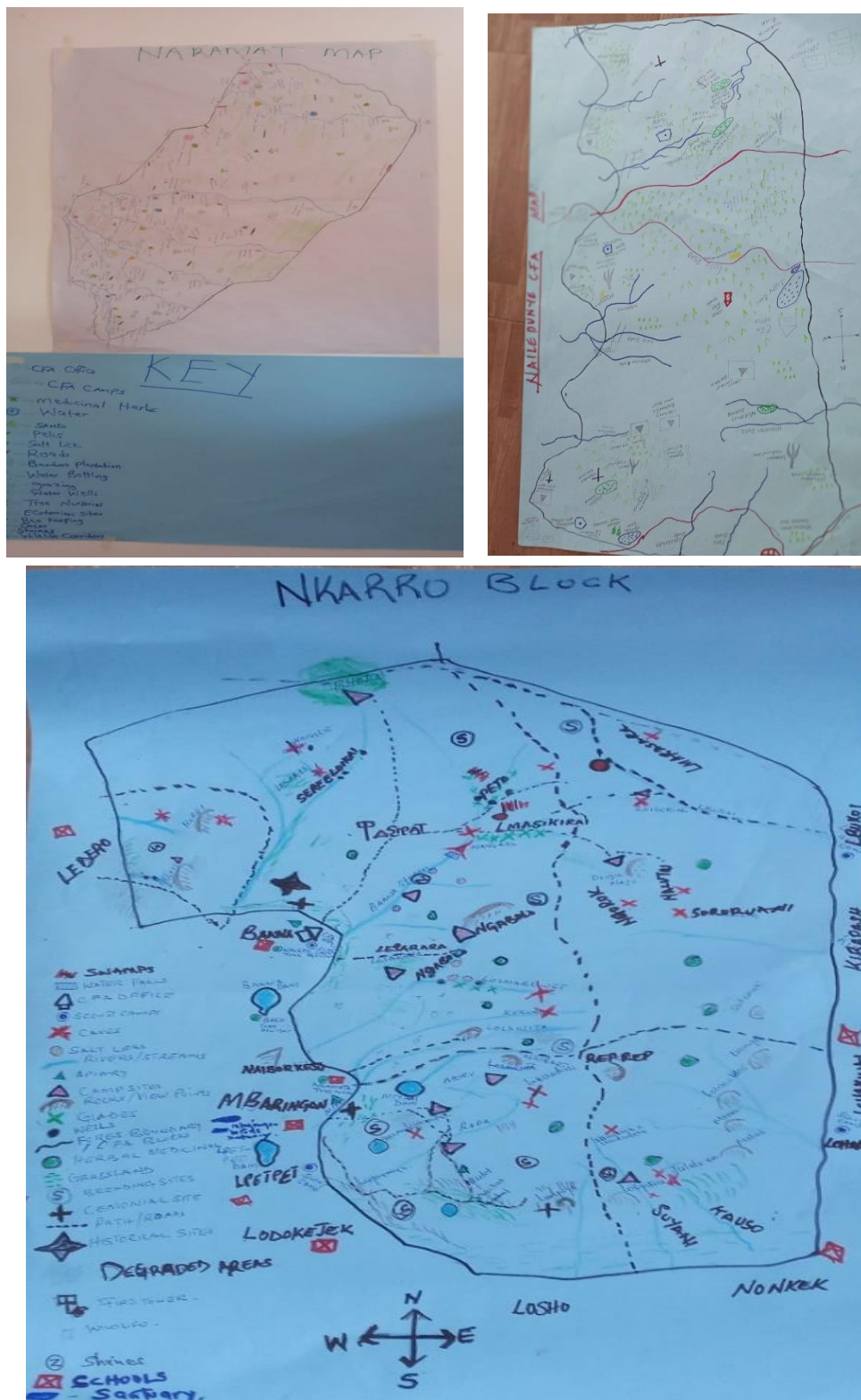


Figure 60: Sketch participatory maps drawn by the LPT before resource mapping

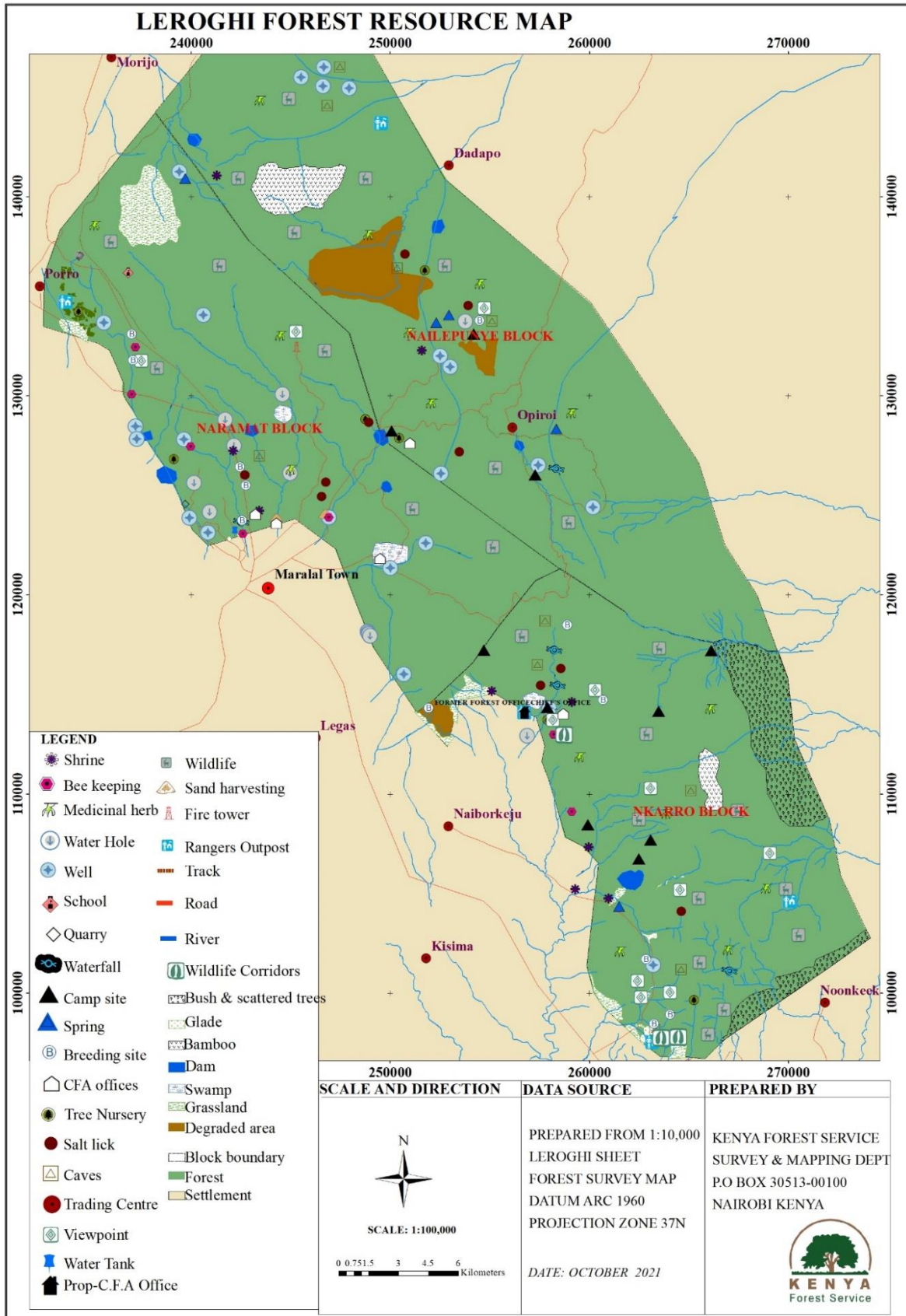


Figure 61: Leroghi/Kirisia forest ecosystem resources

Wildlife habitat

The forest is a home to many wildlife species e.g. elephants, buffaloes, leopards, zebras, etc. which add to the biodiversity and ecotourism values of the ecosystem.

Nature based enterprises e.g. bee keeping

The majority of people living around Kirisia Forest are pastoralists although semi-pastoral and sedentary farming and bee keeping have been practiced since time immemorial. There is enormous potential for increasing the benefits of Kirisia Forest to the inhabitants by acquiring more income through bee keeping and through improving forest vigour from conservation. The vegetation cover in Kirisia forest and most of the mountainous ecosystems provide ample natural and balanced bee forage within areas well served by permanent water sources. Most of the areas suitable for bee keeping are free of cultivation, pesticides and charcoal production fumes.

Source of food and Herbal medicine

The forest has a wide diversity of edible wild fruits and berries such as *Carissa edulis*, *Vepris simplicifolia*, *Vangueria madagascariensis*, *Scutia myrtina* and *Coccinea grandis*. Wild fruits provide sustenance for children herding livestock and all peoples living adjacent to the forest. Some herbs are also harvested as vegetables during the rainy season.

Some plants or parts such as barks, leaves and roots of many trees, shrubs and climbers in the forest provide important medicine and general immune boosting tonics when taken as soup e.g. *Rhamnus prinoides*, *Maytenus sp.* *Ekebergia capensis* and *Rothea myricoides*.

Wood products

The forest is a source of wood and products for construction, wood fuel and for making implements such as axe and hoe handles, spear shafts, walking and herding sticks, *rungus* and cooking spoons.

Source of water

Kirisia forest is a water catchment area important to Samburu County and gazetted as a water tower by Kenya Water Towers (KwTA). The rivers and streams of the forest are a source of water for domestic purposes by households and Maralal town as well as for use by both livestock and wildlife.

Source of grazing pasture

The forest has been providing grass and browse plant species that are particularly vital to pastoralists especially during the dry seasons.

Research

The forest is rich in a wide variety of biodiversity, which provides a hotspot in terms of education on the many plant and wildlife species for research and education institutions locally, nationally and even internationally.

4.4.2 Threats to forest conservation

Maralal Township is built in a valley adjacent to the forest. The population increase is exerting pressure on the ecosystem in various ways, which include;

- encroachment into the forest area on the area adjacent to the town
- Overharvesting of some plant species like red cedar, sandle wood and olive trees
- Charcoal production due to the increase energy demand for the urban dwellers
- Uncontrolled honey harvesting leading to an increase in incidences of wild fires (Plate 18).



Plate 18: Areas affected by Forests fires

- Increased firewood collection- due to increase of public institutions like schools and towns.
- Illegal settlements inside the forest. There are over six hundred households living in the forest causing forests resources degradation through over grazing and farming practices (Plate 19).
- Overgrazing – there is increased number of livestock in the forest reserve throughout the year. There has been an increase in livestock with no increase in pastures for those dwelling in the forest and adjacent areas (Plate19).



Plate 19: Unregulated grazing in the forest

- Drought and desertification
- Continual and unregulated extraction of tree products is slowly turning the forest into an apocalyptic wasteland, and if not checked all forest cover will eventually disappear (Plate 20).



Plate 20: Degraded areas in the forest

- Decrease in indigenous knowledge on conservation with reference to cutting tree branches for livestock as the youth tend to be felling whole tree down.

- The main maralal road is undergoing tamarcking and that will open up potential for illegal trade of plants and animal species and their trophies
- No control of illegal practice leading to free for all

4.4.3 Constraints to forest conservation

- Inadequate staff to properly man the forest
- The staff from both the KFS and KWS is inadequate reducing the response time when facing threats like illegal logging and forest fires.
- Inadequate means of transport and communication. The KFS station lacks a 4 by 4 vehicle to conduct its operations. The staff depend on only one motorbike, which breaks down frequently. In addition, the staff lack communication gadgets like radios and walk-talkies, making transmission of information difficult.

4.4.4 Problem analysis

The threats and constraints mentioned above are a huge impediment to the proper management of the forest ecosystem. Measures need to be put in place to address them to protect and conserve this vital resource for the provision of goods and services to the local communities sustainably.

4.4.5 Vision of the plan

Leroghi Forest to be a leader in sustainable participatory management for the provision of ecosystem goods and services for the benefit of present and future generations.

4.4.6 Overall goal

To sustainably conserve, manage, restore Leroghi forest ecosystem for provision of goods and services to improve livelihoods for the community in Samburu County.

4.4.7 Main objectives

- To improve livelihoods of the adjacent community.
- To protect the forest for economic benefits.
- Forest Management and Utilization
- To enhance conservation of the forest resources

The figure 62 below shows the various utilization zones in Kirisia forest ecosystem.

4.4.8 Forest Management and Utilization Zonation

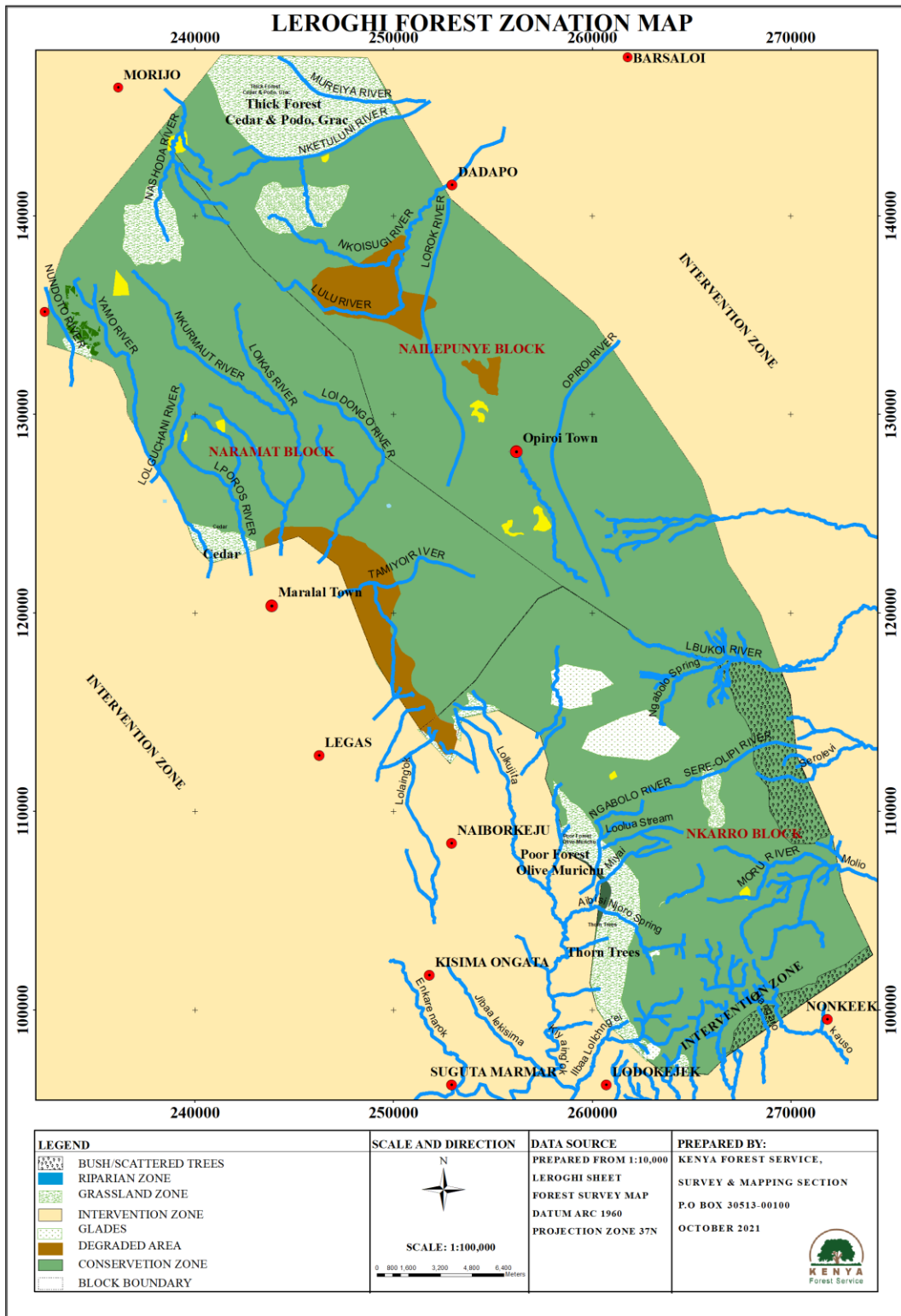


Figure 62: KFS and Community Forest zonation

CHAPTER FIVEA

MANAGEMENT PROGRAMMES

5.1 NKARRO FOREST MANAGEMENT UNIT

5.1 Natural Forest management programme

▪ Background

Nkarro forest block covers approximately 30,650ha of Kirisia forest. It is adjacent to 6 ranches (Ledero, Lkiloriti, Mbarigon, Lodokejek, Nonkeek, Opiroi) and 10 sub locations (Loltulelei, Ledero, Baawa, Lkiloriti, Mbarigon, Lonkaitolia, Lodokejek, Nonkeek, Lchakwai, Lbukoi). The block is relatively intact with at least 35% forest cover in the high canopy.

The main trees species found include: *Podocarpus falcatus* (*Lpiripirinti*), *Olea capenese*(*Loliontoi*), *ssp, Olea Africana*(*Lgeriyoi*), *Cassiporea melasona* (*Mashakuldu*), *Ekebergia capense* (*Sonkoroi*), *Nuxia congesta*, (*Lepironito*) *Croton megalocarpus* (*Lmarkwet*), *Junipera procera* (*Ltarakwai*), *Ficus natalensis*, (*Seepei*) *Prunus Africana* (*Lkujok*), *Teclea simplicifolia* (*Lgilai*). Other important species are of medicinal value: *Rhumnus staddo* (*Lkukulai*), *Todalia asiatica* (*Leparmunyio*), and *Rhumnus prinoides* (*Lkinyil*). It is and has been a source of honey for the community, water, medicinal herbs, firewood and grazing livestock. The forest has faced various challenges which has led to degradation of approximately 130ha as shown in Table 70.

Table 70: Degraded sites in Nkarro forest block

Site name	Degraded area in Ha	Causes	Treatment
Lesoit	100	Fire	Restoration through planting of indigenous trees
Ndikir-Enchangalo	20	Fire	Protection for natural regeneration
Losurutia	10	Fire	Protection for natural regeneration
Total	130		

▪ Management issues (challenges)

- Overgrazing
- Logging for posts, charcoal production and fodder for livestock during dry seasons e.g. Red cider, *Olea Africana*, *Ekebergia capense* (*Sonkoroi*).
- Forest fires during drought seasons
- Use of fire during harvesting of wild honey which causes forest fires.
- Debarking and uprooting of medicinal trees

▪ **Management objectives**

- To rehabilitate degraded areas
- To protect the forest against over grazing, forest fires, unsustainable utilization and logging
- To provide alternative sources of energy and fodder for livestock.

Table 71: Management actions for natural forest management programme

Action	Unit	5 yr targets	Means of verification	Time frame (yrs)					Lead agency	Budget (Kshs.)
				1	2	3	4	5		
Objective 1:To rehabilitate degraded areas										
Establishment of two tree nurseries at Miyai and Lpetpet dam	No.	2	No. of tree nurseries established.	2					CFA, KFS, KWS, SCG, strategic partners	2M
Raise seedlings ‘000’	No.	4,000	no. of seedlings raised	1.5	2.5				CFA, KFS, FAO SCG, strategic partners	1M
Rehabilitate the degraded areas	Ha	100	Area planted	50	50				CFA, KFS, FAO SCG, strategic partners	5M
Maintenance of the degraded sites	Ha	100	Area maintained		100	X	X	X	CFA, KFS, FAO SCG, strategic partners	1.25M
Protecting the degraded area for natural regeneration at Ndikir - Enchangaloand Losurutia	Ha	30	Area protected	30	X	X	X	X	CFA, KFS, FAO, SCG, strategic partners	0.6M
Objective 2: To protect the forest against over grazing, forest fires, unsustainable utilization and logging										
Training of the	No.	20	No. of	4	4	4	4	4	CFA,	1M

Action	Unit	5 yr targets	Means of verification	Time frame (yrs)					Lead agency	Budget (Kshs.)
				1	2	3	4	5		
grazing committee (1 st for Ledero, Baawa, Lkiloriti, Mbarigon, Lpetpet, Ldokejek and 2nd for Nonkeek, Lchakwai, Lbukoi)			trainings conducted						KFS, FAO, SCG, strategic partners	
Preparation of grazing by laws	No.	1	Bylaws in place	1					CFA, KFS, FAO, SCG, strategic partners	0.1M
Control of cattle holdings in the forest	%	100	Percentage of holdings utilized	100	X	X	X	X	CFA, KFS, FAO	1M
Form herbal medicine user group	No.	1	User group formed 1						CFA, KFS, FAO, SCG, strategic partners	0.005M
Construct fire towers at Sipat	No.	1	Fire towers constructed	1					CFA, KFS, FAO, SCG, strategic partners	1.5M
Clearing of fire breaks in Nonkeek- Moru (10Km), Moru-Rapa (10Km), Ndikir-Onchangalo-Namaua (15km) and Raprap-Sirata Rongai	km	45	Report	30	15				KFS, CFA, FAO	0.2M

Action	Unit	5 yr targets	Means of verification	Time frame (yrs)					Lead agency	Budget (Kshs.)
				1	2	3	4	5		
(10Km).										
Objective 3: To provide alternative sources of energy and fodder for livestock.										
Training on biogas production	No.	5	Attendance list	1	1	1	1	1	CFA, KFS, FAO, SCG, strategic partners	0.5M
Provision of energy saving stoves like Kuni mbili jikos	No.	2000	No. of energy jikos provided	400	400	400	400	400	CFA, KFS, FAO, SCG, strategic partners	2M
Installation of wind power at Ndonyo Naju	No.	1	Wind power installed		1				CFA, KFS, FAO, SCG, strategic partners	1M
Provision solar panels	No.	500	No. of solar panels provided	100	100	100	100	100	CFA, KFS, FAO, SCG, strategic partners	2M

5.2 Water resource management programme

▪ Background

Nkarro forest management unit is situated along southern part of Kirisia forest and its biodiversity comprises of both flora and fauna. It is also a water catchment area. There is Baawa permanent river and several seasonal rivers for example; Noonkeek, Lorokare, Rapa, Sere-Olipi, Moru, Lolmoti, Lbukoi and several springs. There is also the Miyai dam which due to siltation need to be rehabilitate in order to provide clean water to the wildlife, livestock and the community.

▪ Management issues (challenges)

- Invasive species which has grown in Miyai dam and Lolkujita wells. This affects the quality and the quantity of water from the dam.
- Destruction of the wells by the wild animals especially the elephants
- The communities travel for long distances in search of water

- iv. Lack of water projects due to misappropriation of funds

▪ **Management objectives**

- i. To rehabilitate Miyai dam and Lolkujita wells to provide enough water for wildlife, domestic and human consumption.
- ii. To Construct dams and water pans to provide irrigation water during dry seasons.
- iii. To develop adequate water projects to supply to the Community.
- iv. To protect water catchment areas.

Table 72: Management actions for water resource management programme

Action	Unit	5 yr targets	Means of verification	Time frame (yrs)					Lead agency	Budget (Kshs.)	
				1	2	3	4	5			
Objective 1:To rehabilitateMiyai dam and Lolkujita wells to provide enough water for wildlife, domestic and human consumption											
Removal of invasive species	Ha	5	Ha of invasive species removed		5				CFA, SCG, KFS, FAO	0.5M	
Removal of silt soil	Ha	5	Area desilted		5				CFA, SCG, KFS, FAO	0.1M	
Planting of trees along the shores of the dam and wells	Km	3	Km planted		3				CFA, SCG, KFS, FAO	0.1M	
Maintenance of the rehabilitated area (Miyai dam and Lolkujita)	%	100	Area maintained		100	X	X	X	CFA, SCG, KFS, FAO, WRA	0.2M	
Objective 2: To Construct dams and water pans to provide irrigation water during dry seasons											
Construction of dams at Mbarigon, Ngamata, Lbaloljingei	No.	3	No. of dams constructed. Reports	1	1	1			CFA, SCG, KFS, FAO, WRA	1M	
Construct of water pans in Lolkujita, Rapa, Moru and Baawa	No.	4	Establishment of water pan	1	1	1	1		CFA, SCG, KFS, FAO, WRUA	0.4M	

Action	Unit	5 yr targets	Means of verification	Time frame (yrs)					Lead agency	Budget (Kshs.)
				1	2	3	4	5		
Objective 3: To develop adequate water projects to supply to the Community.										
Construct water intake from Baawa River, Miyai dam and Lpetpet dam	No.	6	No. of water projects established	2	2	2			CFA, SCG, KFS, FAO, WRUA	0.3M
Installation of piped water to Mbaringon, Lodokejek and Lpetpet	Km	15	No. of km of pipe in place	5	5	5			CFA, SCG, KFS, FAO, WRUA	0.6M
Provision of community water tanks per fetching centers at each sub location)	No.	10	Water tanks constructed	5	5				CFA, SCG, KFS, FAO, WRUA	0.5M
Objective 4. To protect water catchment areas										
Awareness creation	No.	5	Attendance lists, photos	1	1	1	1	1	CFA, NGAO, KFS, FAO, WRUA	0.5M
Fencing off the dams	No.	4	Fence installed	1	1	1	1		CFA, SCG, KFS, FAO, WRUA	0.4M

5.3. Wildlife and ecotourism management programme

▪ 5.2.1 Background

Wildlife is a major tourist attraction, and it is important to conserve and use it sustainably. Some of the wild animals found in Nkarro block include Buffaloes (Losowan), Elephants (Ltome), Gravey Zebras and common Zebras(Loitiko / Loibor kurum), Lions(Lgatuny), Tomson Gazelles (Nkoipera), Warthog (Lbitir), Wild pig (Lguyia), Hyena (Lkonoi), Leopard (Lowaro kerri), Eland (Surua), Baboons (Lotim) Water Buck (Nchalgute) , Cheetah (Lnyaara), and different bird species including the migrants reported from Zech e g Ciconia nigra (black stork),Woolly neck stork (Ciconia Ciconia) Ruppell's Vulture and Hooded vulture. There are also rare species of birds e g Red throated wryneck (under wood packer family). Some of these

birds are associated with cultural believes, for example the greater *Indicator indicator* honey guide (Nchochoroi) shows the presence or direction of bee nest.

Nkarro management unit also has important Elephant breeding site by name Nkutot which be protected to ensure Elephant population is not negatively affected. In addition, Elephant corridors at Kirisia Nkoteyia conservancy and kirisia Samburu Lodge are also found in Nkarro therefore they should be protected against encroachment and poaching.

Other resources available in Nkarro include Camp sites (Peto, Baawa, Ngabolo, Lolkujita. Rapa, Mwatat. Caves (Nankarro1 and 2 Loonkishu derei, and Ntim ekiji. Viewpoints Ngabolo Rock Forest view, Reprep rock, Nkibarti rock several salt licks e. g Ngabolo and water springs which makes Nkarro an area that has a lot of ecotourism potential that can be exploited by the community.

▪ 5.2.2 Management Challenges

- Human Wildlife Conflict
- Poaching
- Lack of Ecotourism infrastructure and equipment
- Inadequate security
- Drought (causing death to wildlife, destruction of habitat and migration.
- Inadequate ecotourism marketing

▪ 5.2.3 Management Objectives

- To conserve and protect wildlife.
- To provide adequate Ecotourism infrastructure and equipment
- To enhance ecotourism marketing

Table 73: Management actions for wildlife and ecotourism management programme

Action	Unit	5 yr target	Means of verification	Annual targets (yrs)					Lead Agencies	Budget (Kshs.)
				1	2	3	4	5		
Objective 1: To conserve and protect wildlife										
Construct watering points for wildlife at Miyai dam, Mwatat and Lesarara.	No	10	No of watering points constructed	2	3	2	2	1	CFA, KWS, KFS, Samburu County government , FAO	5M
Give compensation for losses caused by wild animals	%	100	Percentage of cases compensated	100	x	x	x	x	KWS, SCG, FAO, NRT	5m

Action	Uni	5 yr	Means of	Annual targets (yrs)					Lead	Budge
Conduct education and outreach programs for wildlife conservation	N0.	60	Number of meetings conducted	12	12	12	1 2	1 2	KWS, Samburu SCG, FAO, NRT	0.6m
Develop income generating activities programs for the community neighboring Nkarro eg Bird watching, canopy Board walk etc	No	3	No of income generating programs developed	1	1	1	-	-	KWS, SCG, FAO, NRT	0.3m
Install electric fence to mitigate human wildlife conflict	km	200	Km installed		20 0				KFS, KWS, FAO, SCG	10m
Maintain the fence	%	100	Percentage Maintained		10 0	X	X	X	KFS, KWS, FAO, SCG	0.4m
Objective 2: To provide adequate Ecotourism infrastructure and equipment										
Construct 500Kms of road	Km	500	No of KMS constructed	10 0	10 0	20 0	5 0	5 0	KWS, SCG, FAO, NRT	20m
Develop nature trails	Km	5	No. of km developed	5					KFS, CFA, FAO, SCG, strategic partners	0.5m
Increase the number of camp sites from 2 to 7 at Peto, Lesara , Ngabolo and in Naakedi historical site ,	No	4	No of operational camp sites	1	2	-	-	-	CFA, FAO, SCG	2m
Construct	No	1	Resource		1				CFA, SCG	2m

Action	Uni	5 yr	Means of	Annual targets (yrs)					Lead	Budge
resource center Naiborkeju			center developed						and strategic partners	
Develop a community outreach strategy for promoting ecotourism	No.	1	Strategy in place	1					KFS, KWS, FAO, SCG	0.2m
Objective 3: To enhance ecotourism marketing										
Design and print brochures	No	500	No of brochures printed	200	100	100	50	50	CFA, KFS, KWS, FAO, NRT, SCG	0.2m
Design and produce tourism maps showing Viewpoints, bird watching sites, Nature trails etc	No	300	No of maps produced	100	50	50	50	50	CFA, KFS, KWS, FAO, NRT??, SCG	0.3m
Advertisements on Nkarro tourist sites through social media, Radio and TV.	No.	15	No of advertisements	3	3	3	3	3	CFA, FAO, SCG	0.15m
Install multiagency shared radio frequency	No.	1	No. of radio frequency in place	1					KFS, KWS, FAO, SCG	0.5m

5.4 Community Participation and development management programme

▪ Background

The forest block is largely surrounded by the Samburu community. This community depend on forest as a grazing area for their livestock for they are pastoralists. They also depend on the forest for medicinal herbs, water, fuel wood, honey and construction materials in terms of poles and posts.

In addition, the community performs several of their traditional and cultural activities in the forest for example initiation ceremonies the Morans slaughter He goats and bulls in the caves.

They also have special shrines where they offer sacrifices and prayers in times of droughts and calamities.

▪ **Management issues (challenges)**

- Inadequate of building materials and fuelwood in group ranches
- Overstocking
- Poverty
- Inadequate of community tree nurseries
- Travelling long distances in search of water for domestic use
- Human wildlife conflicts from hyenas, elephants, lion, cheetah and leopards. Wildlife program
- Dependence on rainfall for agriculture
- Drought
- Inadequate community empowerment for forest resources conservation and utilization

▪ **Management objectives**

- To promote agro forestry
- To introduce exotic breeds and livestock diversification to reduce overstocking.
- To enhance rural livelihood through utilization of non-wood forest products
- To Construct and providewater harvesting structures
- To capacity build the community in order to enhance their participation in sustainable forest management.

Table 74: Management actions for community participation and development management programme

Action	Unit	5 yr targets	Means of verification	Time frame (yrs)					Lead agency	Budget (Kshs.)	
				1	2	3	4	5			
Objective 1: To promote agro forestry											
Train the community on tree nursery establishment, management and maintenance at each village	No.	210	No. of trainings conducted	42	42	42	42	42	KFS, CFA, FAO, SCG and strategic partners	0.21m	
Establish community tree nurseries with 50,000 seedlings capacity at Lchoro, Lkiloriti (Ledero), Lbaa Onyekie, Sirata, Ngambo, Miyai,	No.	15	Tree nurseries established	8	7				KFS, CFA, FAO, SCG	1.5m	

Action	Unit	5 yr targets	Means of verification	Time frame (yrs)					Lead agency	Budget (Kshs.)
				1	2	3	4	5		
Mbogani, Lpetpet, Loltulelei, Morijoi, Ngaisirwaruai, Nonkeek, Lchakwai, Soit-Nanyekie and Muruungai										
Objective 2: To introduce exotic breeds and livestock diversification to reduce overstocking										
Provision of sahiwal cattle breed	No.	250	No. of beneficiaries	50	50	50	50	50	KFS, CFA, FAO, SCG, Livestock	5m
Provision of galla goats breed	No.	750	No. of beneficiaries	150	150	150	150	150	KFS, CFA, FAO, SCG, Livestock	4.5m
Promoting poultry farming (“000”)	No.	25	No. of beneficiaries	5	5	5	5	5	KFS, CFA, FAO, SCG, Livestock	0.25m
Objective 3: To enhance rural livelihood through utilization of non-wood forest products										
Promote Aloe value chain development and domestication through training	No.	5	No. of trainings conducted, reports	1	1	1	1	1	KFS, CFA, FAO, SCG, Agric. strategic partners	0.5m
Conduct training on Bamboo propagation	No.	10	Training manuals, reports	2	2	2	2	2	KFS, CFA, FAO, SCG, KEFRI, KWTa, strategic partners	0.1m
Train on Gum Arabic and resins harvesting techniques and storage	No.	10	No. of trainings conducted	2	2	2	2	2	KFS, CFA, KEFRI, SCG, strategic partners	0.1m
Cottage industry development	No.	1	No. of industries established		1				KFS, CFA, FAO, SCG, strategic partners	0.1m
Promoting Beekeeping through training	No.	5	Training manuals Attendance list	1	1	1	1	1	KFS, CFA, FAO, SCG, Livestock, strategic	0.5m

Action	Unit	5 yr targets	Means of verification	Time frame (yrs)					Lead agency	Budget (Kshs.)
				1	2	3	4	5		
									partners	
Provision of bee hives ('000')	No.	2	No of beneficiaries	4	4	4	4	4	KFS, CFA, FAO, SCG, Livestock, strategic partners	2m
Conduct training on fodder production and reseedling	No.	5	No. of trainings conducted Attendance list	1	1	1	1	1	KFS, CFA, FAO, SCG, Agric. strategic partners	0.5m
Zonation of forest and adjacent group ranches for grazing/pasture management	No.	1	Zonation maps		1				KFS, CFA, SCG, Agric, strategic partners	0.1m
Establish hay production and fodder bale centres	No.	5	No. Centres established	1	3	1			KFS, CFA, FAO, SCG, Agric. strategic partners	0.5m
Objective 4: To construct and provide water harvesting structures										
Construction of boreholes with solar pump at Lederu, Lkoloriti (Baawa), Ngambo, Mbarigon, Nonkeek, Loltulelei, Lchaki, Lesunoni and Lbukoi	No.	9	No. of boreholes constructed	3	3	3			KFS, CFA, FAO, SCG, WRA, NEMA strategic partners	4.5m
Provision of water harvesting tanks in schools and CFA office to harvest rain water "000"	No.	19	No. of water tank provided	10	9				KFS, CFA, FAO, SCG, WRA strategic partners	0.95m
Objective 5: To capacity build the community in order to enhance their participation in sustainable forest management										
Develop cost benefit sharing mechanism	No.	1	Reports	1					KFS, CFA, strategic partners	0.1m
Exposure tours to	No.	5	No. of tours	1	1	1	1	1	KFS, CFA,	1m

Action	Unit	5 yr targets	Means of verification	Time frame (yrs)					Lead agency	Budget (Kshs.)
				1	2	3	4	5		
successful CFAs									FAO, SCG, strategic partners	
Training of the community scouts on forest protection	No.	5	Training manuals	1	1	1	1	1	KFS, CFA, FAO, SCG, strategic partners	0.5m
Develop a education and awareness programme on forest conservation	No.	1	Programmes developed	1					KFS, CFA, FAO, SCG, strategic partners	0.1m
Strengthening of conflicts resolution committees through training	No.	1	No. training conducted	1					KFS, CFA, FAO, SCG, strategic partners	0.1m

5.5 Infrastructure and equipment Management programme

▪ Background

Infrastructure is the support system for several activities involving conservation and management. Nkarro currently has poor infrastructure which affects the day to day running of the operations. To improve the conditions there is need to construct more roads, bridges, campsites, nursery shades and water points. The equipment available are also not sufficient. Those that needs to be purchased include: vehicles, motorbikes, radio calls, GPS and head lamps.

▪ Management issues (challenges)

- Lack of office and communication equipment
- Means of transport is not adequate
- Inadequate roads and bridges
- Lack of electric fence
- Lack of office block

▪ Management objective

- To develop and construct sufficient infrastructure.
- To acquire sufficient office and communication equipment.

Table 75: Management actions for infrastructure and equipment management programme

Action	Unit	5 yr targets	Means of verification	Time frame (yrs)					Lead agency	Budget (Kshs.)	
				1	2	3	4	5			
Objective 1: To develop and construct sufficient infrastructure											
Construct CFA office at Baawa	No.	1	Office block constructed		1				KFS, CFA, FAO, SCG, strategic partners	1m	
Forest Rangers camp at Baawa, Lchakwai and Lodokejek	No.	3	Forest Rangers’ camp constructed	1	1	1			KFS, CFA, FAO, SCG, strategic partners	3m	
Grading of Lodokejek- Miyai dam-Miyai road (30Km),	Km.	180	Km constructed						KFS, CFA, FAO, SCG, KEHNA strategic partners	1.8m	
Construction of Lodokejek-Rapa-Baawa roads	Km	150	Km. of road constructed	50	50	50			KFS, CFA, FAO, SCG, KEHNA strategic partners	3.6m	
Construct bridge one at Miyai, 2 at Rapa	No.	3	No. of bridges constructed	2	1				KFS, CFA, FAO, KEHNA, SCG, strategic partners	1.5m	
Objective 2: To acquire sufficient office and communication equipment											
Purchase communication equipment for each	Sets	5	No. of radios purchased	3	2				KFS, CFA, FAO,	0.5m	

Action	Unit	5 yr targets	Means of verification	Time frame (yrs)					Lead agency	Budget (Kshs.)
				1	2	3	4	5		
scout station (5 radio calls, 5 camera, 120 whistles for each scout, 5 GPS, 20 head lamps)									SCG, strategic partners	
Purchase office equipment; 1 computer, tables, cabinet, chairs, printing and photo copying machine, office stationeries	lspm		no. of equipments purchased		1				KFS, CFA, FAO, SCG, strategic partners	0.5m
Purchase patrol vehicle	No.	1	Log book		1				KFS, CFA, FAO	4m
Purchase patrol motor bikes	No.	10	Log books	3	3	3	1		KFS, CFA, FAO	2m

5.6 Human resource management programme

▪ Background

The successful implementation of all the proposed management programmes in this plan will depend on the staff who will oversee the management, protection, policing and security of the forest resources.

For the staff to effectively and efficiently deliver on their mandate, they must be adequate in numbers, have competent in skills and be motivated. There is need to have a workable human resource programme and to bring on board the CFA and other stakeholders in the management of the forest resource.

▪ Management issues (challenges)

- Shortage of human resource
- Inadequate motivation for staff

▪ Management objectives

- To increase human resource
- To develop staff motivation strategies

Table 76: Management actions for human resource management programme

Action	Unit	5 yr targets	Means of verification	Time frame (yrs)					Lead agency	Budget (Kshs.)
				1	2	3	4	5		
Objective 1: To increase human resource										
Recruit community scouts	No.	50	No. of scouts recruited	25	25				KFS, CFA, FAO, strategic partners	5m
Training of scouts	No.	5	No. of scouts trained Training manuals	1	1	1	1	1	KFS, CFA, FAO, strategic	0.5m
Provide identification and uniforms	No.	125	No. of beneficiaries	30	50	45			KFS, CFA, FAO	1
Provide rain coats	No.	125	No. of beneficiaries	30	50	45			KFS, CFA, FAO	1.25m
Employ driver	No.	1	No. of drivers employed			1			KFS, CFA, FAO	0.1m
Employ motor cycle riders	No.	10	No. of riders employed	5	5				KFS, CFA, FAO	1m
Employ CFA office assistant	No.	1	No. of office staff employed		1				KFS, CFA, FAO	0.1m
Objective 2: To develop staff motivation strategies										
Provision of stipend for the scouts (00000)	Kshs .	225	Records	45	45	45	45	45	CFA, KFS, KWS, SCG, strategic partners	2.25m
Provide food rations for the scouts	%	100	Records	100	x	x	x	x	CFA, KFS, KWS, SCG, strategic	0.5m

Action	Unit	5 yr targets	Means of verification	Time frame (yrs)					Lead agency	Budget (Kshs.)
				1	2	3	4	5		
									partners	

5.7 Protection and security management programme

▪ Background

The Forest Rangers had an outpost in Baawa, used by both KFS and the community scouts, however it is old and needs renovation. For effective protection there is also a need to construct two more outs in Lodojek and Lchakwai. The community had established grazing committees who used to serve as community mediators during disputes resolution but there is need to strengthen their governance through capacity building.

▪ Management issues (challenges)

- Inadequate of protection equipment
- Insecurity as a result of resource use conflict between group ranches and other communities

▪ Management objectives

- To protect the forest from illegal activities.
- To provide protection communication equipment and infrastructure.

Table 77: Management actions for protection and security management programme

Action	Unit	5 yr target s	Means of verificatio n	Time frame (yrs)					Lead agency	Budge t (Kshs.)
				1	2	3	4	5		
Objective 2: To protect the forest from illegal activities										
Conduct patrols	Day s	720	Area protected	14 4	14 4	14 4	14 4	14 4	CFA, KFS	0.72M
Arrest of law breakers	%	100	OB	10 0	x	x	x	x	KFS, CFA, NGAO	0.25M
Objective 3: To provide protection communication equipment and infrastructure										
Provide radio	No.	30	Radios provided, warrant	10	15	15			KFS, CFA, SCG, FAO and strategi c partners	0.3M
Provide rungu	No.	125	Rungus’ provided	15	10	10				
Purchase uniforms	No.	35	Uniforms purchased, receipts	15	20					
	No.	1	Photos,	1					KFS,	1M

Action	Unit	5 yr targets	Means of verification	Time frame (yrs)					Lead agency	Budget (Kshs.)
				1	2	3	4	5		
Construct a fire tower at Sipati									CFA, SCG and strategic partners	
Installation of communication booster at Sipati	No.	1	Booster in place	1					KFS, CFA, SCG, FAO and strategic partners	1M
Construction of guard post at Baawa, Lodokejek, and Moru	No.	3	Guard post constructed	1	1	1			KFS, CFA, SCG, FAO and strategic partners	3M
Designate entry points at Baawa, Lodokejek, Nonkoiro, Lchakwai, Moruangai and Nonkeek	No.	7	Entry points marked	3	4				KFS, CFA, SCG, FAO and strategic partners	0.7M

5.8 Research and education Management programme

▪ Background

Nkarro CFA is a segment part of Kirisia forest which has a very great potential of research due to the various tree species available in the forest. The forest which is indigenous requires a lot of research and education in terms of medicinal uses of the herbs and dissemination of the same data. There are several endangered species of red cedar and Olea Africana which should also be explored and protected.

▪ Management issues (challenges)

- Invasive species causing threat especially around water catchment areas which are growing rapidly. For example, senna didmoboti
- Inadequate research on endangered species like red cedar and sandal wood
- Inadequate knowledge on medicinal plants

▪ **Management objectives**

- To research on the interventions on how to curb invasive species
- To research on the use and dosage of medicinal herbs
- To research on how to control extinction and restore endangered species

Table 78: Management actions for research and education management programme

Action	Unit	5 yr targets	Means of verification	Time frame (yrs)					Lead agency	Budget (Kshs.)
				1	2	3	4	5		
Objective 1: To research on the interventions on how to curb invasive species										
Conduct research on most rampant invasive species	No.	1	Research report	1					KFS, CFA, KEFRI, SGG and other strategic partners	0.2m
Clear invasive species	Spp	5	No. of invasive species cleared		5				KFS, CFA, KEFRI, SGG and other strategic partners	0.1m
Research on best applicable methods of controlling the invasive species	%	100	Methods established			100	x	X	KFS, CFA, KEFRI, SGG and other strategic partners	0.1m
Objective 2: To research on the use and dosage of medicinal herbs										
Conduct research on	No.	1	Research report	1					KFS, CFA,	0.1m

Action	Unit	5 yr targets	Means of verification	Time frame (yrs)					Lead agency	Budget (Kshs.)
				1	2	3	4	5		
Traditional knowledge and cultural use of the medicinal herbs									KEFRI, SGG and other strategic partners	
Training on sustainable harvesting of medicinal herbs	No.	5	No. of trainings conducted	1	1	1	1	1	KFS, CFA, KEFRI, SGG and other strategic partners	0.25m
Promotion on usage of medicinal through awareness creation on their value	No.	5	No. of trainings conducted	1	1	1	1	1	KFS, CFA, KEFRI, SGG and other strategic partners	0.1m
Objective 3: To research on how to control extinction and restore endangered species										
Document all endangered	%	100	Reports	100					KFS, CFA, KEFRI, SGG and other strategic partners	0.1m
Develop mechanism to protect the endangered species	No.	1	No. of mechanism developed		1				KFS, CFA, KEFRI, SGG and other strategic partners	0.05m

Action	Unit	5 yr targets	Means of verification	Time frame (yrs)					Lead agency	Budget (Kshs.)
				1	2	3	4	5		
									partners	

CHAPTER FIVE B:

MANAGEMENT PROGRAMMES

5.2 NARAMAT FOREST MANAGEMENT UNIT

5.2.1 Natural Forest Conservation Management Programme

▪ Background information

Naramat management unit has an approximate area of 25,000ha. It is part of the larger Kirisia forest ecosystem which is estimated to be 91,452ha. The other blocks are Nailepunye and Nkarro.

Naramat forest is rich in bio diversity and a source of various forest products and services which include; water, Grass, herbs, honey, salt lick, wild fruits and had sites for cultural practices.

The main trees species found include: *Podocarpus falcatus*, *Olea capenesis*, *Olea Africana*, *Croton megalocarpus*, *Junipera procera* and *Prunus Africana*. Other important species are of medicinal value: *Rhumnus staddol*, *Todalia asiatica*, and *Rhumnus prinoides*.

▪ Management challenges

In the preparation of this management tool the major challenge was degradation. Some of the identified degraded areas in Naramat block are shown in Table 79.

Table 79: Degraded areas in Naramat Forest block

Block	Site name	Degraded area in Ha	Causes	Possible solution
Naramat	Porro, Loikas, Shabaa, Tamiyoi, Ngari	15,000	overgrazing, illegal cutting trees, fires	Control grazing, Sensitization and rehabilitation (Tree planting and protection)
Total		15,000		

The challenges facing conservation and management of the forest resources in this forest block include;

- Degradation; Overgrazing, soil erosion, Illegal logging
- Forest fires during drought seasons
- Inadequate knowledge on importance of forests
- Overreliance on the forest for firewood, charcoal, timber, poles and posts

▪ Management objectives

The following are some of the management objectives which have been proposed to resolve the challenges identified;

- To rehabilitate degraded areas-planting.
- To enhance forest protection and conservation
- To provide alternative sources of energy and other forest products required by the community.

The management actions to be undertaken in order to achieve the above objectives are indicated in Table 80 below;

Table 80: Management actions for natural forest management programme

Action	Unit	5 yr targets	Means of verification	Annual targets (yrs.)					Lead Agency	Budget (Kshs)
				1	2	3	4	5		
Objective 1: To rehabilitate degraded areas-planting										
Identify tree species that match the degraded sites for rehabilitation -tree planting	No	5	-Report on No. of species identified	5	-	-	-	-	CFA, KFS, CGoS, FAO, Other Partners	0.05m
Survey and map the planting site	No	1	-Map for planting site	1	-	-	-	-	CFA, KFS, CGoS, FAO, Other Partners	0.1m
Raise tree seedlings the identified species for restoration (000)	No.	2Million	-No. of seedlings raised -Progress report on seedling production	400	400	400	400	400	CFA, KFS, CGoS, FAO, Other Partners	2m
Prepare planting site	Ha	2000	-Area prepared for planting -Progress report planting preparation	400	400	400	400	400	CFA, KFS, CGoS, FAO, Other Partners	2.5m
Plant in the identified degraded	Ha	2000	-Area planted -Planting progress	400	400	400	400	400	CFA, KFS, CGoS,	2m

Action	Unit	5 yr targets	Means of verification	Annual targets (yrs.)					Lead Agency	Budget (Kshs)
				1	2	3	4	5		
areas			report						FAO, Other Partners	
Maintain the planted area	Ha	2000	-Area maintained - Maintenance progress reports	400	400	400	400	400	CFA, KFS, CGoS, FAO, Other Partners	0.5m
Monitor the planted areas	No	10	-Monitoring report -Survival count reports	2	2	2	2	2	CFA, KFS, CGoS, FAO, Other Partners	0.1m
Objective 2: To enhance forest protection and conservation										
Hold sensitization barazas on importance of forest conservation and forest fire management	No.	10	No. of barazas held	2	2	2	2	2	CFA, KFS, CGoS, FAO, Other Partners	0.1m
Control grazing through zonation of grazing areas	No.	1	- Forest zonation plan	1	-	-	-	-	CFA, KFS, CGoS, FAO, Other Partners	0.05m
Determine livestock carrying capacity of the forest	No	1	-Report on carrying capacity determination	1	-	-	-	-	CFA, KFS, CGoS, FAO, Other Partner	0.1m

Action	Unit	5 yr targets	Means of verification	Annual targets (yrs.)					Lead Agency	Budget (Kshs)
				1	2	3	4	5		
									s	
Prepare a grazing plan	No	1	-Approved grazing plan	-	1	-	-	-	CFA, KFS, CGoS, FAO, Other Partners	0.2m
Monitor and evaluate effectiveness of controlled grazing in restoration	No	16	-Monitoring and evaluation reports	-	4	4	4	4	CFA, KFS, CGoS, FAO, Other Partners	0.1m
Objective 3: To provide alternative sources of energy and other forest products required by the community										
Sensitize FAC on alternative energy sources e.g Biogas and to adoption of agroforestry on farmlands	No	10	No of barazas held	2	2	2	2	2	CFA, KFS, CGoS, FAO, Other Partners	0.1m
Support selected members per sub location to adopt use of biogas	No	250	No of farmers supported	50	50	50	50	50	CFA, KFS, CGoS, FAO, Other Partners	2.5m

5.2.2 Plantation Forest Management Programme

▪ Background

Plantation establishment was initiated in the early 1940's in Angata Nanyoike, Naramat forest block.

The main plantation tree species established are; cypress, a few *Acacia mearnsii* and Eucalyptus. The stocked plantation area is 124ha (Table 81) and the Unstocked area is 23ha.

There is a grassland area of 140ha identified and suitable for plantation establishment in Porro.

The forest station has an approved forest plantation management plan (Maralal Forest Plantation Management plan 2015-2025). The plantations are over-mature and it should be harvested as per the approved felling plan. This will meet the ever-rising need for timber, firewood and poles in the FAC and especially the fast-expanding Maralal township.

The main plantation sites need restocking.

Table 81: Main tree species in plantation forest in Porro, Naramat Forest block

Block	Site	Area (Ha)	Species
Naramat (Porro)	Angata Nanyokie	19.7	<i>Cupressus lusitanica</i>
	Angata Nanyokie	72	<i>Eucalyptus</i>
	Angata Nanyokie	9.3	<i>Eucalyptus mixed Acacia mearnsii</i>
	Angata Nanyokie	23.0	<i>Unstocked</i>
		124.0	

- **Management Challenges**
 - Poor plantations stocking
 - Illegal logging for construction materials
 - Untimely silvicultural operations
- **Management Objectives**
 - To restock plantation areas with appropriate tree species
 - To undertake timely silvicultural operations

The programme has various management actions which needs to be undertaken to achieve the objectives above (Table 82).

Table 82: Management actions for plantation forest management programme

Action	Unit	5 yr. target	Means of verification	Annual targets (yrs.)					Lead agency	Budget (Kshs) ‘000,000’
				1	2	3	4	5		
Objective 1: To restock plantation areas with appropriate tree species										
Do inventory of the plantation areas	No.	1	-Plantation Inventory report	1	-	-	-	-	KFS	0.1m
Update the sub compartment register	No	5	-Updated compartment register -Progress reports	1	1	1	1	1	KFS	0.005m
Prepare a felling plan	No	1	-Felling plan prepared	1	-	-	-	-	KFS	0.005m
Seek approval and	No	1	-Harvesting	1	-	-	-	-	KFS	0

Action	Unit	5 yr. target	Means of verification	Annual targets (yrs.)					Lead agency	Budget (Kshs) '000,000'
				1	2	3	4	5		
prequalified licensees to harvest			Approval letter -Harvesting register							
Raise appropriate plantation establishment seedlings '000'	No	528	-No of seedlings raised -progress report	-	132	132	132	132	KFS, CFA	1.5m
Prepare plantation establishment site through PELIS	Ha	264	-Area prepared -Progress report		66	66	66	66	CFA, KFS, CGoS, FAO	0.5m
Establish the plantations using PELIS	Ha	264	-Restock all plantation areas -PELIS Register -Planting progress report	-	66	66	66	66	CFA, KFS, CGoS, FAO	0.75m
Maintain the established plantations using PELIS	Ha	264	-Records in compartment register - Maintenance progress report	-	66	66	66	66	CFA, KFS, CGoS, FAO	1m
Objective 2:To undertake timely silvicultural operations										
Carry out survival counts in established plantations	Ha	264	-Survival counts reports	-	66	66	66	66	KFS	0.2m
Do gapping/ infilling of planted areas	Ha	264	-Progress reports	-	66	66	66	66	CFA, KFS	0.4m
Prune all the established plantations as per the technical orders	Ha	100% area	-Area pruned -Progress reports	-	100	x	x	x	CFA, KFS	0.05m

Action	Unit	5 yr. target	Means of verification	Annual targets (yrs.)					Lead agency	Budget (Kshs) '000,000'
				1	2	3	4	5		
Thin the plantations as per the technical orders	Ha	100% area	-Area thinned -Progress reports	-	-	-	100	100 %	x	0.15m

5.2.3 Water Resources Management Programme

▪ Background information

Naramat forest has several rivers and springs emanating from the Kirisia forest reserve .

Water from the Naramat forest block plays a critical role in the livelihood of the FAC. Water is mainly for domestic use and for livestock. During long drought periods water shortage bites and conflict for water resources becomes a common phenomenon.

There is need to rehabilitate the water catchment areas within Naramat forest block to ensure water becomes available sustainably to the FAC. The rivers in Naramat forest block include; Loikas, Yaimo/Lakira, Tamiyoi and Loidongo. The springs are; Nkonyek, Eloikas, Tamiyoi, Lonyonyi and Lpartuk.

▪ Management Challenges

- Water resources degradation due to illegal logging, overgrazing and forest fires
- Limited knowledge in water resources management
- Inadequate land/space to construct water pans/dams
- Overdependence by the FAC on the water resources in the forest
- Inadequate modern water harvesting technologies thus forcing the FAC to depend on water points in the forest

▪ Management Objectives

- To protect and rehabilitate water catchment area
- To build capacity on FAC on water management.
- To Promote adoption of alternative water sources

The management actions to be undertaken to conserve, protect and manage the water resources for sustainability are stipulated in Table 83 below;

Table 83: Management actions for water resource management programme

Action	Unit	5 yr. targets	Means of verification	Annual targets (yrs.)					Lead agency	Budget (Kshs) '000,000'
Objective 1: To protect and rehabilitate water catchment areas										
Create awareness for need of protection of catchment areas	No.	15	-No. of barazas held -List of attendance	3	3	3	3	3	KFS, CFA, NGAO, WRA, CGoS, FAO	0.15m

through barazas										
Raising of suitable indigenous tree seedlings ('000')	No.	30	-No of seedlings raised -Progress reports	6	6	6	6	6	WRA, CGoS, KFS, FAO, CFA	0.3m
Rehabilitate the water points by planting indigenous trees (Rivers, Springs, wells, Swamps, Dams, Boreholes)	No	19	- Rehabilitated water points -Progress reports	-	5	5	5	4	WRA, CGoS, KFS, FAO, CFA	0.19m
Fence rehabilitated water points	No	19	-No of water points fenced -Progress reports	-	5	5	5	4	WRA, CGoS, KFS, FAO, CFA	0.19m
Objective 2: To build capacity on FAC on water management.										
Train the FAC on modern water harvesting technologies	No	10	-No of barazas held -Number of FAC members trained	2	2	2	2	2	WRA, CGoS, KFS, FAO, CFA	0.1m
Support FAC to acquire/construct water tanks for roof catchment(100H H/S/location)	No	600	-No of HH supported -Progress reports	120	120	120	120	120	WRA, CGoS, KFS, FAO, CFA	7.5m
Drilling of boreholes in the FAC, two (2)/S/location	No	18	-No of boreholes drilled -Progress reports	6	5	5	2	-	WRA, CGoS, KFS, FAO, CFA	3.6m
Objective 3: To Promote adoption of alternative water sources										
Acquire land to construct earth dams in FAC	No.	6	-Area of dams construction acquired -Documents for acquisition	2	1	1	1	1	WRA, CGoS, KFS, FAO, CFA	3m

			(title deed/Allotment documents)							
Form a dam construction committee	No	1	-List of committee members	1					WRA, CGoS, KFS, FAO, CFA	0.1m
Construction of earth dams	No.	6	-Number of dams constructed -Progress reports	2	1	1	1	1	WRA, CGoS, KFS, FAO, CFA	3m
Supervise of the dam construction	No	18	-No of boreholes drilled -Progress reports	6	5	5	2	-	WRA, CGoS, KFS, FAO, CFA	0.2m

5.2.4 Wildlife and Ecotourism Management programme

▪ Background

Wildlife conservation started many years in the western world. The conservation of wildlife in Kenya started around 1946.

The wild animals which are common in Naramat forest block include the following; -Antelopes, Zebra, Lions, Leopard, Elephants, hyena, porcupine and wild dogs. There several bird species e.g weaverbirds and woodpecker.

Several people do visitation to wildlife habitats for leisure, research and education.

Rehabilitation of wildlife habitats enhances conservation and protection hence promoting ecotourism. Naramat FB has a lot of potential in ecotourism which is untapped. There is need to resolve highlighted hurdles below for ecotourism to thrive.

▪ Management Challenges

- Degradation of wildlife habitats through illegal logging, fires, overgrazing, poaching
- Inadequate knowledge to handle wildlife by the forest adjacent community
- Inadequate funds for development of ecotourism facilities and marketing
- Human Wildlife conflict

▪ Management Objectives

- To protect and conserve wildlife habitats –Fence
- To build capacity of Naramat FAC on wildlife handling/management
- To do resource mobilization towards development of ecotourism facilities
- To resolve Human Wildlife conflict

To achieve the above objectives several management actions are proposed as shown in Table 84;

Table 84: Management actions for wildlife and ecotourism management programme

Action	Unit	5 yr. targets	Means of verification	Annual targets (yrs.)					Lead agency	Budget (Kshs) ‘000,000’
				1	2	3	4	5		
Objective 1: To protect and conserve wildlife habitats –Fence										
Develop a fence design	No.	1	-Fencing design developed	1	-	-	-	-	CFA, KWS, KFS, CGoS, NGAO, FAO, other partners	0.2m
Form a fence committee	No.	1	-List of fence committee members	1	-	-	-	-	CFA, KWS, KFS, CGoS, NGAO, FAO, other partners	0.05m
Train the fence committee	No	1	-List of trained fence committee members -Progress reports	1	-	-	-	-	CFA, KWS, KFS, CGoS, NGAO, FAO, other partners	0.1m
Tender supply of fencing materials	No	1	-Documents for tender awarded -List of assorted fence materials	1	-	-	-	-	CFA, KWS, KFS, CGoS, NGAO, FAO, other partners	0.05m
Erect a perimeter fence	Km	100	-Km of fence erected -Progress reports	25	50	25	-	-	CFA, KWS, KFS, CGoS, NGAO, FAO, other	10m

Action	Unit	5 yr. targets	Means of verification	Annual targets (yrs.)					Lead agency	Budget (Kshs) '000,000'
				1	2	3	4	5		
									partners	
Recruit fence attendants	No	20	-List of fence attendants recruited	20	-	-	-	-	CFA, KWS, KFS, CGoS, NGAO, FAO, other partners	1m
Recruit youth to assist in manning entry gates	No	10	-List of youth recruited to man gates	10	-	-	-	-	CFA, KWS, KFS, CGoS, NGAO, FAO, other partners	0.5m
Objective 2:To build capacity of Naramat FAC on wildlife handling/management										
Identify the farmers to train on wildlife in the FAC	No	1	-List of farmers identified in the FAC	1					CFA, KWS, KFS, CGoS, NGAO, FAO, other partners	0.05m
Train farmers on handling wildlife	No.	20	-Training report -List of participants -Photos	4	4	4	4	4	CFA, KWS, KFS, CGoS, NGAO, FAO, other partners	0.2m
Engage/deploy the trained farmers in FAC on wildlife handling work	No.	1	-Deployment list	1	-	-	-	-	CFA, KWS, KFS, CGoS, NGAO, FAO, other partners	0.1m
Objective 3:To do resource mobilization towards development of ecotourism										

Action	Unit	5 yr. targets	Means of verification	Annual targets (yrs.)					Lead agency	Budget (Kshs) ‘000,000’
				1	2	3	4	5		
facilities										
Form a resource mobilization committee	No.	1	-Committee formed -Progress report	1	-	-	-	-	CFA, KWS, KFS, CGoS, NGAO, FAO, other partners	0.05m
Prepare a plan for resource mobilization	No.	1	-Approved plan for resource mobilization -Progress report	1	-	-	-	-	CFA, KWS, KFS, CGoS, NGAO, FAO, other partners	0.05m
Do a budget for the planned activities	No.	1	-Budget done -Progress report	1	-	-	-	-	CFA, KWS, KFS, CGoS, NGAO, FAO, other partners	0.05m
Engage partners on the process of ecotourism facilities development	No.	10	-No of engagement forums with partners -Progress reports	2	2	2	2	2	CFA, KWS, KFS, CGoS, NGAO, FAO, other partners	0.05m
sign Memorandum of Agreement with Partners(MoA)	No	1	-Documents of MoA signed	1					CFA, KWS, KFS, CGoS, NGAO, FAO, other partners	0.05m
Develop	No	1	-Ecotourism	1					CFA,	2m

Action	Unit	5 yr. targets	Means of verification	Annual targets (yrs.)					Lead agency	Budget (Kshs) '000,000'
				1	2	3	4	5		
ecotourism facilities-camp site at Tamiyoi			facilities developed -Photos -Progress reports						KWS, KFS, CGoS, NGAO, FAO, other partners	
Conduct Monitoring	No.	10	-M & E conducted	2	2	2	2	2	CFA, KWS, KFS, CGoS, NGAO, FAO, other partners	0.1m
Objective 4: To resolve Human Wildlife conflict										
Sensitize the FAC and stakeholders on harmonious co-existence with wildlife	No	10	-No of barazas of attendance	2	2	2	2	2	CFA, KWS, KFS, CGoS, NGAO, FAO, other partners	0.1m
Form a FAC Human Wildlife committee	No	1	-List of committee members	1					CFA, KWS, KFS, CGoS, NGAO, FAO, other partners	0.05m
FAC Human Wildlife committee to identify/document HW cases	No	100%	-No of cases identified/document ed	100	x	x	x	x	CFA, KWS, KFS, CGoS, NGAO, FAO, other partners	0.1m
Compensate the wildlife damage	No	100%	-List of cases compensated/res	100	x	x	x	x	CFA, KWS,	2m

Action	Unit	5 yr. targets	Means of verification	Annual targets (yrs.)					Lead agency	Budget (Kshs) '000,000'
				1	2	3	4	5		
			olved	0					KFS, CGoS, NGAO, FAO, other partners	

5.2.5 Community Participation and Development Management Programme

▪ Background

Naramat FAC is comprised of farmers who mainly rear livestock and grow crops in small scale; land ranging between 0.1 – 2 acres. Food crops grown and livestock kept are both for domestic, small income generation or both. Income generation is low. This is corroborated from the way the community is entirely dependent on Naramat forest block for most of their forest products and services.

The main products obtained from the forest are timber, fuel wood, herbs, grazing, bee keeping and water. Low literacy levels and ignorance from the community contributes to degradation of the forest from over-exploitation of the forest resources.

▪ Management Challenges

- Poverty levels are high due to limited and weather dependent livelihood
- Small land sizes and overstocking
- Over dependence on forest for forest goods
- Drought and limited variety of food/cash crops which are not drought tolerant

▪ Management objectives

- To introduce new and promote existing IGAs to alleviate poverty (Do value addition on NWFP)
- To introduce agroforestry technologies, maximise the usage of small parcels of land
- To Promote alternative energy sources

The management actions required to achieve these objectives are proposed in Table 85 below;

Table 85: Management actions for community participation and development programme

Action	Un it	5 yr. target	Means of verification	Annual targets (yrs.)					Lead agency	Budget (Kshs)	
				1	2	3	4	5			
Objective 1:To introduce new and promote existing IGAs to alleviate poverty (Do value addition on NWFP)											
Introduce new IGAs e.g., brick making, fruit trees (avocado,	No	10	-Records -Progress reports	2	2	2	2	2	CFA, KFS, CGoS.	1m	

Action	Unit	5 yr. target	Means of verification	Annual targets (yrs.)					Lead agency	Budget (Kshs)
				1	2	3	4	5		
tissue culture bananas, mangoes) & do honey value addition									NGAO, FAO, MoALD, other partners	
Introduce high value tree and fruit species in the FAC nurseries per sub location	No	6	-Records -Progress reports	1	2	1	1	1	CFA, KFS, CGoS, NGAO, FAO, MoALD, other partners	0.6m
Do products value addition (Honey, herbal medicine, traditional vegetables)	No	3	-Records -Progress reports	-	1	2	-	-	CFA, KFS, CGoS, NGAO, FAO, MoALD, other partners	0.45m
Introduce zero grazing/Dairy goats rearing 50 per sub-location	No	300	Report on No. of HH with zero grazing units -Progress reports	60	60	60	60	60	CFA, KFS, CGoS, NGAO, FAO, MoALD, other partners	7.5m
Objective 2: To introduce agroforestry technologies maximise the usage of small parcels of land										
Organise education exchange visits	No	10	-Progress reports	2	2	2	2	2	CFA, KFS, CGoS, NGAO, FAO, MoALD, other partners	1m
Organise field days	No	10	-Progress reports	2	2	2	2	2	CFA, KFS,	0.5m

Action	Unit	5 yr. target	Means of verification	Annual targets (yrs.)					Lead agency	Budget (Kshs)
				1	2	3	4	5		
									CGoS, NGAO, FAO, MoALD, other partners	
Form tree nursery user groups 2 per sub location and prepare by-laws to strengthen them	No .	12	No. of FUGs	1 2	-	-	-	-	CFA, KFS, CGoS, NGAO, FAO, MoALD, other partners	0.12m
Promote farmers to plants high value agroforestry trees/establish woodlots-200HH/S/Location	No	1200	-No of HH promoted to plant high value agroforestry tree spp/woodlot establishment	2 4 0	2 4 0	2 4 0	2 4 0	2 4 0	CFA, KFS, CGoS, NGAO, FAO, MoALD, other partners	1.2m
Objective 3: To Promote alternative energy sources										
Adoption of energy saving jikos (`000`) per sub location each 1000 energy saving jikos	No .	6	No. of beneficiaries	3	3	-	-	-	CFA, KFS, CGoS, NGAO, FAO, MoALD, Min of Energy, other partners	0.9m
Promotion of biogas production per sub location	No .	600	Reports	3 0 0	3 0 0	-	-	-	CFA, KFS, CGoS, NGAO, FAO, MoALD, Min of Energy, other	3m

Action	Unit	5 yr. target	Means of verification	Annual targets (yrs.)					Lead agency	Budget (Kshs)
				1	2	3	4	5		
									partners	
Promotion of solar energy through adoption of solar per sub location each 10	No .	600	-Progress reports -Solar panels adopted/installed	300	300	-	-	-	CFA, KFS, CGoS, NGAO, FAO, MoALD, Min of Energy, other partners	1.5m

5.2.6 Protection and Security management programme

▪ Background

Naramat Forest block is part of larger Kirisia forest ecosystem. It is adjacent to Maralal town and faces serious degradation and security threats. There is high pressure for firewood, building materials, urban expansion and overgrazing due to influx of livestock from other counties when drought bites.

▪ Management Challenges

- Inadequate surveillance equipment
- Inadequate capacity to operate surveillance equipment
- Forest fire
- Pests and diseases
- Insecurity; armed morans hide in the forest
- Inadequate Forest Rangers to manage the expansive Naramat forest block, Kirisia forest ecosystem
- Resistance local Community to adhere to forest regulations e.g., payment for forest products and services

▪ Management Objectives

- To control forest fires
- To control pests and diseases
- To recruit community scouts
- To enforce the law to ensure there is compliance with the forest rules and regulations

The management actions proposed to achieve these objectives are shown in Table 86;

Table 86; Management actions for protection and security management programme

Action	Unit	5 yr targets	Means of verification	Annual targets (yrs)					Lead agency	Budget (Kshs)
				1	2	3	4	5		
Objective 1: To control forest fires										
Procure fire equipment per FAC sub location	No.	6	No. in place	6	-	-	-	-	CFA, KFS, CGoS, NGAO, FAO	0.6m
Construction of fire towers –Tamiyoi and Ngari	No.	2	Fire towers constructed	2	-	-	-	-	CFA, KFS, CGoS, NGAO, FAO	3m
Hold workshops on fire fighting	No	10	- Training Reports - Training attendance list	2	2	2	2	2	CFA, KFS, CGoS, NGAO, FAO	0.5m
Objective 2:To control pests and diseases										
Sensitize FAC on disease and pest surveillance	No	5	No of barazas held	1	1	1	1	1	CFA, KFS, CGoS, NGAO, FAO, KEFRI	0.05m
Form a FAC pests and diseases surveillance team	No	1	-List of the members for surveillance team	1	-	-	-	-	CFA, KFS, CGoS, NGAO, FAO, KEFRI	0.01m
Do surveillance of pests and diseases	No	5	-No of surveillance conducted - Reports	1	-	-	-	-	KFS, CFA, CGoS, NGAO, FAO, KEFRI	0.01m

Action	Unit	5 yr targets	Means of verification	Annual targets (yrs)					Lead agency	Budget (Kshs)
				1	2	3	4	5		
Objective 3:To recruit community scouts										
Recruit 30 community scouts	No	30	-List of recruits	30	-	-	-	-	CFA, KFS, KWS, CGoS, NGAO, FAO	1.5m
Train the recruited scouts	No	1	-No of trainings done -List of trained scouts	1	-	-	-	-	CFA, KFS, KWS, CGoS, NGAO, FAO	0.1m
Deploy trained scouts	No	1	-List of deployment	1	-	-	-	-	CFA, KFS, KWS, CGoS, NGAO, FAO	0.05m
Objective 4:To enforce the law to ensure there is compliance with the forest rules and regulations										
Create awareness on the importance of adherence to forest regulations through barazas	No.	20	-No of barazas held -Photos, - Attendance list	4	4	4	4	4	CFA, KFS, KWS, CGoS, NGAO, FAO	0.2m
Conducting joint patrols by Forest Rangers and community forest scouts	%	100	-Patrols records -OB reports/ records	100	x	x	x	x	CFA, KFS, KWS, CGoS, NGAO, FAO	0.1m
Enforce the existing forest laws, rules and regulations	%	100	-Arrest records -Cases taken to court records	100	x	x	x	x	CFA, KFS, KWS, CGoS, NGAO, FAO, National	0.1m

Action	Unit	5 yr targets	Means of verification	Annual targets (yrs)					Lead agency	Budget (Kshs)
				1	2	3	4	5		
									police service, Judiciary	

5.2.7 Infrastructure and Equipment Development Management Programme

▪ Background

Roads, buildings, vehicles, communication and office equipment are crucial to the protection, conservation and sustainable management of Naramat Forest block.

There are few motorable roads in Naramat forest block making response to emergencies in time difficult. Additional infrastructure and equipment are required to enhance conservation, protection and management of the Naramat forest block.

There're no buildings; office block, CFA office, Community resource centre, staff houses and outposts in Naramat forest block. There are no water and power supply and its infrastructure.

▪ Management Challenges

- No motorable forest roads
- No office block for KFS and CFA, no FAC resource centre, no staff houses, Forest Rangers outposts/scouts camp and equip
- Inadequate motor vehicles (light and heavy) e.g., tractor
- No water supply and infrastructure
- No power supply and infrastructure
- All forest borders are porous

▪ Management Objectives

- To design, construct and maintain roads in Naramat forest block
- To construct offices; KFS, CFA, FAC resource centre, staff houses and forest Rangers' outpost/ scouts' camps and equip
- To procure motor vehicles (Light vehicle, tractor, motor cycles)
- To develop infrastructure and supply water- tree nursery, staff houses & outposts at appropriate sites
- To develop infrastructure and supply power-Offices, staff houses, Outposts & FAC Resource centre

The programme proposes various management actions to be undertaken to achieve the objectives (Table 87) below;

Table 87: Management actions for infrastructure and equipment management programme

Action	Un it	5 yr. tar get	Means of verification	Annual targets (yrs.)					Lead agency	Budget (Kshs) ‘000,000’
				1	2	3	4	5		
Objective 1:To design, construct and maintain roads in Naramat forest block										
Design Forest roads	K M	200	-No of roads designed -Records of roads designed	1	-	-	-	-	CFA, KFS, KWS, CGoS, NGAO, FAO, Public works	0.1m
Clear Forest roads	Km	200	-No. of km cleared -Progress reports	100 x	100	x	x	x	CFA, KFS, KWS, CGoS, NGAO, FAO, Public works	1m
Grade the forest roads	Km	200	-No. of km graded -Progress reports	x	100	100		-	CFA, KFS, KWS, CGoS, NGAO, FAO, Public works	2m
Maintain the roads	Km	200	-No. of km maintained -Progress reports	100	x	x	x	x	CFA, KFS, KWS, CGoS, NGAO, FAO, Public works	1m
Objective 2:To construct offices for KFS, CFA, FAC resource centre, staff houses and forest Rangers’ outpost /scouts’ camps and equip										
Construct a Forest station Office at	No.	1	-KFS Office	1	-	-	-	-	CFA, KFS, KWS, CGoS,	2m

Action	Unit	5 yr. target	Means of verification	Annual targets (yrs.)					Lead agency	Budget (Kshs) '000,000'
				1	2	3	4	5		
Tamiyoi									NGAO, FAO, Public works	
Construct outposts for the Forest Rangers /scouts camp at 3	No.	3	No. of outposts constructed	1	1	1	-	-	CFA, KFS, KWS, CGoS, NGAO, FAO, Public works	4.5m
Construct a CFA office and resource centre at Tamiyoi	No.	1	Office constructed	1	-	-	-	-	CFA, KFS, KWS, CGoS, NGAO, FAO, Public works	2m
Constitute a procurement committee	No.	1	-List for the procurement -Reports	1	-	-	-	-	CFA, KFS, KWS, CGoS, NGAO, FAO, Public works, Planning ministry	0.05m
Capacity build the procurement committee on Public procurement & disposal act	No.	2	Reports	1	-	1	-	-	CFA, KFS, KWS, CGoS, NGAO, FAO, Public works, Planning ministry	0.1m
Prepare a procurement	No.	1	Approved procurement	1	-	-	-	-	CFA, KFS,	0.05m

Action	Unit	5 yr. target	Means of verification	Annual targets (yrs.)					Lead agency	Budget (Kshs) '000,000'
				1	2	3	4	5		
t plan			plan						KWS, CGoS, NGAO, FAO, Public works, Planning ministry	
Mobilize resources from strategic partners/stakeholders	No.	4	No of strategic partners/stakeholder engagements - Reports	1	1	1	1	-	CFA, KFS, KWS, CGoS, NGAO, FAO, Public works, Planning ministry and other stakeholders/strategic partners	0.1m
Objective 3: To procure motor vehicles (Light vehicle, tractor, motor cycles)										
Procure motor vehicles (1 tractor, 1 pickup and two motorcycles)	No.	4	-No of vehicles procured -Logbooks for	2	2	-	-	-	CFA, KFS, KWS, CGoS, NGAO, FAO, Public works, Planning ministry and other stakeholders/strategic partners	5m
Service and maintain procured	%	100	-Records of service/maintenance	100	x	x	x	x	CFA, KFS, KWS,	0.5m

Action	Unit	5 yr. target	Means of verification	Annual targets (yrs.)					Lead agency	Budget (Kshs) '000,000'
				1	2	3	4	5		
motor vehicles									CGoS, NGAO, FAO, Public works, Planning ministry and other stakeholders/strategic partners	
Objective 4: To develop infrastructure and supply water- tree nursery, staff houses & outposts at appropriate sites										
Design the water infrastructure for; nursery	No	1	-Records of designs	1					CFA, KFS, KWS, CGoS, NGAO, FAO, Public works, Planning ministry and other stakeholders/strategic partners	0.1m
Mobilize resources from strategic partners/stakeholders	No	4	-No of strategic partners/stakeholder engagements -Reports	1	1	1	1	-	CFA, KFS, KWS, CGoS, NGAO, FAO, Public works, Planning ministry and other stakeholders/strategic	0.1m

Action	Unit	5 yr. target	Means of verification	Annual targets (yrs.)					Lead agency	Budget (Kshs) '000,000'
				1	2	3	4	5		
									gic partners	
Install water infrastructure & supply water at 6 nursery sites	No	6	-No of water infrastructure and water supply developed -Photos -Progress reports	6	-	-	-	-	CFA, KFS, KWS, CGoS, NGAO, FAO, Public works, Planning ministry and other stakeholders/strategic partners, WRA	1.2m
Maintain the water infrastructure	No	6	-No of water infrastructure maintained -Photos -Progress reports	100	x	x	x	x	CFA, KFS, KWS, CGoS, NGAO, FAO, Public works, Planning ministry and other stakeholders/strategic partners, WRA	0.3m
Objective 5: To develop infrastructure and supply power-Offices, staff houses, Outposts & FAC Resource centre										
Mobilize resources from strategic partners/stakeholders	No	4	-No of strategic partners/stakeholder engagements – Progress reports	4	-	-	-	-	CFA, KFS, KWS, CGoS, NGAO, FAO, Public works, Planning ministry and other stakeholders	0.1m

Action	Unit	5 yr. target	Means of verification	Annual targets (yrs.)					Lead agency	Budget (Kshs) '000,000'
				1	2	3	4	5		
									ers/strategic partners, KPLC6	
Install power infrastructure & supply power – offices, staff quarters, FACC Resource centre & out posts	No	6	-No of power infrastructure and power supply developed -Photos -Progress reports	6	-	-	-	-	CFA,KFS ,KWS, CGoS, NGAO, FAO,Public works, Planning ministry and other stakeholders/strategic partners, KPLC	0.6m
Maintain the power infrastructure	No	6	-No of power infrastructure maintained -Progress reports	100	x	x	x	x	CFA,KFS ,KWS, CGoS, NGAO, FAO,Public works, Planning ministry and other stakeholders/strategic partners, KPLC	0.6m

5.2.8 Human resource management programme

▪ Background

The implementation of the planned activities will entirely depend on the human resource in KFS and the CFA.

The human resource should be effective, efficient and well-motivated to deliver the mandate of the co-managers in conservation. The staff should be adequate in number and competent enough.

▪ Management challenges

- Shortage KFS Forest Rangers, CFA volunteer community scouts and other staff

- Low capacity of the volunteer staff-CFA
- Lack of incentive scheme for scouts/CFA staff

▪ **Management objective**

- To recruit more CFA volunteer community scouts, nursery support staff and KFS to deploy more Forest Rangers
- To Capacity build the volunteer CFA staff
- To develop an incentive scheme for volunteer scouts and other staff

The programme has various management actions which need to be undertaken in order to achieve the objectives above, (Table,88);

Table 88: Management actions for Human Resource Management Programme

Objective 1: To recruit more CFA volunteer community scouts, nursery support staff and KFS to deploy more Forest Rangers										Budget (Kshs)
KFS to deploy more Forest Rangers	No .	15	No. of Rangers deployed	15	-	-	-	-	KFS,	4.5m
Recruit more community Scouts	No	30	Scouts recruited	30	-	-	-	-	CFA, KFS, KWS, CGoS, NGAO, FAO, National police service	0.15m
Engage Community Informers	No	15	Informers engaged	15	-	-	-	-	CFA, KFS, KWS, CGoS, NGAO, FAO, National police service	1.5m
Recruit Tree nursery staff	No	15	No of nursery staff recruited	15					CFA, KFS, KWS, CGoS, NGAO, FAO	1.5m
Recruit Tour	No	10	No. of tour	-	1	-	-	-	CFA,	1m

guides			guides recruited		0				KFS, KWS, CGoS, NGAO, FAO, National police service	
2: To capacity build the volunteer CFA staff										
Training the community scouts, nursery and tour guides	No	30	No. of scouts trained	30					CFA, KFS, KWS, CGoS, NGAO, FAO, National police service	0.3m
Train CFA volunteer staff-tree nursery and tour guides	No	6	No of nursery and tour guide staff trained	6	-	-	-	-	CFA, KFS, KWS, CGoS, NGAO, FAO	0.3m
Deploy trained scouts, nursery and tour guides	No	1	List of deployment	1	-	-	-	-	CFA, KFS, KWS, CGoS, NGAO, FAO	0.05m
Do appraisal for the deployed staff										0.05m
3: To develop an incentive scheme for volunteer scouts and other staff										
Develop a monetary incentive scheme for scouts, nursery and tour guide staff	No	1	-Approved incentive schemes developed -Progress reports	1	-	-	-	-	CFA, KFS, KWS, CGoS, NGAO, FAO	0.1m
Develop annual award scheme for scouts,	No	5	-Approved incentive schemes	1	1	1	1	1	CFA, KFS, KWS,	0.5m

nursery and tour guide staff			developed -Progress reports						CGoS, NGAO, FAO	
Do monitoring and evaluation of the incentive schemes	No	5	-Monitoring and evaluation report	1	1	1	1	1	CFA,KFS, KWS, CGoS, NGAO, FAO	0.1m

5.2.9 Research and Education management programme

▪ Background information

Naramat forest was once an intact forest of indigenous tree species. Over the years, the Naramat forest block has been degraded. There is need for research on various aspects to restore to its original state. Biodiversity richness, FAC alternative agroforestry tree species, IGAs, and possibility of introducing other flora and fauna to be researched on.

▪ Management Challenges

- No alternative to polythene tubes for raising seedlings
- Low student interest in community work/ tree nurseries
- Limited methods of rearing livestock
- Limited under-performing IGAs
- Limited water harvesting technologies
- Limited high value tree species to meet the needs of the FAC and indigenous trees for restoration programme

▪ Management Objectives

- To promote forest Education and Research
- To research on appropriate breed & method of rearing livestock in FAC which brings guarantee minimum return on investment
- To research on under-performing IGAs in FAC
- To research on appropriate water harvesting technologies in the FAC

The management actions which will help to address the management objectives identified are shown in Table 89 below;

Table 89: Management actions for Research and Education management programme

Action	Unit	5 yr. targets	Means of verification	Annual targets (yrs.)					Lead agency	Budget (Kshs)
				1	2	3	4	5		
Objective 1: To promote forest Education and Research										
Form a research steering committee to do outreach	No.	1	Reports	1	-	-	-	-	CFA, KEFRI, NGAO, KFS, FAO, Partners,	0.05m
Introduce research on polythene tubes alternative	No	2	Reports	2	-	-	-	-	CFA, KEFRI,NGAO , KFS, FAO,Partners	0.5m
Establish a research tree nursery for research education	No.	1	Reports, No. of research nurseries established	1	-	-	-	-	CFA, KEFRI,NGAO , KFS, FAO,Partners	0.5m
Encourage research student on attachment to assist in conducting research in community work/nurseries	No.	20	No. of students on attachment	4	4	4	4	4	CFA, KEFRI,NGAO , KFS, FAO,Partners	0.1m
Mandatory condition students undertaking research to share research findings	No.	10	No. of students on attachment	2	2	2	2	2	CFA, KEFRI,NGAO , KFS, FAO,Partners, KALRO	0.05m
Research on high value restoration and agroforestry tree/fruit species in the FAC	No	10	-No. of species researched	5	5	-	-	-	CFA, KEFRI, NGAO, KFS, FAO,Partners, KALRO	0.2m
Objective 2: To research on appropriate breed & method of rearing livestock in FAC which brings guarantee minimum return on investment										
Research on improved appropriate	No.	1	-No of research output	1	-	-	-	-	CFA, KEFRI,NGAO , KFS,	0.1m

Action	Unit	5 yr. targets	Means of verification	Annual targets (yrs.)					Lead agency	Budget (Kshs)
				1	2	3	4	5		
livestock breed with guarantee returns									FAO,Other Partners,KALRO	
Research on appropriate livestock production methods with guarantee returns	NO	1	-No of research output	-	1	-	-	-	CFA, KEFRI,NGAO , KFS, FAO,Other Partners,KALRO	0.1
Undertake a livestock carrying capacity study	No.	1	-Carrying capacity study report	1	-	-	-	-	CFA, KEFRI,NGAO , KFS, FAO,Other Partners	0.05m
Hold sensitization barazas to disseminate research findings	No	6	-No Sensitization barazas held -List of attendance	-	-	6	-	-		0.6m
Objective 3:To research on under-performing IGAs in FAC										
Research on underperforming IGAs	No.	5	No. of IGAs researched -Research report	3	2	-	-	-	CFA, KEFRI,NGAO , KFS, KALRO,FAO, Partners,Trade ministry, Banks	0.25m
Hold sensitization barazas to disseminate research findings	No	6	-No of barazas -List of attendance	-	-	6	-	-	CFA, KEFRI,NGAO , KFS, KALRO,FAO, Partners,Trade ministry, Banks	0.6m
Support recommended IGAs(Subsidized interest rates/grants)	No	5	-No of IGAs supported	-	-	5	-	-	CFA, KEFRI,NGAO , KFS, KALRO,FAO, Partners,Trade	5m

Action	Unit	5 yr. targets	Means of verification	Annual targets (yrs.)					Lead agency	Budget (Kshs)
				1	2	3	4	5		
									ministry, Banks	
Objective 4: To research on appropriate water harvesting technologies in the FAC										
Research and promote appropriate water harvesting methods	No.	3	-Research Report	3	-	-	-	-	CFA, NGAO, KFS, FAO, Partners, WRA, WRUA	0.15
Hold sensitization barazas to disseminate research findings	No	6	-No Sensitization barazas held -List of attendance	-	6	-	-	-	CFA, NGAO, KFS, FAO, WRA, WRUA, Partners, KALRO,	0.06m
Hold workshops and field days to share information	No	6	Workshops and field days held	-	6	-	-	-	CFA, KEFRI, NGAO, KFS, WRA, WRUA, FAO, Partners	0.6m
Support the adoption of appropriate water harvesting technology	No	3	-No of harvesting technologies supported	-	3	-	-	-	CFA, KEFRI, NGAO, KFS, FAO, Partners, WRA, WRUA	0.3m
Do monitoring and evaluation to assess the level of adoption of the new water harvesting technology	No	3	- Monitoring and evaluation report	-	-	1	1	1	CFA, KEFRI, NGAO, KFS, FAO, Partners, WRA, WRUA	0.05m

CHAPTER FIVE C

MANAGEMENT PROGRAMMES

5.3 NAILEPUNYE FOREST MANAGEMENT UNIT

5.3.1 Natural Forest Conservation Management Programme

▪ Background

Nailepunye management unit is approximately 36,000ha part of the larger Kirisia forest reserve. It is composed of a wide array of indigenous species that provide goods and services to the community members. These goods and services include grazing fodder, water, herbal medicines, soil, timber, posts, poles, eco-tourism, cultural activities, and so on.

The main trees species found include: *Podocarpus falcatus* (Lpiripirinti), *Olea capenese* (Loliontoi), ssp, *Olea Africana*(Lgeriyoi), *Cassiporea melasona* (Mashakuldu), *Ekebergia capense* (Sonkoroi), *Nuxia congesta*, (Lepironito) *Croton megalocarpus* (Lmarkwet), *Junipera procera* (Ltarakwai), *Ficus natalensis*, (Seepei) *Prunus Africana* (Lkujok), *Teclea simplicifolia* (Lgilai). Other important species are of medicinal value: *Rhumnus staddo* (Lkukulai), *Totalia asiatica* (Leparmunyo), and *Rhumnus prinoides* (Lkinyil

The Nailepunye ecosystem is threatened by degradation through various anthropogenic human activities e.g. grazing, firewood extraction and charcoal production (Table 90). Afforestation efforts have been hampered by technical knowledge limitations, limited availability of information and lack of a step-wise rehabilitation plan. To restore degraded areas fundamentally requires baseline data of the specific sites so as to form a management criteria of restoration actions. Restoring landscapes would increase water, food and household incomes while safeguarding the environment.

Any restoration activities must involve community participation which is the involvement of a broad mass of people in the choice, execution, and evaluation of programs designed to bring about significant upward movement in their levels of living through the sustainable use of forest resources. Community participation in forest restoration would have sustainable benefits both to biodiversity conservation and to the community livelihoods.

Table 90: Degraded sites in Nailepunye management unit

No.	Site	Area (Ha)	Cause of degradation	Treatment
1.	Opiroi	40	Illegal settlements, fire, illegal grazing, illegal logging, soil erosion	Protection for natural regeneration, controlled grazing, fire surveillance, soil conservation, community sensitization, firefighting equipment
2.	Lorrok Lolmong'o	60	Fire, illegal settlements	Protection for natural regeneration, controlled grazing, fire surveillance, soil conservation, community sensitization, firefighting equipment

3.	Lulu	30	Fire, illegal settlements, soil erosion	Protection for natural regeneration, controlled grazing, fire surveillance, soil conservation, community sensitization, firefighting equipment
4.	Lekamoru	40	Illegal settlements, fires	Protection for natural regeneration, controlled grazing, fire surveillance, soil conservation, community sensitization, firefighting equipment
5.	Losipa	20	Illegal settlements, fires	Protection for natural regeneration, controlled grazing, fire surveillance, soil conservation, community sensitization, firefighting equipment
6.	Ngorika	30	Fire	Protection for natural regeneration, controlled grazing, fire surveillance, soil conservation, community sensitization, firefighting equipment
7.	Michominyi,	20	Illegal settlements, fire	Protection for natural regeneration, controlled grazing, fire surveillance, soil conservation, community sensitization, firefighting equipment
8.	Sunoni	40	Fire, illegal settlements, soil erosion	Protection for natural regeneration, controlled grazing, fire surveillance, soil conservation, community sensitization, firefighting equipment
	Total	280		

▪ **Management issues**

- Illegal logging for posts and poles
- Charcoal production
- Forest fires
- Forest degradation from overgrazing

▪ **Management objectives**

- To prepare a restoration plan for degraded areas
- To rehabilitate degraded areas
- To protect and maintain rehabilitated sites
- To promote community involvement in biodiversity conservation

Table 91: Summary of management actions for forest conservation programme

Action	Unit	5 year targets	Means of verification	Annual targets (years)					Lead Agency	Budget	
				1	2	3	4	5			
Objective 1: To prepare a restoration plan for degraded areas											
Map	all	Ha	280	Degraded	280					KFS,	0.1m

Action	Unit	5 year targets	Means of verification	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
degraded sites using GPS co-ordinates (Opiroi, Lorok lolmong'o, Lorrok, Lulu, Lekamoru, Losepa, Ngorika, Michomingi, Loibashai, Longutukie and Sunoni)			sites identified and mapped						CFA, SCG, KWS	
Document degraded sites' conditions	No.	7	Site reports, drones, maps	7					KFS, CFA, SCG, KWS	0.05m
Document ecological information of native species found at the sites for rehabilitated	No.	7	Records, reports, drones, maps	7					KFS, CFA, SCG, KWS	0.05m
Objective 2: To rehabilitate degraded areas										
Conduct sensitization meetings with all stakeholders to inform them on the plan to restore degraded sites in all surrounding villages (Soit Nanyuki, Naimaralal, Opiroi, Lorrok Lolmong, Ntepes, Lulu, Sunoni, Angata Nayukie, Nkirenje, Nkorika, Ntarakwai, and	No.	12	Barazas held	12					KFS, CFA, SCG, KWS	0.1m

Action	Unit	5 year targets	Means of verification	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
Tobiko)										
Construct fire breaks around planned planting sites and other fire hotspots in the forest block	No.	7	Constructed firebreaks No fire breaks in natural forests				7		KFS, CFA, SCG, KWS	0.035m
Raise native species in the CFA nurseries ('000)	No.	30	Seedlings raised	30					KFS, CFA	0.3m
Prepare sites for planting	No.	7		7					KFS, CFA, SCG, KWS	0.35m
Plant degraded sites with native species ('000)	No.	280			180	100			KFS, CFA, SCG, KWS	0.28m
Objective 3: Toprotect and maintain rehabilitated sites										
Erect barriers e.g. fences to prevent planted areas from livestock and game damage	No.	7	Barriers erected around planted areas/sites				7		KFS, CFA, SCG, KWS	0.35m
Maintain the rehabilitated areas	Ha	280	Area maintained				280	x	KFS, CFA, strategic partners	0.14m
Objective 4: To promote community involvement in biodiversity conservation										
Hold sensitization barazas on forest user groups' by-laws and resource allocation rules and regulations to respective members of the user groups to promote sustainable use	No.	10	Barazas held	10					KFS, CFA, SCG, KWS	0.1m

Action	Unit	5 year targets	Means of verification	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
of forest resources										
Train forest grazing user groups on sustainable grazing through drafting of a grazing plan	No.	10	Trainings held	2	2	2	2	2	KFS, SCG, CFA	0.1m

5.3.2 Wildlife and Eco-Tourism Development Management Programme

▪ Background

Nailepunyie is a home to a variety of wild animals ranging from big mammals, birdlife, reptiles, amphibians and insects. It also has a wide range of attractive ecotourism sites including caves, waterfalls, picnic sites, camping sites, viewpoints as illustrated in Chapter 2.

Wildlife in Nailepunyie Block plays a number of critical roles, e.g.

- i. Promotes pollination and continuity of native plant species. This explains the various bee hives established in the forest that help in pollination as they move from flower to flower. Small birds, mammals and insects play an important role in food production. They aid in dispersal of seeds and pollen from area to area thus sustaining the reproductive process of many plant species.

Aesthetic value. Watching wildlife in their natural habitat is known to be relaxing and stress reducing. Campsites, unique sites, waterfalls, caves, viewpoints, picnic sites, shrines and nature trails. Tourism is the main benefit of wildlife resources, and wildlife tourism has the potential to raise revenue through community based eco-tourism activities. However, this could only be achieved if the correct supporting infrastructure and competent staff knowledgeable in skills related to the tourism industry.

▪ Management issues

- Poaching and trophy hunting
- Habitat loss through degradation
- Human encroachment into protected areas
- Species extinction
- Predation pressure (Human-wildlife conflicts)
- Snares and poisoning of wildlife
- Wild fires
- Off-road driving by tourists
- Loss of migratory corridors
- Long periods of compensation from wildlife attacks

- Underdeveloped eco-tourism infrastructure (e.g. roads, hotels, zip lines, etc.)
- Inadequate marketing skills
- Lack of access to eco-tourism hotspots
- Rhinos hunted and poached
- Inadequate expertise/manpower skilled in eco-tourism

▪ **Management objectives**

- To conserve, protect and manage wildlife and their habitats
- To establish the required infrastructure required to support eco-tourism
- To promote and market Nailepunyie Block as an attractive tourist destination both locally and internationally

Table 92: Management actions for wildlife and eco-tourism programme

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
Objective 1: To conserve, protect and manage wildlife and their habitats										
Community sensitization on creating community wildlife conservancies	No.	2	Sensitization barazas held	1	1				SCG, CFA, KWS	0.05m
Create community wildlife conservancies at Loibashai and Tupwa	No.	2	Conservancies established				1	1	SCG, CFA, KWS	0.05m
Develop an inventory of threatened, vulnerable and endangered wildlife species	No.	1	Inventory report		1				SCG, KWS, CFA	0.1m
Construct fire a fire tower at Soit Pus	No.	1	Fire breaks constructed	1					KWS, KFS, SCG, FAO	1.5m
Conduct a wildlife census	No.	1	Census report			1			KWS, SCG	0.2m
Map and gazette all wildlife	No.	2	Migratory routes report and map of			2			KWS,	0.05m

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
migratory corridors			LowuaOibor – Loltiyan and Lowua Oibor – Saanata wildlife corridors							
Develop a list of all wildlife species, (inventory), found in the forest block	No.	1	List of wildlife species				1		KWS, SCG, CFA, Conservancies	0.05m
Erect speed sign posts in the protected areas at junction of Opiroi road Suen – Lulu road, Opiroi escarpment, Opiroi Town, Nkirenyi – Barno, Radar junction	No.	5	Speed signs erected						KFS, CFA, SCG	0.025m
Conduct a feasibility study on the possibilities of re-introducing rhinos into the block	No.	1	Feasibility study reports		1				KWS, SCG	0.1m
Declare the vulture breeding site a natural reserve (an important bird area) by preventing any commercial developments in the area	No.	1	Vulture breeding site declared a natural reserve		1				Ministry of environment and forestry	0.05m
Objective 2: To establish the required infrastructure required to support eco-tourism										

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
Establish eco-lodges within the scenic sites in the block at Loltiyan, Barno and Suen	No.	3	Eco-lodges constructed			1	1	1	KFS, CFA, SCG	4.5m
Establish tented camps at Saanata, Leshingaita, Lulu, Lowua Oibor, Loltiyan, Ngilai and Suen	No.	7	Tented camps established		1	2	2	2		0.7m
Establish camping sites at Loltiyan, Barno and Suen	No.	3	Camping sites established				3		CFA, KFS, SCG	0.3m
Establish nature trails and nature walks at Ngilai-Naampausi, Lorok-Keito, Barnoi-Saanata, Loomunyi-Loomunyi shrine, Loosipa-Sordon, Nkurmaut-Nkoliontoi	No.	3	Nature trails constructed		20				CFA, KFS	0.15m

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
cave, Mpuya-Soit ye ngai (Vultures), Opiroi-Reteti Lookera, Danger-Nalaram cave, Danger-Nolwerikoi, Lorok-Lomuny cave, Mpuya-Lolitiyani										
Establish canopy drops over viewpoints	No.	3	Canopy drops built		1	1	1		CFA, KFS	0.3m
Construct zip lines	No.	3	Zip lines constructed		1	1	1		CFA, SCG	0.9m
Construct an obstacle course for team building exercises	No.	1	Obstacle course established			1			CFA	0.1m
Establish outposts to guard the infrastructure and equipment as well as visitor safety	No.	3	Outposts established				3		KFS	3m
Employ community based scouts to complement forest rangers	No.	30	Employment contracts	10	10	10			KFS, CFA	1.5m
Construct a bungee jumping	No.	3	Site visits		1	1	1		CFA, KFS	0.6m

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
facilities at the viewpoints, cliffs and waterfalls										
Objective 3: To promote and market Nailepunyie Block as an attractive tourist destination both locally and internationally										
Establish a website highlighting all the attractions found in Nailepunyie	No.	1	Website running		1				CFA, SCG	0.05m
Print and distribute brochures to the key stakeholders in Samburu County to attract local tourists from the county	No.	1	Brochures printed		1				CFA, SCG	0.2m
Advertise the potential of Nailepunyie Block in the local radio stations	No.	4	Nailepunyie Block advertised		1	1	1	1	KFS, KWS, CFA, SCG	0.1m
Petition UNESCO to declare Nailepunyie Block a world heritage site due to its function as an important bird area	No.	1	UNESCO certifying Nailepunyie lock as a world heritage site			1			KFS, KWS, CFA, SCG NMK	0.2m

5.3.3 Water resources management programme

▪ Background

Nailepunyie management unit has three main rivers Ngilai, Lulu and Naashuda that are fed by various streams, springs. These rivers and the secondary water bodies are a vital source of water to local community for domestic use, livestock and the wildlife found in the forest block. These water resources are also the lifeline to urban centres.

▪ **Management issues**

- Inadequate water resource management structures.
- Insufficient water projects to supply water to the adjacent community
- Long distances to water sources/uneven distribution of water points
- Encroachment into catchment areas during dry spells
- Pollution of water points
- Lack of Water Resource Users Associations
- Soil erosion along river banks
- Scarcity of water during the dry seasons
- Erratic rainfall and prolonged drought
- Flash floods especially at Opiroi
- Siltation of rivers and streams
- Clogging of streams by polythene papers from town centers e.g. Maralal Town and Opiroi trading centers
- Trampling of riverine soil by huge livestock herds

▪ **Management objectives**

- To promote easy access to clean and sufficient water for community members, livestock and wildlife
- To rehabilitate degraded riparian areas

Table 93: Management actions for water resources management programme

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
Objective 1: To promote easy access to clean and sufficient water for community members, livestock and wildlife										
Hold community sensitization barazas on importance of water harvesting techniques e.g. tanks, gutters, piping etc.	No.	3	Barazas held	3					SCG, CFA, WRA	0.03m
Hold community barazas on	No.	3	Barazas held	3					SCG, CFA,	0.03m

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
importance of the community members to form WRUAs									WRA	
Form WRUAs for Lulu River, Ngilai River and Nashuda River	No.	3	WRUAs formed	3					SCG, CFA, WRA	0.03m
Construct dams to tap water during the rainy season at Mureiya , Opiroi, Lulu, Nashuda Sunoni seasonal Rivers and Porro Lagga	No.	5	Dams constructed	1	1	1	1	1	SCG, CFA, WRA	2.5m
Capacity build the CFA to join WRUAs through barazas	No.	3	WRUA members' register	3					KFS, CFA, WRA, SCG	
Promote installation of storage tanks in homesteads to tap rain water during the wet season in each village through barazas	No.	12	Storage tanks installation barazas in homesteads in the two locations	2	2	2	2	4	SCG, CFA, WRA	0.36m
Establish watering points and water troughs at for livestock to use at Mureiya, Naimaral, Ntepes, Soit Nanyekie, Silango, Lmanarie, Urban, Nkaika, Bakita, Lorrok Lolmongo, Lulu, Sunoni, Ndoldol, Nkirenyi, Naashuda, Porro,	No.	21	Watering points established	4	4	4	4	5	SCG, CFA, WRA, KFS	0.21m

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
Angata, Lorok, Sordon, Loonkutukie										
Carry out a survey on the feasibility of having piped water connected to each village as it has been done in Opiroi village	No.	1	Feasibility study report		1				WRA, WRUAs	0.1m
Objective 2: Torehabilitate degraded riparian areas										
Identify and map degraded riparian sites around the main rivers	No.	3	Degraded riverine sites identified		3				KFS, WRA, CFA, SCG, KWS	0.015m
Raise bamboo seedlings and other native riverine tree species ('000)	No.	100	Native species raised	20	20	20	20	20	KFS, CFA, SCG, WRA	0.1m
Plant bamboo seedlings along riverine areas to reduce erosion in both farmlands and forest?	Ha	100	Bamboo planted on riverine areas	20	20	20	20	20	KFS, CFA, SCG	0.5m
Construct gabions on fragile sites especially on steeply sloping banks	No.	5	Gabions constructed		1	1	1	2	KFS, SCG, CFA	0.25m
Use of hand tools (spades, shovels, jembes, etc.) to desilt the river by removing excess sediments	Ha	10	Sediments dredged		2	2	2	4	KFS, SCG, WRA	0.05m
Clear all plastic	Ha	10	Plastic		2	2	2	4	KFS,	0.1m

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
pollutants from the rivers and streams in farmlands and peri-urban			pollutants cleared from streams in farmlands						SCG, WRA, CFA	

5.3.4 Community participation and development management Programme

▪ Background

Community members in the Nailepunyie FAC are mainly pastoralists who mostly depend on livestock keeping for the majority of their income and livelihood sustenance. Some community members practise crop farming. The most accessed products from the forest are grazing fodder, water, herbal medicines, wild fruits, vegetables and firewood

▪ Management issues

- Drought
- Poverty/high cost of living
- Illiteracy
- Low capacities in incorporating livelihoods from forest resources through Community based organizations

▪ Management objectives

- To capacity build community on Nature Based Enterprises (NBEs)
- To Promote value addition to forest resources extracted by the CFA
- To Promote good governance and leadership in the Nailepunyie CFA

Table 94: Management actions for Community development and conservation programme

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget (Kshs)
				1	2	3	4	5		
Objective 1: To capacity build community on Nature Based Enterprises (NBEs)										
Initiate an adult learning programme of basic writing and reading skills in all villages	No.	12	Training reports	2	2	2	3	3	SCG, CFA	0.12m
Train community on modern honey harvesting	No.	12	Trainings' reports	2	2	2	3	3	SCG, CFA, Sambur	0.12m

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget (Kshs)
				1	2	3	4	5		
techniques in all villages									u co-operative society	
Train the CFA tree nursery FUGs members' in short courses on tree nursery establishment and management in all villages	No.	12	Trainings' reports	2	2	2	3	3	KFS	0.12m
Train CFA members on quality livestock feeds and nourishment in all villages	No.	12	Trainings' reports	2	2	2	3	3	CFA, KALRO, KARI, SCG	0.12m
Train community members on modern poultry farming in all villages	No.	12	Trainings' reports	3	3	2	2	2	SCG, CFA, KALRO, KARI, SCG	0.12m
Train community members on rabbit keeping in all villages	No.	12	Trainings' reports	3	3	2	2	2	SCG, CFA, KALRO, KARI, SCG	0.12m
Promote the adoption of drought resistant high return low investment farming, e.g. macadamia nuts, cassava, sweet potatoes, pigeon peas etc. in all villages	No.	12	Trainings' reports	6	6				SCG, CFA, KALRO, KARI	0.12m
Initiate PES for the compensation of communities that protect	No.	3	Trainings' reports	1	1	1			KFS, WRA, SCG	0.3m

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget (Kshs)
				1	2	3	4	5		
catchments from the users downstream for the three main rivers										
Objective 2: Promote value addition to forest resources extracted by the CFA										
Procure modern honey processing equipment, (bee suits, settling tanks, honey extractors, bee brushes, bee catcher boxes, bee smokers, honey strainers, honey warmers, etc.) in all villages	Sets	12	Honey processing equipment procured	6	6				KFS, SCG, CFA, Samburu Cooperative society	1m
Procure modern packing and packaging containers for honey processed	No.	2	Honey packaging equipment procured	2					KFS, SCG, CFA	0.5m
Label the packaged honey appropriately to give it a unique name and attractive in the market	No.	1	Honey produced labelled		1				KFS, SCG, CFA	0.1m
Establish refrigeration facilities to extend the shelf life of commercial animal products produced by farmers, e.g. meat, milk, etc. in	No.	12	Refrigeration facilities established	3	3	3	3		KFS, SCG, CFA	1m

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget (Kshs)
				1	2	3	4	5		
all villages										
Open up Samburu wares to new markets (Traditional regalia, dressing, bead making, necklaces, bangles, red oak, “ <i>Nkupulito</i> ” <i>Namuka</i> (traditional shoes)	No.	4	Samburu wares displayed in new markets		1	1	1	1	CFA, SCG, KTB	1m
Objective 3: To promote good governance and leadership in the Nailepunyie CFA										
Update the CFA constitution to meet the legal requirements and the aspirations of the association	No.	1	CFA constitution updated	1					CFA, registrar of societies, KFS,	0.1m
Community sensitization and recruitment of additional members into the CFA in all villages	No.	30000	CFA members recruited	600	600	600	600	600	CFA, KFS, NGAO	0.3m
Capacity build the CFA executive committee on book keeping, accounting, conflict resolution, fundraising proposal writing, computer	No.	5	CFA executive members trained	1	1	1	1	1	CFA, KFS, NGAO, strategic partners	0.5m

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget (Kshs)
				1	2	3	4	5		
packages, etc.										
Train Nursery user group officials on tree nursery establishment and seed/seedling propagation	No	4	Reports, site visits		2	2			KFS, CFA	0.4m
Organize exchange tours and benchmarking tours to other CFAs countrywide to expose them to best management practices	No.	5	CFA taken to exchange visits to other management areas	1	1	1	1	1	CFA, KFS	1m
Sign a FMA between the CFA and the KFS to assign user rights to the CFA	No.	1	FMA signed	1					KFS, FAO, CFA	0.3m

5.3.5 Infrastructure and equipment development management programme

▪ Background

Forest infrastructure plays a vital role in the day-to-day activities that are inherent in forest management. For efficient dispensation of duties by the human resources (forest station manager, forest rangers, nursery staff, community scouts, the CFA, and other stakeholders, etc.), it would be necessary for the provision of essential tools, transport and communication apparatus to be availed.

Further to that, basic housing, not only is it a basic human right, it has been entrenched in the Constitution of Kenya 2010. Article 43(1)(b) provides that “every person has the right to accessible and adequate housing and reasonable standards of sanitation. This programme therefore aims to address the provision of good working conditions for all persons in employment involved in the conservation of Nailepunyie Forest Block.

▪ **Management issues**

- Poor road network
- Poor roads' condition
- Lack of staff quarters
- Lack of CFA office
- Inadequate nursery tools and equipment
- Lack of communication equipment
- Only one nursery present

▪ **Management objectives**

- To improve the road network in the forest block
- To provide supporting infrastructure and equipment needs to the KFS and CFA

Table 95: Management actions for infrastructure and equipment programme

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget	
				1	2	3	4	5			
Objective 1: To improve the road network in the forest block											
Maintain existing roads (Lekamoru-Rada, Bohola-Ngilai, New fire tower road, Nkirenyi-Barno) through grading and murraming	KM.	4	KMs maintained			2	2		KFS	1m	
Open up culverts and slabs	No.	8	Culverts and slabs opened up					8	KFS, SCG	0.08m	
Construct bridges at Opiroi and Angata	No.	2	Bridges constructed		1		1		KFS, SCG	0.6m	
Construct new roads to make the block more accessible (Canteen-Lolitiyani, New fire tower-Lowua Oibor,	Km	6	New roads constructed			2	2	2	KFS, SCG, Strategic partners	1.2m	

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
Barno-Loole, Bohola-Nesiwuo, Loosipa-Barno, Suen-Kiyatio)										
Objective 2: To Provide supporting infrastructure and equipment needs to the KFS and the CFA										
Construct a Forest Station office Opiroi	No.	1	Forest office constructed, completion certificate		1				KFS, strategic partners	2m
Construct CFA office at Canteen	No.	1	CFA office constructed, completion certificate		1				KFS, CFA	1.5m
Purchase water tanks to for storage of water at the KFS and CFA office	No.	2	Water tanks purchased		2				KFS, CFA,,	0.15m
Procure office furniture to serve the KFS and CFA offices	Sets	2	Office furniture procured	X	X	3	X	X	KFS, CFA, donors, strategic partners	0.15m
Purchase 4*4 vehicles for forest operations and enforcement purposes	No.	2	Logbooks		2				KFS, FAO, strategic partners	8m
Purchase a tractor for transporting seedlings	No.	1	Logbooks		1				KFS, FAO, strategic partners	2m
Purchase motorbikes	No.	6	Logbooks		6				KFS, FAO, strategic	1.8m

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
									partners	
Construct a radio communication room at Opiroi	No.	1	Site visits, completion certificate						KFS, SCG, strategic partners	0.8m
Purchase communication radios for exchange of information during emergency situations	No.	10	Purchase receipts		10				KFS, FAO, strategic partners	0.4m
Purchase walkie talkies for exchange of information during emergency situations	No.	10	Purchase receipts		10				KFS, FAO, strategic partners	0.3m
Establish CFA tree nurseries at Opiroi, Lulu, Naimaral and Soit-pus	No.	4	Nurseries established		4				KFS, CFA, strategic partners	2M
Procure a computer, printer and camera for the forest station office	No.	3	Office equipment procured		3				KFS	0.3M
Procure a computer, printer and camera for the CFA office	No.	3	Office equipment procured		3				KFS, CFA, strategic partners	0.3M
Connect the	No.	2	Offices		2				KFS,	0.5M

Action	Unit	5-year targets	Means verification of	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
KFS and CFA offices to solar power apparatus			connected to solar power						CFA	

5.3.6 Protection and security Management programme

▪ Background

Forest rangers and community scouts are the frontline of Nailepunyie Forest management unit in protecting endangered species from destruction from fires, wildlife poaching and illegal extraction of forest resources. They act as the guardians of the ecosystem and its role in supporting community livelihoods by providing oversight and promoting safety of the populations under their jurisdictions.

Aside from providing forest law enforcement services, forest rangers provide support to fire fighters, conduct rescue operations when forest visitors go missing, provide a wide variety of community education that promote responsible forest resources extraction and interaction with wildlife plus the importance of ecological preservation

For the rangers to continue to perform their obligations, they need to be adequately capacity built in terms of numbers, trainings and sufficient tools and equipment. This programme aims to achieve this purpose so as to ensure Nailepunyie continues to thrive in its function of providing goods and environmental services to the FAC and as a country as a whole.

▪ Management issues

- Inadequate security personnel
- Illegal logging (posts and poles)
- Unregulated firewood collection
- Charcoal production
- Illegal grazing
- Forest fires from honey harvesters and arsonists
- Illegal sand harvesting
- Forest encroachment at Soit Pus, and Porro River areas
- Unregulated/unsustainable herbal medicines extraction
- Illegal squatters
- Lack of clear boundaries
- Illegal hunting and poaching

▪ Management objectives

- To protect the forest from natural and man-made risks and hazards
- To promote community participation in forest protection

- To have a competent, skilled and equipped security personnel and system

Table 96: Management actions for security programme

Action	Unit	5 year targets	Means of verification	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
Objective 1: To protect the forest from natural and man-made risks and hazards										
Increased patrols by KFS rangers and community scouts (*000)	Ha	30	Forest block patrolled	30	x	x	x	x	KFS, KWS, CFA	1.5m
Conduct firefighting trainings for CFA members and scouts	No.	20	Firefighting trainings conducted	4	4	4	4	4	SCG, KFS, CFA	0.2m
Procure firefighting equipment (fire extinguishers, fire beaters, etc.)	Sets	5	Firefighting equipment procured	1	1	1	1	1	SCG, KFS, CFA	0.5m
Install fire danger rating boards at fire hot spots at Opiroi escarpment, Angata, Lulu	No.	6	Fire danger rating boards installed	6					KFS	0.06m
Install a fire surveillance and warning system involving all stakeholders	No.	1	A fire surveillance system installed	1					KFS, CFA, NGAO. SCG	0.05m
Objective 2: To promote community participation in forest protection										
Register all herbal medicine collectors and register them into the herbalists' forest user group to ensure sustainable	No.	1	Herbal medicine collectors register	1					CFA, KFS	0.1m

Action	Unit	5 year targets	Means of verification	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
harvesting of herbal medicines										
Register all grazers into the grazing user groups to regulate their activities in the forest	No.	1	Grazers registered	1					CFA, KFS	0.1m
Hold regular and joint patrols between KFS rangers and community scouts ('000)	No.	30	Forest block patrolled	30	x	x	x	x	KFS, CFA	0.3m
Objective 3: To have a competent, skilled and equipped security personnel and system										
Deploy additional rangers to the block	No.	75	Rangers deployed	75					KFS	1.5m
Construct security outposts at strategic locations around the block	No.	2	Outposts constructed		2				KFS	4m
Construct armories in the security outposts	No.	2	Armories constructed		2				KFS	0.05m
Enforce the strict laws concerning poaching of wildlife as a	Ha	30	Poaching laws enforced	30	x	x	x	x	KFS, KWS, SCG	0.3m

Action	Unit	5 year targets	Means of verification	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
deterrent to the culprits ('000)										
Install a forest fire tower at Opiroi (Soit Pus)	No.	1	Site visits, completion certificate	1					FAO, KFS, CFA	1.5m

5.3.7 Human resources management programme

▪ Background

Staffing is an important management function in the KFS and the Nailepunyie CFA. This relates to the recruitment, selection, development, training, and compensation of human resources in the two organizations. It is a continuous management function and involves and plays a very important role in enabling the organizations to effectively and efficiently discharge all their management functions. The staffing component of the larger Kirisia Forest is illustrated in Table 3.

Having the correct human resource staff would involve getting the right people for the job at the right time and that would allow natural resources managers to ascertain the number of staff required and when they are needed. This would provide them time to plan in advance for the recruitment of staff for various job roles. Efficient staffing would also deal with the development and capacity building of the existing and new staff. This would not only help in the career building of the staff, but it would also contribute to the pool of existing human capital which would benefit both the KFS and the Nailepunyie CFA in the long run.

▪ Management issues

- Inadequate staff number
- Lack of skilled specific staff
- Low capacity on CFA officials on CBO management and sustainable forestry practices.

▪ Management objectives

- To improve staffing capacity of the KFS officers
- To develop a staff training schedule
- To build capacity of the CFA on organizational management

Table 97: Management actions on human resources programme

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
Objective 1: To Improve staffing capacity of the KFS officers										
Deploy a forest station manager and an assistant to be in the management unit	No.	2	Deployment letter	2					KFS	2m
Deploy a secretary to the block	No.	1	Deployment letter	1					KFS	1m
Deploy a registry officer to the block	No.	1	Deployment letter	1					KFS	1m
Deploy an accountant to the block	No.	1	Deployment letter	1					KFS	1m
Hire casuals to assist in the forest station office and in nursery operations	No.	10	Employment letters letter	1					KFS	5m
Deploy forest rangers to meet the requisite ratio	No.	75	Deployment letter	25	25	25			KFS	1.5m
Objective 2: To develop a staff training schedule										
Conduct a training needs assessment (TNA) to all the staff	No.	1	TNA conducted	1					KFS, SCG	0.2m
Draft a yearly schedule of trainings based on the TNA	No.	1	Training schedule report		1				KFS, SCG	0.05m
Take staff on their identified	No.	10	Staff trained			2	4	4	KFS, SCG	1m

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
trainings based on needs identified										
Objective 3: To build capacity of the CFA on organizational management										
Recruit additional community scouts from all villages	No.	140	Scouts recruited	60	60	20			KFS, CFA, SCG	1.4m
Take community scouts for basic paramilitary training after recruitment	No.	1	Paramilitary training held		1				KFS	1.5m
Hold short courses for the CFA on emerging trends in forestry e.g. climate change mitigation, water management, profitable IGAs e.g. bee keeping	No.	2	Short courses held on emerging trends in forestry		1		1		KFS	0.4m

5.3.8 Research and education Management programme

▪ Background

Research and education is among the main pillars of natural resources management. It unlocks the unknowns and allows stakeholders to explore the forest management unit from different perspectives, and fuels a deeper understanding of the resources of the forest. Researching Nailepunyie Forest management unit would have several advantages, which include and are not limited to,

- i. Expanding the knowledge base about the forest block resources

- ii. Providing the latest information on the status of the resources
- iii. Establishing the challenges facing the management of forest resources management so as to identify strategies and solutions to combat them
- iv. It encourages curiosity on emerging issues and trends previously not heard about or encountered
- v. It promotes problem solving as it focuses on what other researchers had done before. Depending on their failures or successes, researchers would narrow down their scopes on best practices that proved to be efficient
- vi. It helps researchers reach many people. With studies conducted, researchers would have an avenue on illustrating how their results would impact the community members relying on the resources personally.

With respect to Nailepunyie Block, two main researchable areas were identified to further improve community livelihoods and enhance environmental conservation, as these are the main pillars of PFM, and they were,

- i. Livestock production, and,
- ii. Ecosystem degradation

▪ **Management issues**

- Livestock diseases
- Climate change
- Soil erosion
- Climate smart agriculture
- Poor animal husbandry practices

▪ **Management objectives**

- To implement modalities of adopting disease free livestock
- To promote models to stem environmental degradation
- To disseminate research findings

Table 98: Management actions for research and education programme

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget	
				1	2	3	4	5			
Objective 1: Toimplement modalities of adopting disease free livestock											
To identify modes of preventing environmental contamination by ensuring the highest livestock hygiene	No.	60	Environmental contamination methods established	1 2	1 2	1 2	1 2	1 2	SCG (livestock department), CFA, KALRO, Plantvillage (NGO)	0.6m	

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
standards are maintained by visits from community disease reporters										
To identify methods of controlling intermediate hosts and vectors that cause diseases e.g. ticks, worms, amoeba, etc.	No.	3	Disease controlling methods identified	1		1		1	SCG (livestock department), CFA, KALRO	0.3m
To identify ways of controlling arthropod pests E.g. horn fly, lice, fleas, etc	No.	1	Arthropod pests control methods identified		1				SCG (livestock department), CFA, KALRO	0.1m
To identify methods of isolating sick animals (quarantine programmes) e.g. corralling in all villages	No.	12	Isolation methods identified	6	6				SCG (livestock department), CFA, KALRO	0.3m
To roll out an annual vaccination campaign of all livestock	No.	5	Vaccination campaign launched	1	1	1	1	1	SCG (livestock department), KALRO	0.5m
Identifying appropriate disinfectants to purify infected areas after the vaccination programmes	No.	4	Vaccinated areas purified		1	1	1	1	KALRO	0.04m

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
Objective 2: To promote models to stem environmental degradation										
Carry out a geological survey on the economic viability of rare earth minerals e.g. magnetized soil (potentially could be iron, cobalt, nickel, manganese or gadolinium deposits) and granite on the sites identified by community members	No.	1	Geological survey conducted			1			Mines and geological department	0.2m
Hold barazas to promote public consciousness on climate change and global warming and to obtain their experiences on how erratic weather patterns have affected their way of life	No.	4	Barazas held	2	2				KFS, FAO, CFA, SCG	0.4m
Run school campaigns spread awareness on	No.	20	Awareness campaigns held	5	5	5	5		KFS, FAO, CFA, SCG	1m

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
environmental degradation and its possible solutions										
Identify wildlife species in danger of extinction	No.	1	Wildlife in danger of extinction list developed			1			KWS, SCG	0.1m
Identify protection and implementation of short term measures to halt extinction of wildlife species	No.	1	Short term measures to identify, protect and implement extinction of wildlife species		1				KWS, WRTI? KFS, SCG	0.2m
Identify long term measures of rebuilding the populations of endangered wildlife species	No.	1	Long term measures to identify, protect and implement extinction of wildlife species				1		KWS, KFS, SCG	0.4m
Objective 3: To disseminate research findings										
Publish findings in journals	No.	15	Findings published in journals			3	3	3	KFS, KWS, SCG	0.3m
Present research findings at conferences of professional associations	No.	3	Research findings presented to professional associations			1	1	1	KFS, KWS, SCG, Strategic partners	0.3m
Present research findings to	No.	3	Research findings presented to			1	1	1	KFS, KWS, SCG	0.3m

Action	Unit	5-year targets	Means of verification	Annual targets (years)					Lead Agency	Budget
				1	2	3	4	5		
local community groups and other local stakeholders			community groups and local stakeholders							
Share research information through social media (Facebook, Twitter, Tiktok, Instagram, etc.)	No.	12	Research findings shared on social media			4	4	4	KFS, KWS, SCG	0.012m
Discussing research activities findings on the local radio stations	No.	12	Research activities discussed on local radio station			4	4	4	KFS, KWS, SCG	0.12
Issue a press release on research findings	No.	1	Press release issued on research findings					1	KFS, KWS, SCG	0.02m
Publishing research findings on local and national newspapers	No.	1	Research findings published on local and national newspapers					1	KFS, KWS, SCG	0.1m

CHAPTER SIX

PLAN IMPLEMENTATION

6.1. Financial Management

To guide the implementation of this management plan, a financial management mechanism or policy will need to be prepared for the forest. Substantial funds will be required to finance this plan which has both recurrent and capital development expenditure. The main sources of finances will come from the consolidated fund. Expenditure will follow budget allocations for prescribed activities. Revenue collection based on forest resources will be in accordance with the National or County Government regulations and procedures. The CFAs' funds will adhere to their constitution and by-laws governing management of various user groups. The CFAs are advised to raise funds from the various stakeholders identified in the plan and undertake financial management as guided by each stakeholder. This would enable the CFAs to maximize their revenue generation to support conservation efforts as guided by the Leroghi/Kirisia Participatory Forest management plan. Budget reviews should be done annually in order to prioritize the operations in accordance with available funds and prevailing priorities.

The key sources of funds for financing implementation of the plan will include: -

- (a) **Government funds:** Funds appropriated by the Government to KFS and lead institutions like KWS, KWTa, WRA and Samburu County Government as each implement's activities within their mandate.
- (b) **Community Forest Associations' funds:** Revenue generated from investments, PES; and IGAs as well as funds provided by development partners and government agencies ready to support CFA livelihood activities and forest conservation.
- (c) **External sources:** Funds from development partners and other agencies; and funds available at the international level for the sequestration of the Green House Gases, conservation of biological diversity, protection of water catchments and combating desertification.

6.1.1 Resource Mobilization

Funds will be needed for infrastructure development, purchase of, equipment, construction and rehabilitation of roads and other infrastructure. Resource mobilization activities during the plan period will need to be increased substantially to accomplish the proposed management actions. The stakeholders should seek financial support from various sources during the plan period for capital development. Annual recurrent budgets to cover annual work plans and activities within the forest will be prepared by the respective implementing agencies. The CFA should have a five-year investment plan with clear budget for the next five years to ensure timely implementation.

6.1.2 Revenue generation

Various activities could generate revenue from the Forest Reserve over the plan period. This would be obtained from the diverse ecosystem goods and services. The main sources and the projected revenue within the Forest Reserve include, but not limited to firewood collection, grazing, grass cutting, bee keeping, water, ecotourism activities, PES, carbon trading and

extraction of other non-timber forest products. This plan recommends that modalities be put in place to sensitize good governance and streamlining of operations of the CFA that would enhance revenue collection in a clear and transparent manner that would support them. Their activities would include forest rehabilitation and restoration, conservation and protection while addressing livelihood activities aimed at ultimately improving the socio-economic status of the adjacent communities.

- **Crosscutting issues**

The general cross cutting issues that need to be considered in the implementation of the plan include gender disparities and ways for affirmative action, moranism, HIV/AIDs, high illiteracy levels, poverty and climate change. These are the issues if not addressed by the respective stakeholders can jeopardize attempts to achieve the goal of attaining sustainable natural resources management since these issues affect the communities at large.

6.2 Environmental Impact Assessment (EIA)

Putting up establishments in any forest ecosystem could result in negative impacts affecting the dynamics of the system and its ability to render goods and services. An EIA provides a means of mitigation for the welfare of humans and other species dependent on such ecosystems. It provides a mechanism for project planning; implementing and integrating environmental conservation; management and development. It takes cognizance of the social physical and biological components of the environment to ensure minimal negative impacts, as well as promoting environmental benefits according to the requirements of EMCA (amendment), 2015. Any activity that may cause irreversible damage in the forest will not be approved. Forest establishments in this PFMP would include;

- Eco-tourism facilities and buildings
- General infrastructure of setting up forest stations and their associated infrastructure
- Establishment of additional roads, tracks and trails in improving forest accessibility
- All and any proposed activities that would impede the status quo that would negatively affect the quality of life of the communities, wildlife and livestock in terms of noise pollution, and pasture availability and wildlife corridors respectively.

6.3 Plan Monitoring and Evaluation

Monitoring and evaluation serve as a tool for assessing project achievements, success and constraints. It also provides a feedback mechanism to improve proposed activities and make adjustment wherever necessary. The process also identifies problems, their sources to help come up with strategies in addressing them for a successful implementation and continuity of the proposed activities.

6.4 Institutional Arrangements for Plan Implementation

The systematic implementation of the management plan requires appropriate institutional structures that are integrated into existing institutions. The existing Community Forest Association was formed to initiate community participation activities in the forest. They will serve as a forum for dialogue and consensus building, priority setting and balancing the various interests involved.

Table 99: Forest level management committee

Institution	Designation	No.
CFA	Chairman, treasurer and secretary	3
KFS	Forest station manager	1
KWS	Warden	1
SCG	Ward admin, environment dept& livestock and agriculture	3
Nema	Environment officer	1
WRUA	Representative	1
NGAO	Senior Chief	3
Coopted member	NGOs,	
Total		13

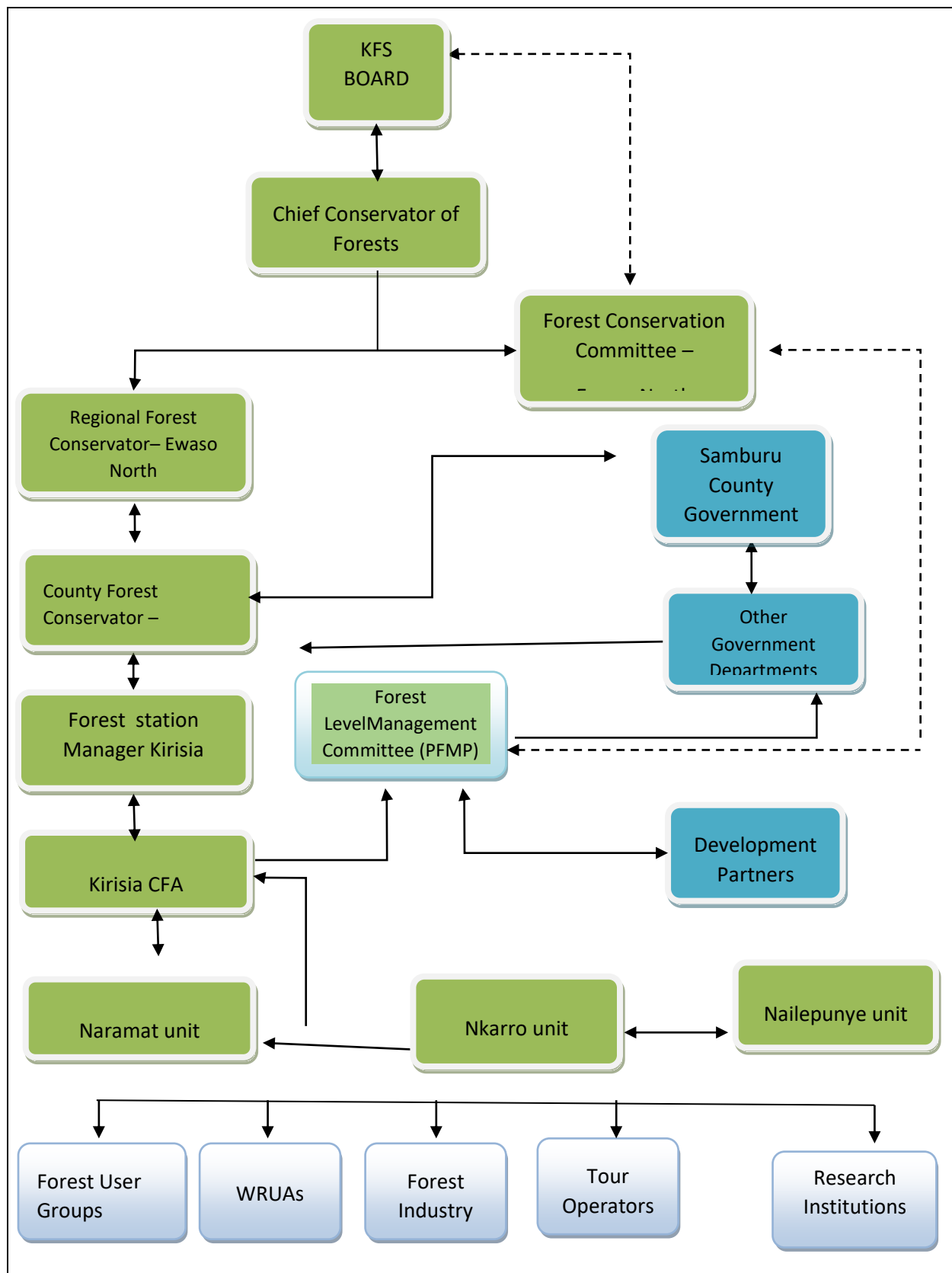


Figure 63: Institutional arrangement for implementation of Leroghi/Kirisia ecosystem plan

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APPENDICES

Appendix 1: List of participants for LPT training from Nkarro, between 15th to 16th September 2021 at Seasons Hotel in Mararal town **Samburu County**

No.	Name	Gender	Institution/ Organization/ position	Position	Inception meeting	Scoping workshop	LPT training	Fieldwork for socio-economic	Zero draft preparation.
1.	Dr Elizabeth Wambugu	F	KFS	Head, Forest Management Plans	X	X	X		x
2.	Charles Odhiambo Ochieng	M	KFS	Samburu EC	X	X	X	x	x
3.	Raymond K. Sambulia	M	KFS	Mararal Forest station manager,	X	X			x
4.	Patrick P. Lekenit	M	NEMA	Director	X	X			
5.	Josyline Thambu	F	KFS	CFA coordinator	X	X			
6.	Daniel K. Lenamunyi	M	KFS	HOC driver	X	X	X		
7.	John Wachihi	M	KFS	Head of Conservancy, Ewaso North	X	X	x		
8.	Benson Lengalen	M	Samburu County Government	Director of Environment and Natural resources	X	X			
9.	Anne F Itubo	F	KFS	Head Participatory Forest Management	X	X	X		x
10.	James M. Lesuyai	M	Samburu County Government	Conservancy co-ordinator	X	X			
11.	Laura Yego	F	KFS	Head of Legal Affairs	X	X			
12.	Dominic	M	KFS	Driver	X	X			

No.	Name	Gender	Institution/ Organization/ position	Position	Inception meeting	Scoping workshop	LPT training	Fieldwork for socio-economic	Zero draft preparation.
	Ndungú								
13.	Paul Gitonga	M	KFS	Driver	X	X	x		
14.	Dzimuji Kambarage	M	KFS	Conservator 1	X	X	X		x
15.	James M. Mwamodenyi	M	KFS	Head of Biodiversity	X	X			
16.	Geophrey Okeyo	M	KFS	Chief Inspector, Samburu	X	X	X		X
17.	Eric Aduda	M	KWS	Senior Warden	X	X			
18.	Robert Lentaaya	M	CFA	Chair	X	X	X		X
19.	Geoffrey Lekuchula	M	CFA	Secretary	X	X	X		X
20.	John Lekula	M	CFA	V. Chair	X	X	X		X
21.	Joseph Lesengei	M	CFA	V. Secretary	X	X	X		X
22.	Purkasha Leraililei	M	CFA	Member	X	X	X		X
23.	Josphine Lepaniyo	F	CFA	Treasurer	X	X	X		X
24.	Meguna Lesorogol	M	CFA	Member			X		
25.									
26.	Popoti Lemparas		KFS	Forester		X	X		
27.	James Lelemusi	M	NGAO	Senior Chief Opiroi		X			

No.	Name`	Gender	Institution/ Organization/ position	Position	Inception meting	Scoping workshop	LPT training	Fieldwork for socio-economic	Zero draft preparation.
28.	Jacob M. Lesamaja	M	SCG	Village Administrator Lorrok Lolmango		X			
29.	Kambaki Lalaikipia ni	M	FAO/G EF-5	Project manager- FAO	X	X	X		x
30.									
31.									
32.									
33.									
34.									
35.	Victoria oliech	F	KFS	Surveyor	X	X	X		
36.	Joseph Munene	M	KFS	Accountant		x	x		X
37.	Nancy Karugi	F	KFS	Management Plans officer		x	x		X
38.	John Rono	M	KFS	Management Plans officer		X	X X		

Appendix 2: List of participants from Nailepunyie during PFMP preparation

No.	Name`	Gender	Institution/ Organization/ position	Position	Inception meting	Scoping workshop	LPT training	Fieldwork for socio-economic	Daft 0 generation	Draft 1 presentation
39.	Elizabeth Wambugu	F	KFS	Head, Forest Management Plans	✓	✓	✓	✓	✓	✓
40.	Charles	M	KFS	Samburu EC	✓	✓	✓	✓	✓	✓

No.	Name	Gender	Institution/ Organization/ position	Position	Inception meeting	Scoping workshop	LPT training	Fieldwork for socio-economic	Draft 0 generation	Draft 1 presentation
	Odhiambo Ochieng									
41.	Raymond K. Sambulia	M	KFS	Mararal Forest station manager,	✓	✓	✓	✓	✓	
42.	Patrick P. Lekenit	M	NEMA	Director	✓	✓				
43.	Josyline Thambu	F	KFS	CFA coordinator	✓	✓				
44.	Daniel K. Lenamunyi	M	KFS	HOC driver	✓	✓				
45.	Johh Wachihi	M	KFS	Head of Conservancy, Ewaso North	✓	✓	✓	✓	✓	✓
46.	Benson Lengalen	M	Samburu County Government	Director of Environment and Natural resources	✓	✓				
47.	Anne F Itubo	F	KFS	Head Participatory Forest Management	✓	✓	✓	✓	✓	✓
48.	James M. Lesuyai	M	Samburu County Government	Conservancy co-ordinator	✓	✓				
49.	Laura Yego	F	KFS	Head of Legal Affairs	✓	✓				
50.	Dominic Ndungú	M	KFS	Driver	✓	✓				
51.	Paul Gitonga	M	KFS	Driver	✓	✓				
52.	Laban Nyaga	M	KFS	Driver	✓	✓				
53.	Dzimuji Kambarage	M	KFS	Conservator 1	✓	✓	✓	✓	✓	✓
54.	James M. Mwamodenyi	M	KFS	Head of Biodiversity	✓	✓				
55.	Geophrey Okeyo	M	KFS	Chief Inspector, Maralal	✓	✓	✓	✓	✓	✓
56.	Eric Aduda	M	KWS	Senior	✓	✓				

No.	Name`	Gender	Institution/ Organization/ position	Position	Inception meeting	Scoping workshop	LPT training	Fieldwork for socio-economic	Draft 0 generation	Draft 1 presentation
				Warden						
57.	James Lenguro Lmerewae	M	Nailepunyie CFA	Chairman	✓	✓	✓	✓	✓	✓
58.	Josephine Naserian Leleshep	F	Nailepunyie CFA	Treasurer	✓	✓	✓	✓	✓	✓
59.	Charles Lenguro	M	Nailepunyie CFA	Vice- secretary	✓	✓	✓	✓	✓	✓
60.	Peterson Lekasuyan	M	Nailepunyie CFA	Vice Chairman	✓	✓	✓	✓	✓	✓
61.	Sarafina Lekaite	F	Nailepunyie CFA	Secretary	✓	✓	✓	✓	✓	✓
62.	Tookoi Lekeete		Nailepunyie CFA	Member		✓	✓	✓		
63.	Roniki Leseiya		Nailepunyie CFA	Member		✓	✓	✓		
64.	Popoti Lemparas		KFS	Forester		✓	✓	✓		
65.	Belion Leparsaiya		Nailepunyie CFA	Member		✓	✓	✓		
66.	James Lelemusi	M	NGAO	Senior Chief Opiroi		✓				
67.	Jacob M. Lesamaja	M	SCG	Village Administrator Lorrok Lolmongo		✓				
68.	Kambaki Lalaikipiani	M	FAO/GEF- 5	Project manager??	✓	✓	✓	✓	✓	✓

Appendix 3. List of Naramat LPT Members during the preparation of PFMP,2023-2027, Maralal, Samburu County.

No.	Name`	Gender	Institution/ Organization/ position	Position	Inception meeting	Scoping workshop	LPT training	Fieldwork for socio-economic	Zerodraft preparation.
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No.	Name	Gender	Institution/ Organization/ position	Position	Inception meeting	Scoping workshop	LPT training	Fieldwork for socio-economic	Zerodraft preparation.
69.	Dr Elizabeth Wambugu	F	KFS	Head, Forest Management Plans	X	X	X		x
70.	Charles Odhiambo Ochieng	M	KFS	Samburu EC	X	X	X	x	x
71.	Raymond K. Sambulia	M	KFS	Mararal Forest station manager,	X	X			x
72.	Patrick P. Lekenit	M	NEMA	Director	X	X			
73.	Josyline Thambu	F	KFS	CFA coordinator	X	X			
74.	Daniel K. Lenamunyi	M	KFS	HOC driver	X	X	X		
75.	John Wachihi	M	KFS	Head of Conservancy, Ewaso North	X	X	x		
76.	Benson Lengalen	M	Samburu County Government	Director of Environment and Natural resources	X	X			
77.	Anne F Itubo	F	KFS	Head Participatory Forest Management	X	X	X		x
78.	James M. Lesuyai	M	Samburu County Government	Conservancy co-ordinator	X	X			
79.	Laura Yego	F	KFS	Head of Legal Affairs	X	X			
80.	Dominic Ndungú	M	KFS	Driver	X	X			
81.	Paul Gitonga	M	KFS	Driver	X	X	x		
82.	Dzimuji	M	KFS	Conservator 1	X	X	X		x

No.	Name	Gender	Institution/ Organization/ position	Position	Inception meeting	Scoping workshop	LPT training	Fieldwork for socio-economic	Zerodraft preparation.
	Kambarage								
83.	James M. Mwamode nyi	M	KFS	Head of Biodiversity	X	X			
84.	Geophrey Okeyo	M	KFS	Chief Inspector, Samburu	X	X	X		X
85.	Eric Aduda	M	KWS	Senior Warden	X	X			
86.	Doughlas Leboiyare	M	Naramat CFA	Chairman	X	X	X		x
87.	Gladys Lenyarua	F	Naramat CFA	Treasurer	X	X	X		x
88.	Richard Lesilampa	M	Naramat CFA	Member	X	X	X		x
89.	Silas Lekairab	M	Naramat CFA	Member	X	X	X		x
90.	Ljenesi Lekupe	M	Naramat CFA CFA	Secretary	X	X	X		x
91.	Antonela Lesekuno	F	Naramat CFA CFA	Vice secretary		X	X		x
92.	Elizabeth Loldebe	F	CFA	Member		X	X		x
93.	Mary Lolooki					X	X		x
94.	Popoti Lemparas		KFS	Forester		X	X		
95.	James Lelemusi	M	NGAO	Senior Chief Opiroi		X			
96.	Jacob M. Lesamaja	M	SCG	Village Administrator Lorrok Lolmongo		X			
97.	Kambaki	M	FAO/G	Project	X	X	X		x

No.	Name	Gender	Institution/ Organization/ position	Position	Inception meeting	Scoping workshop	LPT training	Fieldwork for socio-economic	Zerodraft preparation.
	Lalaikipiani		EF-5	manager- FAO					
98.	Adan Letiwa	M	CFA	Member		x	x		x
99.	David Loiriro	M	CFA	Member		X	X		X
100	James Lemeteki	M	CFA	Member	x	x	x		x
101	Looibasha Loimoonga	M	CFA	Member		x	x		
102	Loponu Lenyarua	M	CFA	Member					
103	Victoria oliech	F	KFS	Surveyor	X	X	X		
104	Joseph Munene	M	KFS	Accountant		x	x		X
105	Nancy Karugi	F	KFS	Management Plans officer		x	x		X
106	John Rono	M	KFS	Management Plans officer		X	X X		

Appendix 4 : List of plant and trees found in Kirisia/Leroghi forest and the surrounding areas

S.No	Samburu name	Comm\ on name	Botanical name	Economic uses
Nkarro				
1.	Lpiripirinti	Podo	<i>Podocarpus gracilior</i>	Timber, posts, shade, ornamental, bird food
2.	Ltarakwai	Pencil cedar	<i>Juniperus procera</i>	Timber, posts, bark for roofing, bark medicinal for humans and elephants
3.	Lorien	Olive	<i>Olea africana spp. cuspidatus</i>	Medicinal, fodder for livestock, carvings,
4.	Loliontoi	Black iron wood	<i>Olea capensis spp macrocarpa</i>	Fodder, posts, medicinal, building materials,
5.	Lchingei	Euclea	<i>Euclea divinorum</i>	Medicinal, edible fruit for humans and birds.
6.	Lkinyel	Shiny leaf	<i>Rhamnus</i>	Roots medicinal for coughs,

S.No	Samburu name	Comm\on name	Botanical name	Economic uses
		buckthorn	<i>prunioides</i>	
7.	Lkokulai	Buckthorns	<i>Rhamnus staddo</i>	Medicinal, coughs, reduces fever
8.	Parmunyo	Orange climber	<i>Toddalia asiatica</i>	Medicinal, malaria, colds, coughs
9.	Lmakutikuti	Butterfly bush	<i>Rotheca myricoides</i>	Medicinal, STD, back pain
10.	Lamuriai	Carissa	<i>Carissa spinarum</i>	Medicinal, rheumatoid arthritis, tonic, gout, painkiller, fruits edible, fermented beverage,
11.	Lmargweti	Croton	<i>Croton megalocarpus</i>	Medicinal, chronic cough, firewood, bee fodder,
12.	Lderekes	Gum Arabica tree	<i>Acacia senegal</i>	Food, Gum Arabic, cosmetics, industrial pharmaceutical, painting,
13.	Silalei	African myrrh	<i>Commiphora africana</i>	Ceremonial, ball gum, Incense,
14.	Lkiyanate	Lkiyanate		To treat TB
15.	Reteti	Sycamore tree	<i>Ficus thonningii</i>	Gum used to chew used to make milk gourds
16.	Sirai	Desert date	<i>Balanites aegyptica</i>	Gum is used for medicine, Roots used as a fertility drug for women.
Naramat				
	Loliontoi	Black iron wood	<i>Olea capensis spp macrocarpa</i>	Fodder, posts, medicinal, building materials,
16.	Lchingei	Euclea	<i>Euclea divinorum</i>	Medicinal, edible fruit for humans and birds.
17.	Lkinyel	Shiny leaf buckthorn	<i>Rhamnus prunioides</i>	Roots medicinal for coughs,
18.	Lkokulai	Buckthorns	<i>Rhamnus staddo</i>	Medicinal, coughs, reduces fever
19.	Parmunyo	Orange climber	<i>Toddalia asiatica</i>	Medicinal, malaria, colds, coughs
20.	Lmakutikuti	Butterfly bush	<i>Rotheca myricoides</i>	Medicinal, STD, back pain
21.	Lamuriai	Carissa	<i>Carissa spinarum</i>	Medicinal, rheumatoid arthritis, tonic, gout, painkiller, fruits edible, fermented beverage,
22.	Lmargweti	Croton	<i>Croton megalocarpus</i>	Medicinal, chronic cough, firewood, bee fodder,

S.No .	Samburu name	Comm\on name	Botanical name	Economic uses
23.	Lderekes	Gum Arabica tree	<i>Acacia senegal</i>	Food, Gum Arabic, cosmetics, industrial pharmaceutical, painting,
24.	Silalei	African myrrh	<i>Commiphora africana</i>	Ceremonial, ball gum, Incense,
25.	Lkiyanate	Lkiyanate		To treat TB
26.	Reteti	Sycamore tree	<i>Ficus thonningii</i>	Gum used to chew used to make milk gourds
16.	Sirai	Desert date	<i>Balanites aegyptica</i>	Gum is used for medicine, Roots used as a fertility drug for women.
S.No .	Local name Samburu	Common name	Botanical name	Economic uses
Nailepunye				
27.	Lpiripirinti	Podo	<i>Podocarpus gracilior</i>	Timber, posts, shade, ornamental, bird food
28.	Ltarakwai	Pencil cedar	<i>Juniperus procera</i>	Timber, posts, bark for roofing, bark medicinal for humans and elephants
29.	Lorien	Olive	<i>Olea africana spp. cuspidatus</i>	Medicinal, fodder for livestock, carvings,
30.	Loliontoi	Black iron wood	<i>Olea capensis spp macrocarpa</i>	Fodder, posts, medicinal, building materials,
31.	Lchingei	Euclea	<i>Euclea divinorum</i>	Medicinal, edible fruit for humans and birds.
32.	Lkinyel	Shiny leaf buckthorn	<i>Rhamnus prunioides</i>	Roots medicinal for coughs,
33.	Lkokulai	Buckthorns	<i>Rhamnus staddo</i>	Medicinal, coughs, reduces fever
34.	Parmunyo	Orange climber	<i>Toddalia asiatica</i>	Medicinal, malaria, colds, coughs
35.	Lmakutikuti	Butterfly bush	<i>Rotheca myricoides</i>	Medicinal, STD, back pain
36.	Lamuriai	Carissa	<i>Carissa spinarum</i>	Medicinal, rheumatoid arthritis, tonic, gout, painkiller, fruits edible, fermented beverage,
37.	Lmargweti	Croton	<i>Croton megalocarpus</i>	Medicinal, chronic cough, firewood, bee fodder,
38.	Lderekes	Gum Arabica tree	<i>Acacia senegal</i>	Food, Gum Arabic, cosmetics, industrial pharmaceutical, painting,

S.No	Samburu name	Comm\on name	Botanical name	Economic uses
39.	Silalei	African myrrh	<i>Commiphora africana</i>	Ceremonial, ball gum, Incense,
40.	Lkiyanate	Lkiyanate		To treat TB
41.	Reteti	Sycamore tree	<i>Ficus thonningii</i>	Gum used to chew used to make milk gourds
16.	Sirai	Desert date	<i>Balanites aegyptica</i>	Gum is used for medicine, Roots used as a fertility drug for women.

Appendix 5: Sub compartment information Maralal forest station

SUB-COMPART MENT	SPECIES	PLA NTIN G YR	DENS ITY	M. DB H	M. HT	AREA (ha)	VOLUM E (m3)	REMARKS / RECOMMENDATIONS
Porro 1A						11.7		
Porro 1B	E.sal	1976	300	92. 7	9.7	3.5		2nd coppices of 2012 and 2014.Only coppices of 2012 were measured
Porro 1C	E.sal	1981	463	211	27. 4	5.8	1911.62	1st Crop (portion 1& 2 combined)
Porro 1D	E.sal	1981	500	210	30. 5	2.3	846.86	Mixture of microcolys and Saligna. Saligna is dominant
Porro 1E						1.8		
Porro 2A	E.macro	1976	375	187 .6	35. 5	3.1	865.20	2nd coppice of 2014.Only trees for timber were c/f
Porro 2B	E.sal	1981	762	78. 5	8.5	8.9	730.46	2nd coppices of 2012
Porro 2C	E.camal	1977	625	134 .44	11. 9	3.1	387.79	
Porro 2D	E.sal/A.me arnsii	1981	267	216 .95	16. 5	9.3	916.55	Plantation invaded by Acacia mearnsii. Trees very crooked
Porro 2E	Cup.lus	1995	266	273 .2	13	6.5	736.68	Trees not pruned or thinned
Porro 2F	E.sal	1981	163	210 .2	22. 6	4.5	613.12	
Porro 2G	E.sal/E.ma cro	1981	410	207	23. 7	12.7	3290.66	1st coppice of 2010.There are Remnants of old crop. Saligna is dominant
Porro 2H	Cup.lus	1995	750	78. 5	5.3 5	2.5	100.62	Trees highly damaged by cattle, thus developing stunted growth

Porro 2I						6.7		
Porro 2J	E.mac	1990	400	105	9.7	0.6	55.71	
Porro 2K	Cup. lus					0.5		To plant
Porro 2L	Cup.lus	1990	550	37	3.1	0.5	32.69	Trees with stunted growth
Porro 2M	E.sal	1981	200	210	23. 4	1.1	169.82	Scattered trees mixed with indigenous trees
Porro 2N	Cup. lus					8.0		To plant
Porro 2O	Cup. lus					0.5		To plant
Porro 3A	E.sal	1978	320	122 .7	16. 5	11.4	1146.03	Partly clear felled. 1st coppice of 2012
Porro 3B	E.sal	1978	160	213 .3	20. 4	12.2	1620.59	1st crop. Scattered trees
Porro 3C	E.sal	1981	258	253 .9	21. 7	6.2	1416.58	
Porro 3D	Cup.lus	1995	950	168 .7	8.2	0.6	66.86	Trees damaged by livestock.
Porro 4A						10		Proposed plantation areas
Porro 4B						30		Proposed plantation areas
Porro 4C						30		Proposed plantation areas
Porro 4D						40		Proposed plantation areas
Porro 4E						30		Proposed plantation areas
						264		

Appendix 6: List of animals found in Kirisia/Leroghi forest

No.	Local (Samburu) name	Common name	Scientific name	Economic significance
Nkarro				
1.	Ltome	Elephant	<i>Loxodonta Africana</i>	Destroy crops, cause human injuries and deaths
2.	Losowan	Buffalo	<i>Cercerus carffer</i>	Destroy crops, causes deaths and injuries to humans, spread diseases to livestock
3.	Loibor kurum	Gravy zebra	<i>Equus grevies</i>	Destroy crops, heavily endangered due to poaching
4.	Nkoiyege	Common zebra	<i>Equus becheli</i>	Destroy crops
5.	Nchalagute	Water buck	<i>Kobu ellipsiprymnus</i>	Sedentary by nature, but threatened by habitat loss and human settlement

No.	Local (Samburu) name	Common name	Scientific name	Economic significance
6.	Lngarab	Warthog	<i>Phacochoerus Africana</i>	Powerful diggers?/ of? and may cause damage to root crops
7.	Ntarawet	Impallas	<i>Aepyceros melampus</i>	Destroy young seedlings in planted sites
8.	Nkoi-perai	Thomson gazelle	<i>Eudorcas thomsonii</i>	Highly prized as tourist attractions
9.	Lguya	Wild pig	<i>Sus scrofa</i>	Causes crop damage
10.	Nkolii	Grant's gazelle	<i>Nanger granti</i>	Causes crop damage
11.	Nkisin	Klipspringer	<i>Oreotragus oreotragus</i>	It's habitat is mainly on rocky outcrops, inaccessible by man
12.	Ndesi	Dik dik	<i>Madoqua piacentinii</i>	Causes some game damage, but their numbers are known to be decreasing due to hunting by man
13.	Lmadada	Tree hyrax	<i>Dendrohyrax validus</i>	Mostly nocturnal and shy, tends to avoid humans
14.	Nkinyanchurr	Rock hyrax	<i>Procavia capensis</i>	Considered a pest for stored crops
15.	Lngatuny	Lion	<i>Panther leo</i>	Preys on livestock and humans
16.	Loworu kerii	Leopard	<i>Panther pardus</i>	Preys on livestock especially sheep and goats
17.	Lnyirara	Cheetah	<i>Axynoxy jubetus</i>	Preys on livestock especially sheep and goats
18.	Lkonoi	Hyena	<i>Crocuta crocuta</i>	Considered a danger to both man and livestock
19.	Mbarie	Jackal		Preys on livestock
20.	Suyan	Wild dog	<i>Lycaon pictus</i>	Preys on livestock
No.	Local (Samburu) name	Common name	Scientific name	Economic significance
Naramat				
1.	Ltome	Elephant	<i>Loxodonta Africana</i>	Destroy crops, cause human injuries and deaths
2.	Losowan	Buffalo	<i>Cenkerus carffer</i>	Destroy crops, causes deaths and injuries to humans, spread diseases to livestock
3.	Loibor kurum	Gravy zebra	<i>Equus grevies</i>	Destroy crops, heavily endangered due to poaching
4.	Nkoiyege	Common zebra	<i>Equus becheli</i>	Destroy crops
5.	Nchalagute	Water buck	<i>Kobu</i>	Sedentary by nature, but

No.	Local (Samburu) name	Common name	Scientific name	Economic significance
			<i>ellipsiprymnus</i>	threatened by habitat loss and human settlement
6.	Lngarab	Warthog	<i>Phacochoerus Africana</i>	Powerful diggers and may cause damage to root crops
7.	Ntarawet	Impallas	<i>Aepyceros melampus</i>	Destroy young seedlings in planted sites
8.	Nkoiperai	Thomson gazelle	<i>Eudorcas thomsonii</i>	Highly prized as tourist attractions
9.	Lguya	Wild pig	<i>Sus scrofa</i>	Causes crop damage
10.	Nkolii	Grant's gazelle	<i>Nanger granti</i>	Causes crop damage
11.	Nkisin	Klipspringer	<i>Oreotragus oreotragus</i>	It's habitat is mainly on rocky outcrops, inaccessible by man
12.	Ndesi	Dik dik	<i>Madoqua piacentinii</i>	Causes some game damage, but their numbers are known to be decreasing due to hunting by man
13.	Lmadada	Tree hyrax	<i>Dendrohyrax validus</i>	Mostly nocturnal and shy, tends to avoid humans
14.	Nkinyanchurr	Rock hyrax	<i>Procavia capensis</i>	Considered a pest for stored crops
15.	Lngatuny	Lion	<i>Panther leo</i>	Preys on livestock and humans
16.	Loworu kerii	Leopard	<i>Panther pardus</i>	Preys on livestock especially shshep and goats
17.	Lnyirara	Cheetah	<i>Axynoxy jubetus</i>	Preys on livestock especially shshep and goats
18.	Lkonoii	Hyena	<i>Crocuta crocuta</i>	Considered a danger to both man and livestock
19.	Mbarie	Jackal		Preys on livestock
20.	Suyan	Wild dog	<i>Lycaon pictus</i>	Preys on livestock
No.	Local (Samburu) name	Common name	Scientific name	Economic significance
Nailepunye				
1.	Ltome	Elephant	<i>Loxodonta Africana</i>	Destroy crops, cause human injuries and deaths
2.	Losowan	Buffalo	<i>Cencerus carffer</i>	Destroy crops, causes deaths and injuries to humans, spread diseases to livestock
3.	Loibor kurum	Gravy zebra	<i>Equus grevies</i>	Destroy crops, heavily endangered due to poaching
4.	Nkoiiyege	Common	<i>Equus becheli</i>	Destroy crops

No.	Local (Samburu) name	Common name	Scientific name	Economic significance
		zebra		
5.	Nchalagute	Water buck	<i>Kobu ellipsiprymnus</i>	Sedentary by nature, but threatened by habitat loss and human settlement
6.	Lngarab	Warthog	<i>Phacochoerus Africana</i>	Powerful diggers and may cause damage to root crops
7.	Ntarawet	Impallas	<i>Aepyceros melampus</i>	Destroy young seedlings in planted sites
8.	Nkoiperai	Thomson gazelle	<i>Eudorcas thomsonii</i>	Highly prized as tourist attractions
9.	Lguya	Wild pig	<i>Sus scrofa</i>	Causes crop damage
10.	Nkolii	Grant's gazelle	<i>Nanger granti</i>	Causes crop damage
11.	Nkisin	Klipspringer	<i>Oreotragus oreotragus</i>	It's habitat is mainly on rocky outcrops, inaccessible by man
12.	Ndesi	Dik dik	<i>Madoqua piacentinii</i>	Causes some game damage, but their numbers are known to be decreasing due to hunting by man
13.	Lmadada	Tree hyrax	<i>Dendrohyrax validus</i>	Mostly nocturnal and shy, tends to avoid humans
14.	Nkinyanchurr	Rock hyrax	<i>Procavia capensis</i>	Considered a pest for stored crops
15.	Lngatuny	Lion	<i>Panther leo</i>	Preys on livestock and humans
16.	Loworu kerii	Leopard	<i>Panther pardus</i>	Preys on livestock especially sheep and goats
17.	Lnyirara	Cheetah	<i>Axynoxy jubetus</i>	Preys on livestock especially sheep and goats
18.	Lkonoi	Hyena	<i>Crocuta crocuta</i>	Considered a danger to both man and livestock
19.	Mbarie	Jackal		Preys on livestock
20.	Suyan	Wild dog	<i>Lycaon pictus</i>	Preys on livestock

Appendix 7: Mapped Forest Resources in Nkarro management area

No.	Site (Local area name)	Resource name	Other resources on the same site	GPS reading			Type and status of the forest
				Elevation (M)	Northings (N)	Eastings (E)	
1	Lodokejek	Degraded area	Bee keeping, 241 degraded area	1783M	UTM0098047	37N0261210	Open spaces and shrubs
2	Ledero	Wild life	Grazing area	2692	UTM0115062	37N0250809	Open

No.	Site (Local	Resource	Other resources	GPS reading			Type and
		corridor					canopy
3	Kisima	Miyai dam	Ecotourism, fishing, view point	1786M	UTM0104784	37N0261000	Open ar
4	Lodokejek	Old Outpost	Trees	1409M	0104431	0270226	Scattered Indigen
5	Lodokejek	Glad, Grazing Area	Water pan, foot paths, distilled water	1814M	UTM0098073	37N0263331	Open gl
6	Kisima	Losuko Kitok	Ecotourism site	1804m	UTM0104212	37N0260697	Open Ar
7	Border Bawa sub and Loder sub location	Grazing	Namuehe rocks	2170	UTM014749	37N0251352	Open Canopy
8	Lodokejek	Grazing		1398	0105333	0269868	Mix indigen
9	Lodokejek	View point, catholic shrine	View point	1900M	UTM0097339	37N0263426	Shrub, Rocky
10	Baawa	Nawueniarte rock	Hyenas bleeding site	2195	UTMO114866	37N0251654	Open Canopy
11	Kisima	Grassland	Ecotourism, camping site	1816m	UTM0102772	37N0262945	Open gl and scattered indigen
12	Baawa	Lesore Rock	Bleeding site for monkeys, traditional grounds	2234M	UTM0115007	37N20251876	Open Canopy
13	Lbukoi	View point		2545	0106952	0269035	Dense indigen

No.	Site (Local)	Resource	Other resources	GPS reading			Type and
14	Lodokejek	Elephant Northern Corridor	Medical herbs, poisonous arrow, wild fruits, Sand	1816M	UTM0097754	37N0263520	Dry forest degraded
15	Kisima	Rapakini grassland	Ecotourism, beautiful scenery, camping site	1835M	UTM0101740	37N0263129	Open grassland surrounded by dense forests
16	Lodokejek	Elephant bleeding site	Bee keeping and scientific research	1826	UTM0098421	37N0263414	Dense forest
17	Lodokejek	Grazing		2545	0106953	0269040	Dense indigenous forest
18	Baawa/Ledero	Lesimiti View point		2269	37N0251976	UTM0115931	Open
19	Kisima	Elephant bleeding site	Tourism Attraction	1844m	UTM0101659	37N0262938	Dense forest
20	Lodokejek	Water spring	Ecotourism camping site	1932M	UTM0099030	37N0264115	Rocky Area forested
21	Baawa	Elephant bleeding site		1976	37N0252904	UTM0116602	Open
22	Kisima	Spring, water catchment	Birds, Sanctuary/watching	1817M	UTM 0103123	37N0263707	Dense forest, high canopy
23	Lodokejek	View Point	View point	2005M	UTM0099998	37N0264010	Shrubland Degraded
24	Baawa	Laltarakwa Camp site		1053	37N0252942	Utm0117095	Open

No.	Site (Local	Resource	Other resources	GPS reading			Type and
25	Kisima	Lorurana grazing land	Grazing zone	1815M	UTM0103761	37N0262053	Open gl but scattered indigene
26	Lodokejek	Longishu derei cave	Ecotourism site	1932M	UTM0100757	37N0264445	High de forest
27	Baawa	Naigolie cave	Meat roasting ground	7037	37N0253319	UTM0117800	
28	Kisima	Lorora ceremonial site	Bee keeping	1779M	UTM0105121	37N0259208	Scattered Accacia
29	Lodokejek	Longishu derai cave	Ecotourism	1954M	UTM0100969	37N0264487	Dense forest
30	Baawa	Naigolie Spring	View point, Wildlife corridor	2066M	37N0253649	UTM0117846	
31	Kisima	Lolkujita camping site	Ecotourism	1832M	UTM0107029	37N0262536	Dense forest
32.	Ladokojek	Rapa Camping Site	Ecotourism	1797M	UTM0099811	37N0262916	Open and dense
33	Baawa	Ceremonial site	Campsite	1937	37N0253239	UTM0115986	Open
34	Kisima	Well and water catchment	Ecotourism, bird watching	1821M	UTM0107163	37N0262693	Open and surrounded by dense forest
35	Lodokojek	Water point	Ecotourism	1788M	UTM0099671	37N0262795	Open and surrounded by dense forest
36	Baawa	Beco tree	Water catchment	1829	37N025467	UTM0112189	Intact

No.	Site (Local	Resource	Other resources	GPS reading			Type and
		nursery					Acacia Forest
37	Kisima	Camping site	Bee keeping, water catchment	1829M	UTM0107198	37N0262884	Open gl surround by dense indigene tree, and high canopy
38	Kodokejek	Natural waterpan	Wildlife corridor	2035	0100832	37N0265587	Open sp surround by dense forest
39	Kisima	Lolkujita catchment area	Ecotourism, Bee keeping, site attraction view point	1834	0107219	37N0262926	Dense Forest
40	Baawa	Historical site	Nakedi view point	2010	0254801	0115666	
41.	Lodokejek	Water point	Main water point	1908	0110817	0266936	Dense forest w open are
42	Baawa	Sere-oloikari glade	Spring well, salt links, footpath	2017	0255763	0117082	Open Canopy

No.	Site (Local	Resource	Other resources	GPS reading			Type ar
43	Kisima	Ngos le kikwal – Lorora ceremonial place	Bee keeping, grazing land	1808	0107098	0127096	Open Canopy

Appendix 8: List of resources mapped in Naramat management area

RES OUR CE NAM E	RESOUR CE LOCATI ON	Nothin gs	Eastings (37S)	Elevati on (m)	Main tree SPP	Wildlife	Current/po tential Utilization	Other resources
Tree nurse ry	Losoro area	12783 3	236754	2181	Podo,ce dar,	Elephant,Zeb ra,Leopard,D ikDik,Warth ong		Herbs,Bee keeping
Herbs	Lakaale	11769 5	250039	2146	Matama yna,Mta rakwa	Elephant,Bir ds,Siribai,Ng uturuk,Lube, Ngeresiret vanga		Scouts camp,Gate,
Tree nurse ry	Loikas	12360 5	244178	1975	Croton, Lchingei ,Lamalo giLsigiy o,Lmort oi	Zebra,Elphan t,Buffallo,M onkeys,Birds		Bee keeping,Loik as river
Plant ation	Porro	13299 6	234894	2458	Jumiper us procera, Blu gum, Cypress	Warthong, Elephnts, Zebras,Leopa rd ,Hyena		Maize,Beans, Potatoes, Sukuma wiki
NAR AMA T CFA	Loikas	12386 1	244067	1988	Olmorde i,Lkirnd egei,Sen eto,Lech	Elephant,Zeb ra,Cattle		Water tank/Nakany unga stream

RES OUR CE NAM E	RESOUR CE LOCATI ON	Nothin gs	Easting (37S)	Elevati on (m)	Main tree SPP	Wildlife	Current/po tential Utilization	Other resources
Offic e					ingei,M origoi,L mataong i,Lamur nje,seep eii			
Camp site	Lakaale	11768 2	250594	2263	Itarakwa , Mtarag wa.Sirai, Lamurw a, Salir	Elephanats,B irds,Hyena,L eopard		Fire tower, Scouts camp,Cultura l site
Shall ow well	Lowawen a	13443 1	234769	2454	Jumiper us procera, Blu gum, Cypress	Warthong, Elephnts, Zebras,Leopa rd ,Hyena		
Bee kepin g	Losoro area	12781 3	236739	2192	Red cedar,Po do	Elphants, Lopard , Hyena		Herbs
Propo sed NAR AMA T CFA office	Loikas	12383 1	244095	1985	Olmorde i,Lkirnd egei,Sen eto,Lech ingei,M origoi,L mataong i,Lamur nje,seep eii	Elephant,Zeb ra,Cattle		Water tank/Nakany unga stream
Bee keepi ng	Lakaale	11744 8	250903	2281	Mtarak wa,Mzik inyoi, Lchange i, Sagumai , Salii,Mt amagwa	Birds,Elepha nts, Hyenas, Leopard,Vult ures		Water bodies, Roads, Quarries

RES OUR CE NAM E	RESOUR CE LOCATI ON	Nothin gs	Easting (37S)	Elevati on (m)	Main tree SPP	Wildlife	Current/po tential Utilization	Other resources
Nara mat scout s Camp	plantation	13380 0	234693	2412	Red cedar,Po do	Leopard, Warthong, Antelope, Zebra,Elepha nt		Shallow wells
Scout s camp	Losoro area	12781 8	236707	2183	Red cedar,Po do	Leopard, Warthong, Antelope, Zebra,Elepha nt		Herbs
Propo sed Reha bilitat ion sites	Laltanakw a	12495 9	244086	2002	Lchenge i, Lmorgoi ,Lokiridi nga	Zebra, Squirrels, Buffalos, Ekelikilie, Elephants		
Grazi ng site	Minjominj i	13558 7	236325	2503	Red cedar, Grass	Leopard, Warthong, Antelope, Zebra		Shallow water well
Herbs	Lparfuk	12781 6	236707	2184	Red cedar, Olea falcafurs	Elephants, Leopards, Warthongs		Herbs
Wildl ife corrid ors	Lakaale	11714 3	251255	2253	Mtarak wa,Sagu mai,Lch engai,M sikinyoi, Mkatura i	Hedge Hog,Elephan t,Hyenas		Wild tobacco,Graz ing glades
Sprin g	Loikas	12613 5	245001	1999	croton,L marugeli , Lchange i,Sokoro i,	Elephants, Leopards, Warthongs,L ions, Zebra,Buffal oes		Wells
Sand harve sting	Mpagas	13505 9	236422	2464	Red cedar	Zebras, Elephants		Red ochre

RES OUR CE NAM E	RESOUR CE LOCATI ON	Nothin gs	Easting (37S)	Elevati on (m)	Main tree SPP	Wildlife	Current/po tential Utilization	Other resources
Well	Losoro area	12779 1	236707	2186	Red cedar	Elephants, Leopards,Hy enas, Zebras, Warthongs		Herbs, Bee keeping
Ecoto ursim Camp site	Boolaa	11893 3	255175	2300	Lkukuka i, Ntutete, Ngingil, Barmun yo, Ngarami rami	Elephants,Bu ffaloes, Lions, Hyena,Leopa rd, Warthongs		Bird watching,Bee hives, Fish
Well	Mugur Nanyokie	13376 2	235535	2369	Red Cedar, Podo	Elphants, Zebra, Warthongs, Hyena, Leopard		Sand harvesting
Salt lick	Losoro area	12799 5	237255	2133	Red cedar, Podo	Elephants, Hyenas,Leop ard, Warthong, Zebra, Dikdik		Water points
Acces s road	Lesarai	12019 1	247958	1989	Croton, Red cedar, Olea africana, Sirai,La kirdagai, Senotoi, Lmorijoi ,Labaai, Sigiit	Elephants, Zebras, Hyenas, Leopard, Butterflies,		Herbs, Check dams, Water catchment areas
Wells	Sere Kiji	12821 6	245164	2029	Croton, Lchenge i, Lxkwai, Saher, Lmorijoi	Elephants, Buffaloes, Lions,Leopar ds,Birds		None

RES OUR CE NAM E	RESOUR CE LOCATI ON	Nothin gs	Eastings (37S)	Elevati on (m)	Main tree SPP	Wildlife	Current/po tential Utilization	Other resources
Water sprin g	Larre	13376 2	235535	2369	Jumiper us procera, Orea	Elephants, Leopards, Zebras, Warthongs, Hyenas		Water resources
Well	Loikas	12821 6	245164	2029	Croton, Lterakw ai, Longera , Sepei,So nkoroi	Elephants, Buffaloes,Li ons, Leopard, Birds		None
Sand harve sting	Ngari Loosira	12014 4	248030	1990	Sirai, Croton, Lmorjoi, Red Cedar, Olea africana	Duff, Laria, Surbelei, Lairurjury, Termites		Bee keeping, Bird watching
Grazi ng site	Leshapaiy a Sagumai	12899 0	244645	2164	Lamolo gi, Lchenge i,itarawk wai, Lmurai, Lgilai	Elephant, Zebras		Herbs
Sprin g	Porro	13309 2	235930	2323	Red cedar, Podo	Elephants, Hyena,Leopa rd		Sand harvesting
Lakir a sprin gs	Lapartuk	12802 9	237263	2136	Red cedar	Elephants,Le opards, Warthongs,Z ebras		Herbs, Campsite
Salt lick	Nkonyek salt lick	13006 8	244269	2066	Itarakwa i,Lgilai, Lpiripiri ti,Lmisi giyoi,So koro,cro ton	Elephants,Li on,Leopard, Hyenas,Mon keyS,Zebra		Loikas river, Wells

RES OUR CE NAM E	RESOUR CE LOCATI ON	Nothin gs	Easting (37S)	Elevati on (m)	Main tree SPP	Wildlife	Current/po tential Utilization	Other resources
Fire tower	Nasarai	12079 9	248642	2129	Sirai,Sii git,Laab ai,Sigiit, Lamurai	Elphants,Leo pards,Zebras		Guest house, Bird watching, Sports hicking,cultu ral siteShrines ,cultural sites,Forest rangers camp
Cave	Loipede	13324 0	235802	2336	Red cedar	Elephants, Leopard,Hye na,Hyrax,Bir ds		Sand harvesting
Lakir a sprin gs2	Lakira	12808 7	237244	2134	Podo, Red cedar	Elephants,Le opard,Warth ogs		Sand harvesting
Cultu ral sites	Nkonyoke cultural site	13028 2	244581	2080	Ltarakui ,Bluegu m,Lchan gei,Lpiri piri,Lon gilai,Lm isiginyo, Lamurai	Elephants,Li on,Hyenase, Leopards,wart hong,Birds		Bee keeping,Cam psite
Herbs	Lesirai	12095 7	248850	2064	Lchingei ,Lkukul ai, Lmakuti kuti, Lakurdi ngai,La murai,S unoni,L ardanyai , Sirai,Olr ea africana	Leopards,Hy enas,Zebras, Elephants,Har e,Warthong, Squirrel		Zipline,Vbird watching

RES OUR CE NAM E	RESOUR CE LOCATI ON	Nothin gs	Easting (37S)	Elevati on (m)	Main tree SPP	Wildlife	Current/po tential Utilization	Other resources
Lakir a camp site	Lakira	12812 3	237273	2155	Podocar pus,Jum iperous, Procera, Orea Africana	Elephants,Le opards,Warth ongs,Zebras		Water point ,Sand harvesting
Nkon yei Camp site	Nkonyek	13623 4	244761	2064	Podocar pus,Jum iperous, Procera, Orea Africana	Elephants,Le opards,Warth ongs,Zebras		Water point ,Sand harvesting
Wildl ife corrid ors	Lketurai	12116 6	249112	1966	Sirai,Lc hingei,S irai	Zebras, Elephants,Hy enas,Leopard s		Grazing,Ecot ourism
Yamo camp site	Yamo	12568 2	238635	2130	Red cedar, Podo	Elephants, Baboons, Warthongs, Zebras, Dikdik, Lopards		Water points
Nkon yek bee keepi ng	Nkonyek	13035 2	244536	2081	Red cedar, Podo	Elephants, Baboons, Warthongs, Zebras, Dikdik, Lopards		Cultural site
Anim al corrid ors	Lolkecheti	11423 0	249096	1975	Lchenge i, Lmorgoi ,Lokiridi nga,Crot on	Elephants, Hyenas,Zebr as		River, Bamboo plantation
Grazi ng area	Miimani	12729 4	238858	2237	Grass, Glades	Baboons Elephants, Zebras, Leopards		Shallow wells

RES OUR CE NAM E	RESOUR CE LOCATI ON	Nothin gs	Eastings (37S)	Elevati on (m)	Main tree SPP	Wildlife	Current/po tential Utilization	Other resources
Water tank	Nkonyek	13006 4	244733	2061	Lpirinti, Itarkwai , Lngilai, Lngriyoi , Croton, Lmsigin yoi	Elephant, Donkey, Zebra, Monkey, Birds		Pump house
Salt lick	Lolkecheti	12154 8	249429	1973	Lchingie , Sirai, Lmsigiy oi, Red cedar, Orea Africana	Elephants, Butterflies, Zebras, Wartthongs		Grazing
Pump house	Nkanyek	13009 4	244699	2060	Lchingie , Sirai, Lmsigiy oi, Red cedar, Orea Africana	Elephants, Butterflies, Zebras, Wartthongs		Grazing
Well	Lolkecheti	12155 6	2493522	1974	Lchingie , Lkukul ai, Lmakuti kuti, Lakurdi ngai, La murai	Elphants, Zebras, Hare		Bamboo, Grazing
Nkon kenye	Nkonyek	13016 2	244671	2054	Bluegu m, Lpiripint i, Lgilai, Itarakwa i, Sokoroi	Elephant, Lion, Zebra, Birds		Campsite
Beek eepin g	Tarnanyoi	12163 3	249379	1978	Lchenge i, Sirai, Senatoi, Labai	Zebras, Elephants		Tree nursery, Ecolodge, kfs ranger camp,

RES OUR CE NAM E	RESOUR CE LOCATI ON	Nothin gs	Easting (37S)	Elevati on (m)	Main tree SPP	Wildlife	Current/po tential Utilization	Other resources
								Cultural center
Bamb oo	Bamboo	12405 3	244361	1977	Itarakwai, Lgilai, Lpiripiri ti,Lmisi giyoi,So koro,cro ton	Birds, Zebras, Hare		Shrine
Scout s camp	Tamiyoi	12170 6	249390	1976	Sirai, Lchenge i	Zebras, Elephants		Ecotoursim site
Fire tower	Lekaramo ru	12957 5	239951	2377	Lpirinti, Itarkwai , Lngilai, Lngriyoi , Croton, Lmsigin yoi	Elephant,Zeb ras, Buffaloes, Warthong,Bi rds		Grazing area
Wells	Lekaramo ru	12957 7	240730	2273	Ltarakui ,Bluegu m,Lchan gei,Lpiri piri,Lon gilai,Lm isiginyo, Lamurai	Elephants,Li ons,Zebra, Warthong, Birds		
Bee keepi ng	Lidongo	12172 0	249392	1980	Croton, Lchingei , Lngenyoi, Senetoi, Sigiit, Red cedar, Lmorjoi, Laabai,	Zebra, Elephants, Hyena, Squirrel,Lion s, Leopards		Tree nursery, Bee keeping

RES OUR CE NAM E	RESOUR CE LOCATI ON	Nothin gs	Easting (37S)	Elevati on (m)	Main tree SPP	Wildlife	Current/po tential Utilization	Other resources
					Lmsigi oi			
Grazi ng area	Lk moru	12995 2	240892	2333	Itarakwa i,Lgilai, Lpiripiri ti,Lmisi giyoi,So koro,cro ton	Elephants,Ze bras,Lions,Bi rds		Lare oibor well
Sand harve sting	Lioidongo	12408 0	246739	1981	Lchingei ,Lmorjoi ,Senetoi, Sirai,Ln gerijoi	Zebras, Elephants,Li on,Hyena		Bee keeping, KFS-Rangers camp
Water hole	Sagumai	12874 5	221162	2257	Itarakwa i,Lgilai, Lpiripiri ti,Lmisi giyoi,So koro,cro ton	Elephants,Ze bra,Monkey s,Birds		Grazing area
Tree nurse ry	Loidongo	12393 1	246938	1963	Lchingei ,Lkukul ai, Lmakuti kuti, Lakurdi ngai,La murai	Elphants, Leopard ,Lions,Zebra s		Sand harvesting
Sand harve sting	Loidongo	12384 4	246981	1961	Croton, Sertoi,L morjoi,S irai, Lngeriy oi, Lchenge i, Lmsigi yoi	Zebra, Elephants,, Lion, Hyenas		River

RES OUR CE NAM E	RESOUR CE LOCATI ON	Nothin gs	Easting (37S)	Elevati on (m)	Main tree SPP	Wildlife	Current/po tential Utilization	Other resources
Propo sed camp site	Sagumai	12407 1	243431	2137	Lmorjoi, Lchenge i,Lokire ngei, Lmaria	Elephant,Zeb ra,Birds, Cattle		Cultural site
Sand harve sting	Loidongo	12393 1	247065	1961	Lgilai,C roton, Lchingei ,Seretoi, Sirai	Elephants,Ze bra,Monkeys ,Birds		Wells
Cultu ral sites	Sagumai	12419 0	243305	2142	Lgilai,C roton, Lchingei ,Seretoi, Sirai	Elephants,Ze bra,Monkeys ,Birds		Camping site
Grazi ng	Soitpus	12548 7	246446	2119	Larudag i, Lmsigiy oi, Labai, Ltarakw ai	Zebra, Elephants,, Lion, Hyenas		
Shrin e	Lemamny aro	12127 0	242217	2146	Sepei,Lc henegi,L kiturai,l oragia,L amurai, Lchenge i	Elephants,Ze bra,Birds,Le opards,Lion, Birds		Lemanyaro wells
Fire tower	Loonguru man	12557 2	246211	2129	Labai, Lmsigiy oi, Lordo,L chingei,I tarakwai	Zebras,Eleph ants,Squirrel		Ecotoursim site,Campsite ,Eco tourism site
Wells	Lemanyar o	12725 6	242106	2146	Labai, Lmsigiy oi, Lordo,L chingei,I tarakwai	Zebras,Eleph ants,Squirrel		Ecotoursim site,Campsite ,Eco tourism site

RES OUR CE NAM E	RESOUR CE LOCATI ON	Nothin gs	Easting (37S)	Elevati on (m)	Main tree SPP	Wildlife	Current/po tential Utilization	Other resources
Acces s road	Loonguru man	12590 1	246306	2083	Red cedar,La murai	Zebras,Eleph ants,Hyena		Grazing fields
Eleph ant bleedi ng site	Sagumai	12654 2	242377	2198	Lketurai , Lmsigin yo,Lamr ingei,Lc hingei	Elephant,Zeb ra Hyena, Monkeys, Birds		None
Herbs	Suen	12806 8	249152	2071	Lchingei ,Lkukul ai, Lmakuti kuti, Lakurdi ngai,La murai,S unoni,L ardanyai , Sirai,Olr ea africana	Zebras, Elephants, Lion, Buffaloes, Leopard, Hyena		
Degra ded area	Sagumai	12500 2	243071	2153	Lmaria, Sunoni, Lchingei ,Lokiridi ngei	Elephant,Zeb ra Hyena, Monkeys, Birds		Sagumai road
Dam	Nkusoroni	12523 5	249652	2085	Lchingei , Lgilai,Lt arakwai, Lngeriy oi	Elephants,Li ons,Zebra,Le oprads		Wildlife corridors, Ecotourism site
Dam	Lngiro Dam	12500 2	243071	2153	Longeri ngoi,Lc hingei, Lmsigiy oi,Lamu rai	Warthongs, Zebras,Birds, Elephnants		Ltunkai road

RES OUR CE NAM E	RESOUR CE LOCATI ON	Nothin gs	Easting (37S)	Elevati on (m)	Main tree SPP	Wildlife	Current/po tential Utilization	Other resources
Well	Mpagas	12853 8	245840	2175	Sirai,Lc hengei,l masingi nyo,La murai	Elephants,Ze bras,Monkey ,Birds		Grazing area, Loikas river
Cultu ra site	Lonkurum uan	12655 9	246322	2121	Ltarakw ai, Croton, Lmaria, Lchngei, Sirai	Elephant, Lion, Zebra, Birds		Grazing area
Ecoto ursim site	Lonkunam wan	12530 5	246606	2117	Lpirinti, Itarkwai , Lngilai, Lngriyoi , Croton, Lmsigin yoi	Warthongs, Zebras,Birds, Elephnants		Campsite
Camp site	Soitpus	12546 3	246442	2113	Lpirinti, Itarkwai , Lngilai, Lngriyoi , Croton, Lmsigin yoi	Warthongs, Zebras,Birds, Elephnants		Cultural site
Dam	Sueen	12875 5	248877	2056	Ltarakw ai, Croton, Lmaria, Lchngei, Sirai	Elephant, Zebra, Monkey, Suruai, Buffal oes		Tree nursery
Tree nurse ry	Sueen	12870 8	248871	2057	Ltarakw ai, Croton, Lmaria, Lchngei, Sirai	Elephant, Zebra, Monkey, Suruai, Buffal oes		Sueen dam

RES OUR CE NAM E	RESOUR CE LOCATI ON	Nothin gs	Easting (37S)	Elevati on (m)	Main tree SPP	Wildlife	Current/po tential Utilization	Other resources
Eco touris m sites	Sueen	12878 7	248759	2068	Ltarakw ai, Croton, Lmaria, Lchngei, Sirai	Elephant, Zebra, Monkey, Suruai, Buffal oes		
Scout s camp	Lodongo	12399 3	246788	1973	Ltarakw ai, Croton, Lmaria, Lchngei, Sirai	Elephant, Zebra, Monkey, Suruai, Buffal oes		Loondogo rivr, Sand harvesting
Bee keepi ng	Lodongo	12389 6	246879	1966	Ltarakw ai, Croton, Lmaria, Lchngei, Sirai	Elephannt, Ze bra, Donkey, Monkey, Bird s		Londogo river & road
Reha bilitat ion site	Nosurai	12416 8	246639	1981	Lchingei , Lmisigi yo, Ltara kwai, Sir ai, Croto n	Birds, Donkeys, Zebras, Eleph ants, Monkeys		Nosurari stream
Masai well	Longusha ni	12722 6	240405	2156	Orea, Ce dar, Gras s	Elephants Hy ena, warthong, Ze bra		Caves, Bee keeping
Cultu ral site	Longusha ni	12639 3	239963	2242	Red cedar	Elephants, Ze bra, Hyena, Warthong		Rehabilitatio n site
warth ong cave	Longusha ni	12702 7	240374	2137	Orea, Ce dar, Gras s	Elephants, Wr thong, Zebra		Rehabilitatio n site
Camp site	Longusha ni	12667 4	240614	2226	Orea, Ce dar, Gras s	Elephants, Ze bra, Hyena, Warthong		

RES OUR CE NAM E	RESOUR CE LOCATI ON	Nothin gs	Easting (37S)	Elevati on (m)	Main tree SPP	Wildlife	Current/po tential Utilization	Other resources
Cultu ral	Longusha ni	12650 02	240659	2225	Orea, Cedar, Grass	Elephants, Hyena,Zebra, Warthongs		
Grazi ng site	Longusha ni	12639 1	240669	2225	Orea africana	Elephants, Hyena, Warthongs, Zebra		
Herbs	Longusha ni	12592 9	240743	2223	Grass and shrubs	Elephants,Ze bras,Hyena		
Tree nurse ry	Lporos	12294 5	242724	1980	Red cedar, Croton	Elephants,Zb ras, Hyena, Warthong		
Water pan	Longshani	12532 9	241054	2205	Grass ,Orea	Elephants,Ze bras, Hyena, Warthong		
Shrin e	Lporos	12367 0	242506	1989	Croton, Red cedar	Elephants,Hy ena,Zebra,W arthon		
Fish pond	Lporos	12369 1	242508	1994	Croton, Cedar	Elephant,Zeb ras,Warthong		
Bee keepi ng	Lporos	12305 3	242574	1995	Red cedar, Croton	Elephants		
Camp site	Lowawewa	13435 9	234732	2452	Red cedar, Podo, Blue gum	Elephants, Leopard,Zebr a,Warthong, Hyena		

Appendix9: Resources mapped in Nailepunyie management unit

N o.	Site (local area name)	GPS readings			Type of forest and status	Main tree species	Animal species of special interest	Current and potential utilization
		Elevati on (M)	Northi ngs	Eastin gs				

N o.	Site (local area name)	GPS readings			Type of forest and status	Main tree species	Animal species of special interest	Current and potential utilization
		Elevati on (M)	Northi ngs	Eastin gs				
1.	Angata- Maralal road shortcut	2344	014175 6	02409 97	Mixed indigeno us with open grasslan d	Lmushngas hi, Sandal wood, Olkokolai, Acacia drepanalobi um, Acacia seyal, Lamuriai	Elephan t, leopard, warthog , hyena, buffalo, lion	Transport utility
2.	Rada- Mchumin yi road to Maralal	2502	013669 6	01350 27	Mixed indigeno us	Ltarakwai, Podo, Saramunai, Lkokolai	Zebra, elephan t, lion, leopard	Transport utility
3.	Ntarakwai to Losipa road	2317	014006 5	02359 03	Open with mixed indigeno us	Ltarakwai, Lchengei	leopard, lion	Road, school and church amenity
4.	Porro River	2262	013854 0	02360 79	Mixed indigeno us	Ltarakwai, Podo, Ngeriyion, Sepeia	Elephan t, baboon, antelop e	Conservatio n, bee keeping
5.	Mchumin yi grazing area	2520	016159	02358 24	Open with mixed indigeno us	Ltarakwai, Podo	Zebra, leopard, elephan t	Grazing, eco-tourism (campsites)
6.	Nkuruma ut River	2192	013399 5	02389 67	Mixed indigeno us	Ltarakwai, Podo, Nkinyil	Elephan t, zebra, leopard	Water point
7.	Nkuruma ut-Soit animal watering point	2211	013399 2	02389 67	Mixed indigeno us	Ltarakwai, Podo	Zebra, elephan t	Water point
8.	Elephant	2268	013373 0	02377 59	Mixed indigeno us	Ltarakwai, Sinoni, Msigiyio	Elephan t, zebra, lion	Wildlife grazing area
9.	Nailepuny ie-	2370	012927 0	02401 77	Mixed indigeno	Ltarakwai, Podo,	Antelop e, lion,	Conservatio n

N o.	Site (local area name)	GPS readings			Type of forest and status	Main tree species	Animal species of special interest	Current and potential utilization
		Elevati on (M)	Northi ngs	Eastin gs				
	Naramat Block boundary				us	Sagumai, Ngeriyio	elephan t	
10 .	Lekamour u grazing area	2363	024017 2	01292 65	Open with mixed indigeno us	Ltarakwai, Podo, Sunoni, Sagumai	Zebra, elephan t, leopard	Eco-tourism (campsites), conservatio n
11 .	Cherin grazing area	2523	013182 6	02879 2	Open with scattered indigeno us	Ltarakwai, Lpiripiriti, Lngeriyoo	Elephan t, lion, leopard	Conservatio n
12 .	Loosipa grazing area	2511	013852 8	02386 88	Mixed grasslan d and mixed indigeno us	Ltarakwai, Lgeriyo, Olokolai, Lkiyei	Elephan ts, zebra, lion, leopard	Conservatio n
13 .	Proposed zip line at Ndunyo Siwo	2387	013969 4	02384 81	Mixed indigeno us on a hill	Losesei, Lamurlai, Nkokolai, Sagumai	Elephan ts, zebra, lion, leopard	Eco- tourism, conservatio n
14 .	Mpanga's shrine	2362	013972 4	02400 89	Mixed indigeno us	Sandal wood, Ltarakwai, Saramunai, Seketet	Elephan t, hyena. Lion, leopard	Cultural site/worship ing, conservatio n
15 .	Lesayia water point	2390	013851 8	02397 96	Mixed indigeno us	Ngilai, Lpiripititi, Ltarakwai	Antelop e. Lion, elephan t	Conservatio n
16 .	Nachunid a River	2146	014129 1	02239 33	Mixed indigeno us	Ltarakwai, Lkinyiel, podo	Leopard, lion, elephan t	Conservatio n
17 .	Cultural site at Lmunget	2226	014015 2	02392 36	Mixed indigeno us	Ltarakwai, Lpiripititi	Zebra, lion, elephan t	Eco- tourism, conservatio n

N o.	Site (local area name)	GPS readings			Type of forest and status	Main tree species	Animal species of special interest	Current and potential utilization
		Elevati on (M)	Northi ngs	Eastin gs				
18 .	Eco- tourism site at Nturugum i	2426	014075 5	02415 25	Open grasslan d with scattered trees	Grass, Moro, Lmusugash, Lpiripiriri, Parimunyo, Simantei, Lkinyil	Wartho g, elephan t, Oryx, buffalo, cows, monkey , birds	Eco-tourism
19 .	Viewpoint / escarpme nt at Munyamu nyi Sunoni	2342	011417 57	02410 13	Mixed indigeno us with open grasslan ds	Lmusngashi , sandal wood, Olkokolai, Acacia seyal, Acacia drepanalobi um, Lamuriai	Elephan t, lion, warthog , hyena, buffalo	Eco-tourism
20 .	Grazing site at Barnoi	2389	014150 0	02410 40	Mixed indigeno us	Red cedar, Lmungash, Senandei, Mutamaiyo	Elephan t, leopard, warthog , hyena, buffalo, lion	Grazing
21 .	Ndonyo elephant maternity	2575	013928 5	02427 14	Closed canopy mixed indigeno us	Lkukut, podo, Olea Africana, Mtarakwai	Elephan t, birds, buffalo, leopard, wild pig	Conservatio n
22 .	Sirango dam	2184	014262 7	02397 65	Scattered scrublan d	Acacia seyal, Acacia drepanalobi um, Acacia tortilis, Croton megalocarp us	Ducks, bees, cows, goats, sheep, elephan t, buffalo, antelop e	Conservatio n

N o.	Site (local area name)	GPS readings			Type of forest and status	Main tree species	Animal species of special interest	Current and potential utilization
		Elevati on (M)	Northi ngs	Eastin gs				
23 .	Sordon River	2399	013683 6	02433 00	Mixed indigeno us	Bamboo, Ltarakwai, Lpiripiriti, Lgelei	Birds, buffalo, elephan t, lions	Conservatio n
24 .	Camp site at Ndonyo elporostan i	2286	014281 9	02403 90	Mixed indigeno us	Croton megalocarp us, Olea Africana, Lmisigiyo	Birds, elephan t, lion	Eco-tourism
25 .	Lchoroi swamp	2467	014016 4	02418 2	Mixed dense indigeno us	Podo, Porokwai, Matasia, Lkukut, Sepei	Birds, buffalo, elephan t, lions	Conservatio n
25 .	Proposed KFS outpost at Ltalet	2277	014254 3	02407 64	Open with scattered trees	Podo, Songoroi, Lmoroo	Elephan t, warthog , antelop e, lions	Security utility
26 .	Lchoroi spring	2459	014016 3	02816 81	Mixed dense indigeno us	Podo, Porokai, Matasia, Lkukut, Sepei	Birds, buffalo, lion, bushbu ck, nkewa	Conservatio n
27 .	Lamaal shrine at Nkiin	2441	014047 1	02416 34	Mixed indigeno us	Senetei, Mugumo, Sepei, Sekawai, Lkinyil, Parumunyo	Lion, leopard, elephan t	Cultural site
28 .	Opiroi swamp	2131	012060 0	26007 32	Closed canopy of mixed indigeno us	Cedar, podo	Birds	Conservatio n
29 .	Ngilai dam	1533	012719 5	02544 25	Mixed shrubs and trees	Acacia spp. , Croton megalocarp us	Birds, warthog , leopard	Water source, conservatio n

N o.	Site (local area name)	GPS readings			Type of forest and status	Main tree species	Animal species of special interest	Current and potential utilization
		Elevati on (M)	Northi ngs	Eastin gs				
30 .	Old Ngilai KFS camp site	1694	012548 8	02575 49	Mixed shrubs and trees	Acacia spp. , Croton megalocarp us	Birds, warthog , leopard	Security utility
31 .	Ngilai shallow well	1687	012550 4	02575 82	Mixed indigeno us`	Senetoi, Lopirai, Lamurei	Birds	Water source, conservatio n
32 .	Proposed water bottling site along Lulu river	1694	013579 2`	02502 34	Scattered mixed indigeno us	Lokoria, Sarai, Accacia spp.	Leopard, monkey , birds warthog	Conservatio n
33 .	Grazing area at Opiroi viewpoint	2035	012035 1	02530 75	Mixed indigeno us	Lchengei, Lmisigioi, Lamurai	Birds, warthog	Grazing, eco-tourism
34 .	Proposed campsite at Opiroi	2224	013304 0	02545 87	Mixed indigeno us	Ltarakwai, Acacia spp.	Elephan t, leopard, birds	Eco-tourism
35 .	Natural bananas at Opiroi	1886	012217 2	02589 09	Closed mixed indigeno us canopy	Croton megalocarp us, Lingelai, Lkorochoi, natural bananas	Birds	Eco-tourism
36 .	Cultural site at Opiroi	2203	013301 5	02547 19	Mixed indigeno us with rocky outcrops	Seketei, Olea Africana, Acacia spp. , sandal wood, red cedar	Vulture , elephan t, snakes	Eco-tourism
37 .	Proposed fire at Opiroi		131527	02456 97				
38 .	Suen Dam	2057	012878 8	02409 42	Mixed indigeno us	Croton, Cerdar, Lchingil,	Zebra, ducks, mutoro	Conservatio n

N o.	Site (local area name)	GPS readings			Type of forest and status	Main tree species	Animal species of special interest	Current and potential utilization
		Elevati on (M)	Northi ngs	Eastin gs				
						Lmisigiyo i	k	
39 .	Grazing area at Opiroi	2039	013086 9	02542 15	Open	Grass	Birds, cows, sheep, elephan t	Grazing site
40 .	Ngilai waterfall	1607	012600 6	02573 54	Mixed indigeno us	Croton, Retete, Sepetet, Lokoria	Birds	Conservatio n
41 .	Lkapune Lworikoi cave	2090	122150	26007 1	Closed canopy of mixed indigeno us	Croton, Cedar, Lolintoi, Podo	Birds, elephan ts	Conservatio n, eco- tourism
42 .	Footprint on rock at Opiroi	1533	012717 1	02565 99	Scattered mixed indigeno us	Croton, Acacia spp., Lgilai	Wartho gs, wild dogs	Eco-tourism
43 .	Lamkarito spring	1693	012554 7	02572 49	Scattered mixed indigeno us	Croton, Lchingei	Birds	Conservatio n
44 .	Nainguli well		123165	02588 06	Closed mixed indigeno us canopy	Red cedar, Croton, Lcheni	Birds, antelop es, elephan t	Conservatio n
45 .	Lulu primary school	1473	013510 0	02504 05	Open and degraded		Birds	Rehabilitati on
46 .	Shrine/ sacred place for Samburus in Reteti	1536	256657	12701 5	Scattered trees	Reteti, Lgilai, Acacia spp.	Lkuwak , birds,	Eco- tourism, conservatio n
47 .	Nardae cave		124450	26100 0	Closed canopy	Podo, Acacia spp., Croton	Buffalo , elephan t	Eco- tourism, conservatio n

Appendix 9: Monitoring and evaluation framework.for Nailepunye management unit

Management Programme	Objective	Activity		Plan target	Unit	Indicator	No. beneficiaries
Forest conservation	To prepare a restoration plan for degraded areas	Identify and map degraded sites and encroached sites using GPS co-ordinates (Opiroi, Lorok lolmong'o, Lorrok, Lulu, Lekamoru, Losepa, Ngorika, Michomingi, Loibashai, Longutukie and Sunoni)			No.	Degraded sites identified and mapped	
		Document existing degraded sites' conditions			No.	Records, reports	
		Document degraded sites' histories			No.	Records, reports	
		Document ecological information of native species found at the sites to be rehabilitated			No.	Records, reports	
		Document intended actions to achieve restoration goals			10	Records, reports	
	To rehabilitate degraded areas	Conduct sensitization meetings with all stakeholders to inform them on the plan to restore degraded sites		No.	No.	Barazas held	

Management Programme	Objective	Activity		Plan target	Unit	Indicator	No. beneficiaries
		Raise native species in the CFA nurseries ('000)		No.	No.	Seedlings raised	
		Prepare identified sites for planting		No.	No.	Site visits	
		Plant degraded sites with native species ('000)		No.	No.	Site visits	
	Protect and maintain rehabilitated sites	Erect barriers e.g. fences to prevent planted areas from livestock and game damage			Ha	Barriers erected around planted areas	
		Construct fire breaks around planted areas and other fire hotspots in the forest block			No.	Constructed firebreaks	
		Conduct silvicultural prescriptions as highlighted in the restoration plan (e.g. beating up, climber removal, spot weeding, selective thinning, etc.)			Lps	Silvicultural prescriptions conducted	
		Inspect/assess rehabilitated sites for stand characteristics, species composition and invasion			Ha	Rehabilitated sites assessed	

Management Programme	Objective	Activity		Plan target	Unit	Indicator	No. beneficiaries
	Promote community involvement in biodiversity conservation	incidences					
		Hold sensitization barazas on on forest licensing and resource allocation rules and regulations		No.	No.	Barazas held	
		Train forest grazing user groups on sustainable grazing through drafting of grazing plans		No.	No.	Trainings held	
Wildlife and eco-tourism	To conserve, protect and manage wildlife and their habitats	Community sensitization on creating community wildlife conservancies			No.	Sensitization barazas held	
		Create community wildlife conservancies			No.	Conservancies established	
		Develop an inventory of threatened, vulnerable and endangered wildlife species			No.	Inventory report	
		Construct fire breaks within and near protected areas			No.	Fire breaks constructed	
		Conduct a wildlife census			No.	Census report	
		Map and gazette all wildlife migratory corridors			No.	Migratory routes report and map	

Management Programme	Objective	Activity		Plan target	Unit	Indicator	No. beneficiaries
		Develop a list of all wildlife species, (inventory), found in the forest block			No.	List of wildlife species	
		Construct fire towers			No.	Fire towers constructed	
		Erect speed sign posts in the protected areas			No.	Speed signs erected	
		Conduct a feasibility study on the possibilities of re-introduce rhinos into the block			No.	Rhinos translocated	
	To establish the required infrastructure required to support eco-tourism	Establish eco-lodges within the scenic sites in the block			No.	Eco-lodges constructed	
		Establish tented camps			No.	Tented camps established	
		Establish camping sites			No.	Camping sites established	
		Establish nature trails and nature walks			No.	Nature trails constructed	
		Develop historical and cultural sites, and shrines for public use			No.	Shrines established	
		Establish boardwalks over viewpoints			No.	Site visits	
		Establish canopy drops over viewpoints			No.	Canopy drops built	
		Construct zip lines			No.	Zip lines constructed	

Management Programme	Objective	Activity		Plan target	Unit	Indicator	No. beneficiaries
		Construct an obstacle course for team building exercises			No.	Obstacle course established	
		Establish security outposts to guard the infrastructure and equipment as well as visitor safety			No.	Outposts established	
		Employ community based scouts to supplement forest rangers			No.	Employment contracts	
		Construct a bungee jumping facilities at the viewpoints, cliffs and waterfalls			No.	Site visits	
		Training, sensitization and capacity building the community on the importance and value of wildlife			No.	Training reports	
	To promote and market Nailepunyie Block as an attractive tourist destination both locally and internationally	Establish a website highlighting all the attractions found in Nailepunyie			No.	Website running	
		Print and pass out brochures to the key stakeholders in Samburu County to attract local tourists			No.	Brochures printed	

Management Programme	Objective	Activity		Plan target	Unit	Indicator	No. beneficiaries
		from the county					
		Advertise the potential of Nailepunyie Block in the local radio stations			No.	Nailepunyie Block advertised	
		Petition UNESCO to declare Nailepunyie Block a world heritage site due to its function as an important bird area			No.	UNESCO certifying Nailepunyie lock as a world heritage site	
Water resources	To promote easy access to clean and sufficient water for community members, livestock and wildlife	Hold community sensitization barazas on importance of water harvesting techniques e.g. tanks, gutters, piping etc.			No.	Barazas held	
		Hold community barazas on importance of the community members to form WRUAs			No.	Barazas held	
		Form WRUAs in Nailepunyie Block			No.	WRUAs formed	
		Construct dams to tap water during the rainy season			No.	Dams constructed	
		Capacity build the CFA to form a water users user groups			No.	Water user groups registered	

Management Programme	Objective	Activity		Plan target	Unit	Indicator	No. beneficiaries
		Promote installation of storage tanks in homesteads to tap rain water during the wet season each sub-location			No.	Storage tanks installed in homesteads in the two locations	
		Establish watering points and water troughs at each village for domestic livestock to use			No.	Watering points established	
		Carry out a survey on the feasibility of having piped water connected to each village			No.	Feasibility study report	
	Rehabilitate degraded riverine areas	Identify and map degraded riparian sites around the main rivers			No.	Degraded riverine sites identified	
		Raise bamboo seedlings and other native riverine tree species			No.	Native species raised	
		Plant bamboo seedlings along riverine areas to reduce erosion			Ha	Bamboo planted on riverine areas	
		Construct gabions on vulnerable sites especially on steeply			No.	Gabions constructed	

Management Programme	Objective	Activity		Plan target	Unit	Indicator	No. beneficiaries
		sloping banks					
		Use of a bulldozer to dredge the river by removing excess sediments			Ha	Sediments dredged	
		Clear all plastic pollutants from the rivers and streams			Ha	Pollutants removed	
Community development and conservation	Capacity built on community Nature Based Enterprises (NBEs) and Income Generating Activities (IGAs)	Initiate an adult learning programme of basic writing and reading skills in both sub-locations			No.		
		Train community on modern honey harvesting techniques in both sub-locations			No.	Trainings' reports	
		Train the CFA tree nursery FUGs members' in short courses on tree nursery establishment and management in both sub-locations			No.	Trainings' reports	
		Train CFA members on quality livestock feeds and nourishment in both sub-locations			No.	Trainings' reports	
		Train community members on modern			No.	Trainings' reports	

Management Programme	Objective	Activity		Plan target	Unit	Indicator	No. beneficiaries
		poultry farming					
		Train community members on rabbit keeping			No.	Trainings' reports	
		Promote the adoption of high return low investment farming, e.g. macadamia nuts, cassava, etc.			No.	Trainings' reports	
		Initiate PES for the compensation of communities that protect catchments for the users downstream			No.	Trainings' reports	
	Promote value addition to forest resources extracted by the CFA	Procure modern honey processing equipment, (bee suits, settling tanks, honey extractors, bee brushes, bee catcher boxes, bee smokers, honey strainers, honey warmers, etc.)			Lps	Honey processing equipment procured	
		Procure modern packing and packaging containers for honey processed			Lps	Honey packaging equipment procured	
		Label the packaged honey appropriately to give it a unique name			No.	Honey produced labelled	

Management Programme	Objective	Activity		Plan target	Unit	Indicator	No. beneficiaries
		and attractive in the market					
		Establish refrigeration facilities to extend the shelf life of commercial animal products produced by farmers, e.g. meat, milk, etc.			Lps	Refrigeration facilities established	
	Promote good governance and leadership in the Nailepunyie	Update the CFA constitution to meet the legal requirements and the aspirations of its members		No.	No.	CFA constitution updated	
		Community sensitization and recruitment of additional members into the CFA		No.	No.	CFA members recruited	
		Capacity build the CFA executive committee by trainings on book keeping, accounting, conflict resolution, funding proposal writing, etc.		No.	No.	CFA executive members trained	
		Organize exchange tours and benchmarking tours to		No.	No.	CFA taken to exchange visits to other management	

Management Programme	Objective	Activity		Plan target	Unit	Indicator	No. beneficiaries
		other CFAs countrywide for them to learn best management practices				areas	
		Draft a participatory forest management plan for Nailepunyie Block		No.	No.	PFMP drafted	
		Sign a FMA between the CFA and the KFS to assign user rights to the CFA		No.	No.	FMA signed	
Infrastructure and equipment development	To improve the road network in the forest block	Maintain existing roads through grading			No.	Site visits	
		Open up culverts and slabs			No.	Culverts and slabs opened up	
		Construct bridges at Opiroi and Angata			No.	Bridges constructed	
		Construct new roads to make the block more accessible			No.	New roads constructed	
	Provide supporting infrastructure and equipment needs to the KFS and the CFA	Construct a Forest Station Manager's office			No.	Forest manager's office constructed	
		Construct a CFA office			No.	CFA office constructed	
		Purchase water tanks to supply the KFS and CFA office			No.	Water tanks purchased	
		Procure office			Lps	Office furniture	

Management Programme	Objective	Activity		Plan target	Unit	Indicator	No. beneficiaries
		furniture to serve the KFS and CFA offices				procured	
		Purchase 4*4 vehicles			No.	Logbooks	
		Purchase a tractor for transporting seedlings			No.	Logbooks	
		Purchase motorbikes			No.	Logbooks	
		Purchase communication radios			No.	Purchase receipts	
		Purchase walkie talkies			No.	Purchase receipts	
		Establish CFA tree nurseries at Opiroi, Lulu, Naimaral and Soit-pus			No.	Nurseries established	
		Procure a computer, printer and camera for the forest station manager office			No.	Office equipment procured	
		Procure a computer, printer and camera for the CFA office			No.	Office equipment procured	
		Connect the KFS and CFA offices to mains electricity			No.	Offices connected to mains electricity	
Security and protection	To protect the forest from natural and man-made hazards and risks	Increased patrols by KFS rangers and community scouts ('000)			Ha	Forest block patrolled	
		Conduct regular firefighting trainings			No.	Firefighting trainings conducted	

Management Programme	Objective	Activity		Plan target	Unit	Indicator	No. beneficiaries
		for CFA members					
		Procure firefighting equipment (fire extinguishers, fire beaters, etc.)			Lps	Firefighting equipment procured	
		Install fire season signs at fire hot spots			No.	Fire season signs installed	
		Install a fire surveillance and warning system involving all stakeholders			No.	A fire surveillance system installed	
		Survey the forest block to establish the correct boundaries and install boundary beacons ('000)			Ha	Forest block boundaries established	
	To promote community participation in forest protection	Register all herbal medicine collectors and register them into a forest user group			No.	Herbal medicine collectors registered	
		Register all grazers into the grazing user groups to regulate their activities in the forest			No.	Grazers registered	
		Hold regular and joint patrols between KFS rangers and community scouts			No.	Forest block patrolled	

Management Programme	Objective	Activity		Plan target	Unit	Indicator	No. beneficiaries
		(‘000)					
		Promote the adopt the use of energy saving jikos to reduce pressure on fuelwood from the forest			Lps	Energy saving techniques adopted	
	To have a competent, skilled and equipped security personnel and system	Deploy additional rangers to the block			No.	Rangers deployed	
		Construct security outposts at strategic locations around the block			No.	Outposts constructed	
		Construct armories in the security outposts			No.	Armories constructed	
		Enforce the strict laws concerning poaching of wildlife as a deterrent to the culprits (‘000)			Ha	Poaching laws enforced	
Human resources	To Improve staffing capacity of the KFS officers	Deploy a forest station manager to be the block			No.	Deployment letter	
		Deploy an assistant forest station manager to assist the forest station manager			No.	Deployment letter	
		Deploy a secretary to the block			No.	Deployment letter	

Management Programme	Objective	Activity		Plan target	Unit	Indicator	No. beneficiaries
		Deploy a registry officer to the block			No.	Deployment letter	
		Deploy an accountant to the block			No.	Deployment letter	
		Hire casuals to assist in the forest station office and in nursery operations			No.	Employment letters letter	
		Deploy forest rangers to meet the requisite ratio			No.	Deployment letter	
	To develop a staff training schedule	Conduct a training needs assessment (TNA) to all the staff			No.	TNA conducted	
		Draft a yearly schedule of trainings based on the TNA			No.	Training schedule report	
		Take staff on their identified trainings based on needs identified			No.	Staff trained	
	To build capacity of the CFA on organizational management	Recruit additional community scouts from both sub-locations		No.	40	Scouts recruited	
		Train CFA on the PFM process and outputs		No.	1	PFM trainings conducted	
		Take community scouts for basic		No.	1	Paramilitary training held	

Management Programme	Objective	Activity		Plan target	Unit	Indicator	No. beneficiaries
Research and education		paramilitary training					
		Hold short courses for the CFA on emerging trends in forestry		No.	2	Short courses held on emerging trends in forestry	
	To implement modalities of adopting disease free livestock	To identify modes of preventing environmental contamination by ensuring the highest livestock hygiene standards are maintained		No.	5	Environmental contamination methods established	
		To identify methods of controlling intermediate hosts and vectors that cause diseases		No.	3	Disease controlling methods identified	
		To identify methods of controlling internal parasites in livestock		No.	2	Methods of controlling internal parasites identified	
		To identify ways of controlling arthropod pests		No.	1	Ways of arthropod pests identified	
		To identify methods of isolating sick animals (quarantine programmes)		No.	4	Isolation methods identified	
		To roll out a vaccination campaign of all livestock		No.	5	Vaccination campaign launched	

Management Programme	Objective	Activity		Plan target	Unit	Indicator	No. beneficiaries
		Identifying appropriate disinfectants to purify infected areas after the vaccination programmes		No.	4	Vaccinated areas purified	
	To promote models to environmental degradation stem	Carry out a geological survey on the economic viability of rare earth minerals on the sites identified by community members			No.	Geological survey conducted	
		Declare the vulture breeding site a natural reserve (an important bird area) by preventing any commercial developments in the area			No.	Vulture breeding site declared a natural reserve	
		Hold barazas to promote public consciousness on climate change and global warming			No.	Barazas held	
		Run school campaigns and spread awareness on environmental degradation and its possible solutions			No.	Awareness campaigns held	

Management Programme	Objective	Activity		Plan target	Unit	Indicator	No. beneficiaries
		Carrying out annual afforestation programmes			No.	Afforestation programmes carried out	
		To identify methods of rain water harvesting during the wet season to prevent wastage			No.	Rain harvesting methods identified	
		Identify methods of utilizing renewable energy e.g. wind, solar, etc.			No.	Renewable energy methods identified	
		Identify wildlife species in danger of extinction			No.	Wildlife in danger of extinction list developed	
		Identify protection and implementation of short term measures to halt extinction of wildlife species			No.	Short term measures to identify, protect and implement extinction of wildlife species	
		Identify long term measures of rebuilding the populations of endangered wildlife species			No.	Long term measures to identify, protect and implement extinction of wildlife species	
	Disseminate research findings	Publish findings in journals		No.	15	Findings published in journals	
		Present research findings at conferences of professional		No.	3	Research findings presented to professional associations	

Management Programme	Objective	Activity		Plan target	Unit	Indicator	No. beneficiaries
		associations					
		Present research findings to local community groups and other local stakeholders		No.	3	Research findings presented to community groups and local stakeholders	
		Share research information through social media (Facebook, Twitter, Tiktok, Instagram, etc.)		No.	12	Research findings shared on social media	
		Discussing research activities on the local radio stations		No.	12	Research activities discussed on local radio station	
		Issue a press release on research findings		No.	1	Press release issued on research findings	
		Publishing research findings on local and national newspapers		No.	1	Research findings published on local and national newspapers	

Monitoring and evaluation framework.for Naramat Forest block

						1	2	3	4	5			
Natural Forest conservation	To rehabilitate degraded areas-planting	Identify tree species that match the degraded sites for rehabilitation-tree planting	5	No	Report on the No. of species identified	5	-	-	-	-			
		Survey and map the planting site	1	No	Map for planting site	1	-	-	-	-			
		Raise tree seedlings the identified species for restoration (000)	2Mil	No.	No. of seedlings raised	400	400	400	400	400			
		Prepare planting site	2000	Ha	Progress report on seedling production	400	400	400	400	400			
		Plant in the identified degraded areas	2000	Ha	Area prepared for planting	400	400	400	400	400			
		Maintain the planted area	2000	Ha	Progress report planting preparation	400	400	400	400	400			
		Monitor the planted areas	10	No	Area planted	2	2	2	2	2			
	To enhance forest protection and conservation	Hold sensitization barazas on importance of forest conservation and forest fire management	10	No.	No. of barazas held	2	2	2	2	2			
		Control grazing through zonation of grazing areas	1	No.	-Developed Forest zonation plan	1	-	-	-	-			
		Determine livestock carrying capacity of the forest	1	No	-Report on carrying capacity determination	1	-	-	-	-			

		Develop a grazing plan	1	No	-Developed grazing plan	-	1	-	-	-			
		Monitor and evaluate effectiveness of controlled grazing in restoration	16	No	-Monitoring and evaluation reports	-	4	4	4	4			
	To provide alternative sources of energy and other forest products required by the community	Sensitize FAC on alternative energy sources e.g Biogas and to adoption of agroforestry on farmlands	No	10	No of barazas held	2	2	2	2	2			
		Support selected members per sub location to adopt use of biogas	No	60	No of farmers supported	12	12	12	12	12			
Plantation development	To restock plantation areas with appropriate tree species	Do inventory of the plantation areas	No.	1	Plantation Inventory report	1	-	-	-	-			
		Update the sub compartment register	No	5	Updated compartment register	1	1	1	1	1			
		Prepare a felling plan	No	1	Progress reports	1	-	-	-	-			
		Seek approval and prequalified licensees to harvest	No	1	Felling plan prepared	1	-	-	-	-			
		Raise appropriate plantation establishment seedlings '000'	No	528	-No of seedlings raised -progress report	-	132	132	132	132			

		Prepare plantation establishment site through PELIS	No	264	-Area prepared		66	66	66	66	-			
		Establish the plantations using PELIS	Ha	264	-Restocked plantation areas -PELIS Register -Planting progress report		-	66	66	66	66			
		Maintain the established plantations using PELIS	Ha	264	-Records in compartment register -Maintenance progress report		-	66	66	66	66			
	To undertake timely silvicultural operations	Carry out survival counts in established plantations	Ha	264	-Survival counts reports		-	66	66	66	66			
		Do gapping/ infilling of planted areas	Ha	264	-Progress reports		-	66	66	66	66			
		Prune all the established plantations as per the technical orders	Ha	100 % area	-Area pruned -Progress reports		-	100 %	100 %	100 %	100 %			
		Thin the plantations as per the technical orders	Ha	100 % area	-Progress reports -Area thinned		-	-	-	100 %	100 %			
Water resources	To Protect and rehabilitate water catchment areas	Create awareness for need of protection of catchment areas	No.	15	-No. of barazas held -List of attendance		3	3	3	3	3			

		through barazas																	
		Raising of suitable indigenous tree seedlings ('000')	No.	30	No of seedlings raised -Progress reports		6	6	6	6	6								
		Rehabilitate the water points by planting indigenous trees (Rivers, Springs, wells, Swamps, Dams, Boreholes)	No	19	-Rehabilitated water points -Progress reports		-	5	5	5	4								
		Fence rehabilitated water points	No	19	-No of water points fenced -Progress reports		-	5	5	5	4								
	To build capacity on FAC on water management.	Train the FAC on modern water harvesting technologies	No	10	-No of barazas held		2	2	2	2	2								
		Support FAC to acquire/construct water tanks for roof catchment(100HH/S/location)	No	600	-Number of FAC members trained		120	120	120	120	120								
		Drilling of boreholes in the FAC, two (2)/S/location	No	18	-No of HH supported		6	5	5	2	-								
	To assist FAC to acquire land for dam construction and reduce pressure	Acquire land to construct earth dams in FAC	No.	6	-Land Area for dams construction acquired -Documents for		2	1	1	1	1								

	on overreliance on forest water points				acquisition (title deed/Allotment documents)												
		Form a dam construction committee	No	1	-List of committee members	1											
		Construction of dams	No.	6	-Number of dams constructed	2	1	1	1	1							
		Supervise of the dam construction	No	18	-No of boreholes drilled -Progress reports	6	5	5	2	-							
	To protect and conserve wildlife habitats –Fence	Develop a fence design	No.	1	-Fencing design developed	1	-	-	-	-							
		Form a fence committee	No.	1	-List of fence committee members	1	-	-	-	-							
		Train the fence committee	No	1	-List of trained fence committee members	1	-	-	-	-							
		Tender supply of fencing materials	No	1	-Progress reports	1	-	-	-	-							
		Erect a perimeter fence	Km	100	-Km of fence erected -Progress reports	25	50	25	-	-							
		Recruit fence attendants	No	20	-List of fence attendants recruited	20	-	-	-	-							
		Recruit youth to assist in manning entry gates	No	10	-List of youth recruited to man gates	10	-	-	-	-							
Ecotourism and wildlife	To build capacity of Naramat FAC	Identify the farmers to train on wildlife in the	No	1	-List of farmers identified in the FAC	1	-	-	-	-							

	on wildlife handling/management	FAC												
		Train farmers on handling wildlife	No.	20	-Training report		4	4	4	4	4			
		Engage/deploy the trained farmers in FAC on wildlife handling work	No.	1	-List of participants		1	-	-	-	-			
	To do resource mobilization towards development of ecotourism facilities	Form a resource mobilization committee	No.	1	-Committee formed		1	-	-	-	-			
		Develop a plan for resource mobilization	No.	1	-Progress report		1	-	-	-	-			
		Do a budget for planned activities	No.	1	-Plan developed		1	-	-	-	-			
		Engage partners on the process of ecotourism facilities development	No.	10	-No of engagement forums with partners -Progress reports		2	2	2	2	2			
		sign Memorandum of Agreement with Partners (MoA)	No	1	Documents of MoA signed		1	-	-	-	-			
		Develop ecotourism facilities	No	1	-Ecotourism facilities developed -Photos -Progress reports		1	-	-	-	-			
		Conduct Monitoring	No.	10	-M & E conducted		2	2	2	2	2			
		To resolve Human Wildlife	Sensitize the FAC and stakeholders	No	10	-No of barazas		2	2	2	2	2		

	conflict	on harmonious co-existence with wildlife												
		Form a FAC Human Wildlife committee	No	1	-List of attendance		1	-	-	-	-			
		FAC Human Wildlife committee to identify/document HW cases	No	100%	-List of committee members		100%	100%	100%	100%	100%			
		Compensate the wildlife damage	No	100%	-No of cases identified/document		100%	100%	100%	100%	100%			
Community participation and development	To introduce new and promote existing IGAs to alleviate poverty (Do value addition on NWFP)	Introduce new IGAs e.g., brick making, fruit trees (avocado, tissue culture bananas, mangoes) & do honey value addition	No	10	-Records -Progress reports		2	2	2	2	2			
		Introduce high value tree and fruit species in the FAC nurseries per sub location	No	6	-Records -Progress reports		1	2	1	1	1			
		Do products value addition (Honey, herbal medicine, traditional vegetables)	No	3	-Records -Progress reports		-	1	2	-	-			
		Introduce zero	No	300	-Reports on No.		60	60	60	60	60			

	grazing/Dairy goats rearing 50 per sub-location			of HH with zero grazing units										
	-Progress													
To introduce agroforestry technologies, maximise the usage of small parcels of land	Organise exchange visits	No	10	-Progress reports		2	2	2	2	2				
	Organise field days	No	10	-Progress reports		2	2	2	2	2				
	Form tree nursery user groups 2 per sub location and have bylaws in place	No.	12	-No. of FUGs		12	-	-	-	-				
	Promote farmers to plants high value agroforestry trees/establish woodlots-200HH/S/Location	No	1200	-No of HH promoted to plant high value agroforestry tree spp/woodlot establishment		240	240	240	240	240				
Promote alternative energy sources	Adoption of energy saving jikos (`000`) per sub location each 1000ESJ	No.	6	No. of beneficiaries		3	3	-	-	-				
	Promotion of biogas production per sub location	No.	600	Reports		300	300	-	-	-				
	Promotion of solar energy through adoption of solar per sub location each 100	No.	600	-Progress reports	300	300	-	-	-	-				
To control forest	Procure fire	No.	6	No. in place		6	-	-	-	-				

	fires	equipment per FAC sub location															
		Construction of fire towers – Tamiyoi and Ngari	No.	2	Fire towers constructed	2	-	-	-	-							
		Hold workshops on fire fighting	No	10	-Training Reports	2	2	2	2	2							
	To control pests and diseases	Sensitize FAC on disease and pest surveillance	No	5	No of barazas held	1	1	1	1	1							
		Form a FAC pests and diseases surveillance team	No	1	-List of the members for surveillance team	1	-	-	-	-							
		Do surveillance of pests and diseases	No	5	-No of surveillance conducted	1	-	-	-	-							
	To recruit community scouts	Recruit 30 community scouts	No	30	-List of recruits	30	-	-	-	-							
		Train the recruited scouts	No	1	-No of trainings done	1	-	-	-	-							
		Deploy trained scouts	No	1	-List of trained scouts	1	-	-	-	-							
	To enforce the law to ensure there is compliance with the forest rules and regulations	Create awareness on the importance of adherence to forest regulations through barazas	No.	20	-No of barazas held -Photos, -Attendance list	4	4	4	4	4							
		Conducting joint patrols by Forest Rangers and community forest	%	100	-Patrols records -OB reports/records	100	100	100	100	100							

		scouts																	
		Enforce the existing forest laws, rules and regulations	%	100	-Arrest records -Cases taken to court records		100	100	100	100	100								
Infrastructure, equipment and Human resource	To design, construct and maintain roads in Naramat forest block	Design forest roads	KM	200	-No of roads designed -Records of roads designed		1	-	-	-	-								
		Clear forest roads	Km	200	-No. of km cleared -Progress reports		100	100	100	100	100								
		Grade the forest roads	Km	200	-No. of km graded -Progress reports		100	100	100	100	100								
		Maintain the roads	Km	200	-No. of km maintained -Progress reports		100	100	100	100	100								
	To construct offices for KFS, CFA, FAC resource centre, staff houses and forest Rangers' outpost /scouts camps and equip	Construct a Forest station office at Tamiyoi	No.	1	-KFS Office		1	-	-	-	-								
		Construct outposts for the Forest Rangers /scouts camp at 3 sites	No.	3	No. of outposts constructed		1	1	1	-	-								
		Construct a CFA office and resource centre at Tamiyoi	No.	1	Office constructed		1	-	-	-	-								
		Constitute a procurement committee	No.	1	-List for the procurement -Reports		1	-	-	-	-								

		Capacity build the procurement committee on public procurement & disposal act	No.	2	-Reports		1	-	1	-	-			
		Develop a procurement plan	No.	1	Reports		1	-	-	-	-			
		Mobilize resources from strategic partners/stakeholders	No.	4	No. of procurement plans		4	-	-	-	-			
		Mobilize resources from strategic partners/stakeholders	No.	4	No of strategic partners/stakeholder engagements -Reports		1	-	-	-	-			
	To procure motor vehicles (Light tractor, motor cycles)	Procure motor vehicles (1 tractor, 1 pickup and two motorcycles)	No.	4	No of vehicles procured -Logbooks for procured motor vehicles		2	2	-	-	-			
		Service and maintain procured motor vehicles	%	100	-Records of service/maintenance		100	100	100	100	100			
	To develop infrastructure and water-nursery, houses & staff at	Design the water infrastructure for; nursery	No	1	-Records of designs		1							
		Mobilize resources from strategic partners/stakeholders	No	4	-No of strategic partners/stakeholder engagements -Reports		4	-	-	-	-			

	appropriate sites	ers													
		Install water infrastructure & supply water at 6 nursery sites	No	6	-No of water infrastructure and water supply developed -Photos -Progress reports	6	-	-	-	-					
		Maintain the water infrastructure	No	6	-No of water infrastructure maintained -Photos -Progress reports Objective 5: To develop infrastructure and supply power-Offices, staff houses, Outposts & FAC Resource centre	100%	100%	100%	100%	100%					
	To develop infrastructure and supply power-Offices, staff houses, Outposts & FAC Resource centre	Mobilize resources from strategic partners/stakeholders	No	4	No of strategic partners/stakeholder engagements -Progress reports	4	-	-	-	-					
		Install power infrastructure & supply power – offices, staff quarters, FAC Resource centre & out posts	No	6	-No of power infrastructure and power supply developed -Photos -Progress reports	6	-	-	-	-					
		Maintain the	No	6	No of power	10	10	10	100	100					

		power infrastructure			infrastructure maintained -Progress reports		0%	0%	0%	0%	0%			
	To recruit more CFA volunteer community scouts, nursery support staff and KFS to deploy more Forest Rangers	KFS to deploy more Forest Rangers	No.	15	No. of Rangers deployed		15	-	-	-	-			
		Recruit more community Scouts	No	30	Scouts recruited		30	-	-	-	-			
		Engage Community Informers	No	15	Informers engaged		15	-	-	-	-			
		Recruit Tree nursery staff	No	15	No of nursery staff recruited		15	-	-	-	-			
		Recruit Tour guides	No	10	No. of tour guides recruited		-	10	-	-	-			
	Capacity build the volunteer CFA staff	Training the community scouts, nursery and tour guides	No.	1	No. of scouts trained		1	-	-	-	-			
		Train CFA volunteer staff-tree nursery and tour guides	No	1	No of nursery and tour guide staff trained		1	-	-	-	-			
		Deploy trained scouts, nursery and tour guides	No	1	List of deployment		1	-	-	-	-			
		Do annual appraisal for the deployed staff	No	5	-Report		1	1	1	1	1			
	Develop an incentive scheme for volunteer scouts and other	Develop a monetary incentive scheme for scouts, nursery	No	1	-Approved incentive schemes developed		1	-	-	-	-			

	staff	and tour guide staff												
		Develop annual award scheme for scouts, nursery and tour guide staff	No	5	-Progress reports		1	1	1	1	1			
		Do monitoring and evaluation of the incentive schemes	No	5	-Approved incentive schemes developed		1	1	1	1	1			
Research education	and To promote forest Education and Research	Form a research steering committee to do outreach	No.	1	Reports		1	-	-	-	-			
		Introduce research on polythene tubes alternative	No	2	Reports		2	-	-	-	-			
		Establish a research tree nursery for research education	No.	1	Reports,		1	-	-	-	-			
		Encourage research student on attachment to assist in conducting research in community work/nurseries	No.	20	No. of research nurseries established		4	4	4	4	4			
		Mandatory condition students undertaking	No.	10	No. of students on attachment		2	2	2	2	2			

		research to share research findings																	
		Research on high value restoration and agroforestry tree/fruit species in the FAC	No	10	No. of students on attachment		5	5	-	-	-								
	To research on appropriate breed & method of rearing livestock in FAC which brings guarantee minimum return on investment	Research on improved appropriate livestock breed with guarantee returns	No.	1	-No of research output		1	-	-	-	-								
		Research on appropriate livestock production methods with guarantee returns	No	1	-No of research output		-	1	-	-	-								
		Undertake a livestock carrying capacity study	No.	1	-Carrying capacity study report		1	-	-	-	-								
		Hold sensitization barazas to disseminate research findings	No	6	-No Sensitization barazas held -List of attendance		-	-	6	-	-								
	To research on under-performing IGAs in FAC	Research on underperforming IGAs	No.	5	No. of IGAs researched Research report		3	2	-	-	-								
		Hold sensitization barazas to disseminate research findings	No	6	-Research report List of attendance		-	-	6	-	-								

		Support recommended IGAs (Subsidized interest rates/grants)	No	5	-No of barazas		-	-	5	-	-			
	To research on appropriate water harvesting technologies in the FAC	Research and promote appropriate water harvesting methods	No.	3	-Research Report		3	-	-	-	-			
		Hold sensitization barazas to disseminate research findings	No	6	-No Sensitization barazas held		-	6	-	-	-			
		Hold workshops and field days to share information	No	6	-List of attendance		-	6	-	-	-			
		Support the adoption of appropriate water harvesting technology	No	3	Workshops and field days held		-	3	-	-	-			
		Do monitoring and evaluation to assess the level of adoption of the new water harvesting technology	No	3	No of harvesting technologies supported		-	-	1	1	1			

