CHUKA PARTICIPATORY FOREST MANAGEMENT PLAN

2015 - 2019

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APPROVAL

Chuka Participatory Forest Management Plan

2015-2019

This Management Plan is hereby approved; its implementation will be guided by the signed "Management Agreement" between KFS and the Mt. Kenya East Environmental Conservation Association here in referred to as MKEECA and will be based on approved annual work plans.

The plan may be amended as need arises through mutual agreement by both parties.

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Emilio N. Mugo

Ag. Director, Kenya Forest Service

This _____Day of _____2015

FOREWORD

The forest sector in Kenya is currently undergoing a major transformation with the involvement of a wide range of stakeholders. This change has been necessitated by dynamism within the country both in socio-economic and governance sectors. The rise in population and accompanying demand of natural resources such as forest products have made it necessary to redefine forest management so as to include wider stakeholders in forest management.

The Government in appreciation of the great potential and value of the forests in the Country which include the Chuka forest reserve has put in place legislations, policies and action plans to conserve and sustainably utilize both natural and physical resources. The implementation of these policies, legislations and actions plans require well thought management plans which ensure that set goals and objectives are achieved.

This new management approach has been facilitated by, the Forests Act 2005 that replaced the Cap 385, which did not recognize participation of stakeholders in forest management and planning. The new Act introduces Participatory Forest Management (PFM) that allows the local community to form and register an association, prepare a forest management plan and co-manage the forest with KFS.

The Chuka forest management plan provides a platform for engaging the Kenya Forest Service (KFS) in forest management. It is in line with this development that local communities in Chuka forest have formed the Community Forest Association (Mt. Kenya East Environmental conservation Association (MKEECA) which together with KFS and other stakeholders has prepared this forest management plan.

PFM can only be efficiently implemented through development of PFMPs; therefore this plan will provide the necessary platform for collaboration of all stakeholders in sustainable management and conservation of forest resources at Chuka Forest station.

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Ecosystem Conservator,

Tharaka Nithi County

ACKNOWLEDGEMENT

Chuka PFMP has been developed through a consultative and participatory manner. The plan is a product of intensive desktop reviews, resource inventories, biodiversity studies, social-economic survey, field surveys and open dialogues with community members and stakeholders. The task entailed engagements with a Local Planning Team (LPT) comprised of representatives from Chuka, KFS, KWS, Government line ministries, local opinion leaders and the private sector. The LPT would wish to pass its sincere gratitude to all stakeholders who made the preparation of this plan successful.

We wish to make special mention of the staff in the Ecosystem Conservators office, the station Forest Manager - Chuka Forest station, KWS regional office, representatives of County Government and line Ministries, who provided vital information for the plan. The LPT is thankful to the officials and the representatives of over 95 User Groups from MKEECA who fully participated in all activities in the development of the plan.

We mention in a special way the facilitators from ERMIS Africa and the consultant from Gull enterprises who coordinated the whole process of drafting the pan especially putting the data and information provided into the technical language. The LPT expresses special gratitude to GEF/UNDP for providing financial support which enabled the development of this plan.

The contribution of the local communities living around Chuka Forest cannot be overemphasized. The willingness of local community to answer questions and provide vital information during the socio economic and resource assessment and in meetings is really appreciated. All persons involved in this management plans are greatly appreciated since it is not possible to mention all individual and organizations involved

PARTICIPATING INSTITUTIONS & PARTNERS

ROLE	INSTITUTION	FACTS
Sponsor's	The Global Environment Facility Small Grants Programme	Global Environment Facility Small Grants Programme (GEF SGP) is a corporate program, launched in 1992, the year of the Rio Earth Summit. The program is implemented by the United Nations Development Programme (UNDP) and executed by the United Nations Office for Project Services (UNOPS). GEF SGP has worked with communities and civil society around the world aimed towards sustainable livelihoods for global environmental benefits.
	United Nation Development Programme	The **United Nations Development Programme** (**UNDP**) is the United Nations' global development network with its Headquarters in New York City. UNDP advocates for change and connects countries to knowledge, experience and resources to help people build a better life. It provides expert advice, training, and grant support to developing countries, with increasing emphasis on assistance to the least developed countries.
PARTNERS	Chuka CFA	MKEECA is an association formed and managed by the community within the provisions of Forests Act 2005 which is further strengthened by Rule 10, of the Societies Act cap 107. The CFA membership constitutes of community members the seven locations adjacent to Chuka forest with main goal to Co-manage Chuka forest.
	Kenya Forest Service (KFS)	Kenya Forest Service (KFS) is a State Corporation established in February 2007 under the new Forests Act 2005 to conserve, develop and sustainably manage forest resources for Kenya's social-economic development. The corporation is mandated to conserve, develop and sustainably manage forestry resources.
TECHNICAL TEAM	Environmental Research, Mapping & Information Systems in Africa (ERMIS Africa)	ERMIS Africa's mission is to promote, facilitate and advance sustainable development of vulnerable within society including children, women, youths, and members of minority or marginalized communities through research, mapping, information sharing, capacity building, policy advocacy, and livelihood support innovations

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ACRONYMS

CBD	Convention on Biological Diversity
CBO	Community Based Organization
CFA	Community Forest Association
CITES	Convention on International Trade on Endangered Species
CU	Chuka University
DDC	District Development Committee
EAC	East Africa Community
EMCA	Environment Management and Coordination Act
ERMIS	Environmental Research Mapping & Information Systems
GEF	Global Environment Facility
GFP	Global Forest Principles
ICRAF	International Centre of Research on Agro forestry
IGA	Income Generating Activities
KEFRI	Kenya Forest Research Institute
KFS	Kenya Forest Service
KWS	Kenya Wildlife Service
LPT	Local Planning Team
MCA	Members of the County Assembly
MDGS	Millennium Development Goals
MEAS	Multilateral Environmental Agreements
M&E	Monitoring & Evaluation
MKEECA	Mt. Kenya East Environmental conservation Association
MKFRMP	Mt. Kenya Forest Reserve Management Plan
MOALF	Ministry of Agriculture, Livestock and Fisheries
MoH	Ministry of Health

MoLHUD	Ministry of Land, Housing and Urban Development
MoLSSS	Ministry of Labour, Social Security and Services
NBFP	Nature Based Forest Programmes
NEAP	National Environment Action Plan
NGAO	National Government Administrative Office
NGO	Non-governmental Organization
PFM	Participatory Forest Management Plan
UNDP	United Nation Development Programme
UNFCCC	United Nation Framework Convention for Climate Change
WRMA	Water Resource Management Authority

EXECUTIVE SUMMARY

Chuka forest was gazetted way back in 1932 and since then, it has been managed primarily for conservation. It has three beats namely Kiang'ondu where the station is situated, Mitheru and Kiamuriuki. The main activities Forest Adjacent Communities (FACs) are engaged in include bee keeping, herbal medicine collection, collection of firewood and also cultural activities. The forest holds great diversity of plant and animal species and forms the catchment area for a number of major rivers as well as being the source of tributaries to larger rivers in the region. As a result, the forest is crucial in supporting the local community livelihoods and has a cumulative climate moderation of the local ecosystem.

Chuka forest is bordered by farmlands as the surrounding communities are largely farmers but also depend on the forest for water, firewood/fuel wood, timber, honey harvesting/beekeeping, medicinal herbs and fodder for their livestock. In light of increased populations of FACs and demand for these forest resources it became necessary to put measures in place to protect the ecological integrity and biodiversity of the forest from the impacts of indiscriminate utilization of forest resources.

This participatory forest management plan (PFMP) was developed in accordance to Section 35 (1) of the Forests Act (2005) which states "Every state forest, local authority forest and provisional forest shall be managed in accordance with a management plan that complies with the requirements prescribed by rules made under this Act."

The PFMP development was undertaken by MKEECA in partnership with the office of the Ecosystem Conservator Tharaka Nithi County. The development was done through planning with KFS, MKEECA, Local Planning Teams (LPT) with inputs from County Government officials, local leaders including chiefs, Members of the County Assembly (MCA) and local opinion leaders. The PFMP offers a paradigm shift in the management of forest property. Local communities configured into CFA's enter an agreement with KFS on sustainable management of the forest for mutual benefit. The agreement is based on consultative identification of the community and verification of resource base, assessment of the forest area and communities, and eventual preparation of the forest management plan.

The development of this PFMP was conceived with the aim of setting up a structure to guide the sustainable management and utilization of Chuka forest resources while at the same ensuring that the FACs benefit from the products and services of the resources. The plan documents all the resources found within the forest, the threats to the forest, challenges in the managements of the forest and prescribes a set of programmes to address the forest conservation/protection issues, enhance the benefits for the community and improve the effectiveness and efficiency of the management of the forest. The proposed projects are on the 4 Zones i.e. Intervention Zone, Production Zone, Natural Forest Zone and Bamboo Zone.

CHAPTER 1

1 GENERAL INTRODUCTION

Background

Chuka forest reserve is a State forest covering an area of 23,492.0 ha with an external boundary of 216 Km in length. The forest is part of the larger Mt. Kenya Forest Ecosystem within the Eastern Forest Conservancy. Chuka forest is divided into 3 management units (forest beats) i.e. Mitheru, Kiangondu and Kiamuriuki. Administratively the forest falls within the Chuka and Maara Sub-counties of Tharaka Nithi County. The forest holds great diversity of plant and animal species and forms the catchment area for a number of major rivers as well as being the source of tributaries to larger rivers in the region. As a result, the forest is crucial in supporting the local community livelihoods and has a cumulative climate moderation of the entire Mt. Kenya ecosystem and the country at large. The forest is owned by the government under management of the Kenya Forest Service in collaboration with Kenya Wildlife service in the Ministry of Environment, Water and Natural Resources.

Chuka forest consists of both exotic plantations and natural forests. However natural forest is dominant, with Podocarpus, *Ocotea usambarensis* (Camphor), *Setia eliptica*, *Croton megalocarpus* as some of the trees found there. However, some parts of the forest had been greatly affected by unsustainable harvesting of indigenous trees in the 90's especially of *Ocotea usambarensis*. However the current status has improved significantly.

Chuka forest is bordered by farmlands as the adjacent communities are largely farmers although they also depend on the forest for water, firewood/fuel wood, timber, honey harvesting/beekeeping, medicinal herbs and fodder for their livestock. In light of increased populations of forest adjacent communities (FACs) and demand for these forest resources it became necessary to put measures in place to protect the ecological integrity and biodiversity of the forest from the impacts of indiscriminate utilization of forest resources. The formation and registration of MKEECA CFA in 2006, which brings together all the communities and groups around the forest, was one of those measures. The CFA gives the FACs an opportunity to participate in conservation and sustainable management of resources within Chuka forest.

The development of this PFMP was conceived with the aim of setting up a structure to guide the sustainable management and utilization of Chuka Forest resources while at the same time ensuring that the FACs benefit from the products and services of the resources. The plan documents all the resources found within the forest, the threats to the forest, challenges in the managements of the forest and prescribes a set of programmes to address the forest

conservation/protection issues, enhance the benefits for the community and improve the effectiveness and efficiency of the management of the forest.

Planning Process

The development of this PFMP was undertaken through participatory approaches and methodologies where all stakeholders were involved. It was prepared through an open and transparent process involving representatives of all the main stakeholder groups. A series of thematic workshops were held and attended by representatives of different stakeholder groups. During the preparation process there was a wide-range of discussions covering all major areas of interest. The final strategies and actions incorporated into the plan were reached through a process of consensus.

Initial community sensitization that led to the formation of community forest associations were initiated by KFS after the enactment of Forests Act, 2005. As a result, the MKEECA CFA was formed as recommended in the PFM guidelines of 2007, (KFS, 2007)[1]. The CFA brought together individual members of the community from the seven locations that are adjacent to Mt. Kenya East forest. Groups and individuals already registered with the CFA and those yet to join were mobilized to participate in the PFMP development.

The process commenced with the formation of a Local Planning Team in May 2013 at a Stakeholders forum in Messacco Hotel in Chuka town which comprised of members from the community, county government representatives and KFS with ERMIS Africa as the consulting team. The team was trained and in turn assisted the community in assessment of the different forest resources by providing crucial in-depth information about the forest and local communities. The team also provided information on the best community entry mechanism as mobilization was taking place.

The PFMP utilized primary and secondary datasets and information. The table below presents the various methods used in the PFMP process.

[1]The participatory Forest Management Guidelines, December 2007, are not a set of Kenya forest service (KFS) regulations

Table 1.1 Methods used in Chuka PFMP Process

Datasets and Information	Methods and Tools	PERIOD
Forest Boundaries, Forest Area, General Conditions of the forest, within the forest, Land ownership/tenure status, forest issues.	Thematic Map Datasets, GPS Survey, GIS Analysis, FGDs, Questionnaires, Mental and Sketch Maps	Two weeks
Forest adjacent population, Number of villages, Land use practices and their suitability, drivers of forest degradation.	Field Survey, FGDs, Questionnaires, and workshops	Two weeks
Local attitudes toward forest, social or organizational conflicts, ideas the communities have for conserving and managing the area, perceptions of the role of the government, local expectations, local communication mechanism, opinion leaders, stakeholders and their roles, socio-economic status for forest users, use of forest products, products and services derived from the forest, forest value –biodiversity	Field Surveys, FGDs, Questionnaires, and Workshops	Four weeks

Implementation of the plan

The approved plan will be implemented over a 5year period commencing on the approval date. It will be implemented jointly by the MKEECA and KFS supported by other stakeholders like the County government of Tharaka Nithi. All activities on establishment, management and conservation issues, consumptive and non-consumptive forest products including benefits to all stakeholders shall be in accordance with the terms contained in the agreement between the Director of Kenya Forest Service and the Community Forest Association. A monitoring protocol will also be inbuilt in the plan.

Amendments and Revision of PFMP

This PFMP may be amended following consultation between the CFA, KFS and other stakeholders like county government, KWS, WARMA. depending on the existing challenges, development priorities and policy guidelines. Following the initial five year period of implementation, the plan will be renewed or revised depending on the impact of all the projects implemented.

CHAPTER 2

2 DESCRIPTION OF THE FOREST

Geographical location

Chuka forest is located in Meru South and Maara Sub-counties of Tharaka Nithi County. The forest adjacent area spans six locations (Kiang'ondu, Magumoni, Mitheru, Mugwe, Mwonge and Thuita). The forest is bordered by Kirigi forest to the East and Irangi Forest to the west. It lies within longitudes $37^0$19'0''E, $37^0$36'0''E and Latitudes $0^0$11'0''S, $0^0$19'30''S. The forest can be accessed along Nairobi-Meru road, diversion into Kiangondu road (forest road) within Chuka town that leads into Chuka station that is within the Chuka forest area (see figure 2-1, 2-2, 2-3).

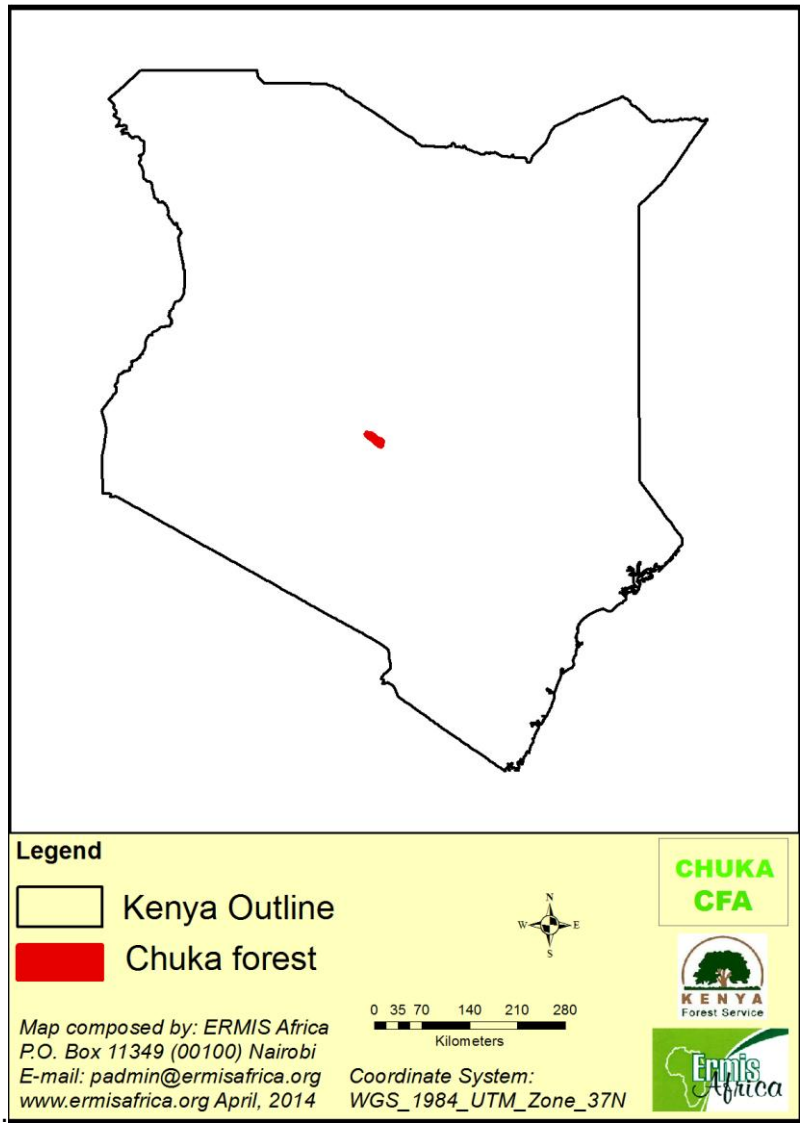


Figure 2-1: Geographical location of Chuka forest in Kenya

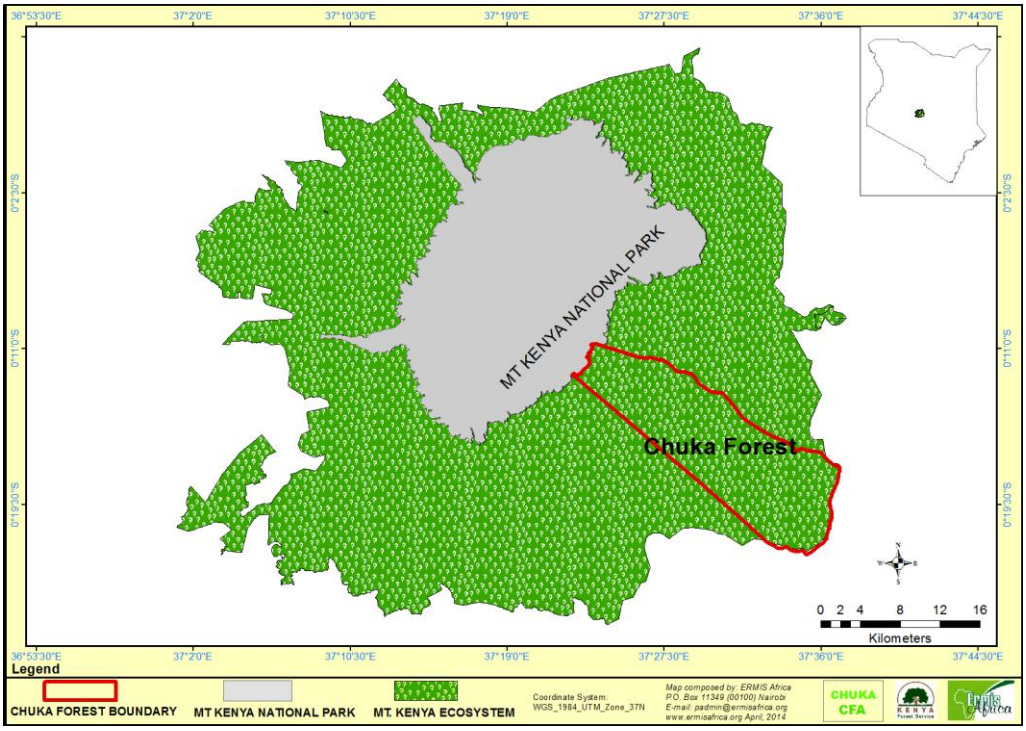


Figure 2-2: Chuka forest within Mt. Kenya ecosystem

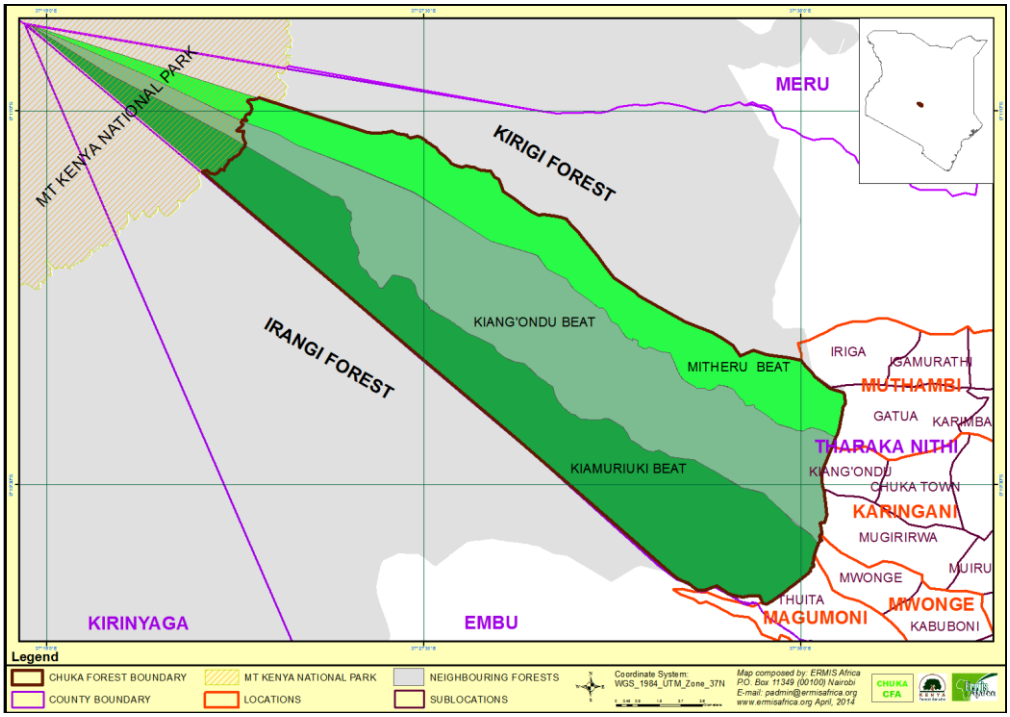


Figure 2-3: A map of Mt. Kenya East Forest and current administrative boundaries

Legal Status

Chuka forest as part of Mt Kenya forest was gazetted during the colonial period under legal Notice No. 44 of 1932 later under the independent Kenya, all previous proclamations were re-gazetted under legal Notice number 174 of 1964. The forest covers an area of 23,492.0 ha with an external boundary of 216 Km and the forest has not undergone any excision or addition since gazettement.

Forest Administration

Chuka is a public forest that is managed by the Kenya Forest Service (KFS). The forest is found within Mt. Kenya Ecosystem. The Ecosystem conservator based at Chuka town is mandated to supervise, manage and coordinate all the forest activities within the county while Chuka forest station manager is responsible for its day to day management. The station is further divided into three beats each manned by Forest Rangers. All forestry activities within the eastern conservancy are a direct charge of the Head of Conservancy based at Embu.

Biophysical Description

The biotic structure of Chuka forest is influenced mainly by altitude. The main factors considered here include topography, climate, geology and soils, hydrology, flora, fauna and other forest resources.

Topography

Chuka forest falls within the larger Mt Kenya Ecosystem which represents one of the most important pristine mountain ecosystems in the world and the most impressive landscapes in East Africa.

The topography of Chuka forest is characterized by foot ridges/hills, plains, and valleys. At the lower areas of the forest, the terrain is gently sloping and dotted with hills. The valleys in this area are shallower and U-shaped but as you move towards the mountain peaks the gradient is steeper and the valleys are V-shaped. Majority of these valleys have rivers or streams and in some areas marsh areas. The plains are mainly found in the farmland areas while the ridges are at higher altitude areas (3000m a.s.l) of the forest (MKFRMP, 2010).

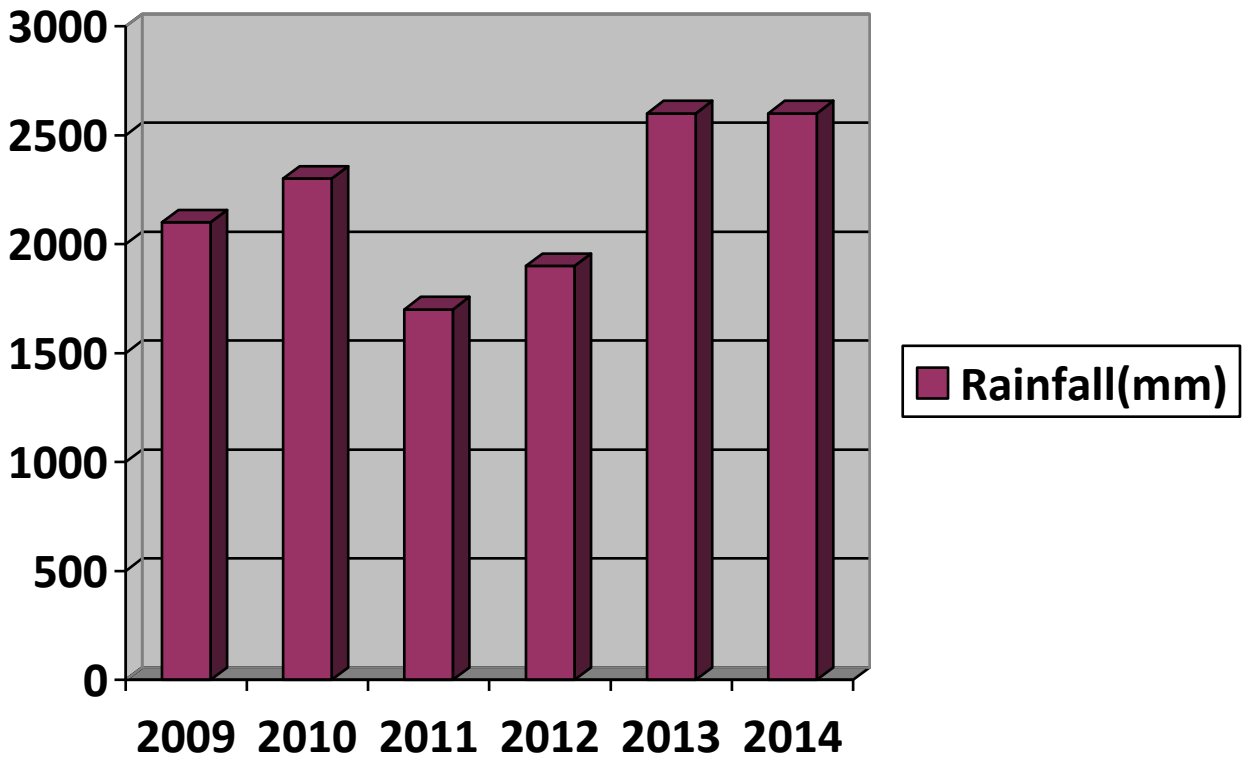
Climate

The climate around Chuka forest is influenced by altitude. There are great differences in altitude within short distances, which determine a great variation in climate over relatively small distances.

Rainfall pattern in Chuka forest area is bimodal and averages about 1500mm -2500mm annually with maximum rains falling during months of March to June and October to December. The driest

months are however January, September and February. The rainfall trends for the last five years are as shown on the figure below (Chuka Forest station data).

Figure 2.4: Rainfall trends in Chuka Forest Station for the last five years



Average temperatures decrease by 0.6^{o}C for each 100m increase in altitude. The diurnal temperature range in January and February may be as high as 20^{o}C. This diurnal variation causes warm air to fall down the mountain during the night and early morning and rise up the mountain from mid-morning to evening. As a result, the upper part of the mountain is usually clear in the morning, clouded over from about 11.00 am to 5.00 pm and clear again shortly before dusk.

Geology & Soils

Mt. Kenya ecosystem consists of basic and intermediate rocks including phonolites, trachytes, basalts, kenytes and syenites. Pyroclastic rocks and volcanic ash originating from various secondary eruptions cover much of the mountain ecosystem especially on the north and northeast slopes- where Chuka forest is located.

The soils of Mt Kenya region are classified into the following four broad groups.

1. In the highest mountain area, above 4000m asl, the soils are shallow and consist of very stony dark loams with high organic matter and low bulk density. They include Leptosols, Regosols and Greysols (soils of valley bottom).
2. The soils on the upper slopes between 2400 and 4000m asl have dark surface horizons and low bulk density. They are also rich in organic matter and are mainly formed from young pyroclastic rocks. These soils include Regosols, Histosols and Andosols.
3. The soil characteristic of the lower slopes (Below 2600m) is influenced by the amount of rainfall received in the area. In the forested mountain areas to the east, south and western slopes where there is plentiful rainfall; the soils are intensively red with considerable amount of clay. The main soil groups are Nitisols, Cambisols and Andosols.

Soils on the western plains and to the northwestern of the mountain (Grassland zone with low rainfall) have dark top horizons and high proportions of clay minerals. The main soil types are Phaeozems, Planosols and Vertisols (MKFRMP, 2010).

Hydrology

Chuka forest is an important catchment area in Tharaka Nithi County. It is the source of 6 permanent rivers namely; Nithi, Tungu, Ruguti, Thuchi, Naka and Gituambugi. Other seasonal/semi permanent rivers and streams within the same forest include: Kithuci, Mwano, Manyaga, Thamia, Kathinthiuku, Iria ria mwanki, Nyamakithi, Mwirithii, Nkurumbaci, Kamagogo, Bwee, Kagijo, Kithua, Kamiri, Kathareni, Gatare, Kimanyaga, Kubu, Ruguti Jiiri, Giaciura, Karumandi, Kigwambogo and Kangito.

As a result, the protection of the forest is crucial in maintaining and/or increasing the water levels in the rivers and the conservation of the water resources in the area since the adjacent communities rely mainly on water abstracted in the forest.

Table 2.1: Water Projects established within Chuka Forest

1.	WATER PROJECTS	ESTIMATED BENEFICIARIES	SOURCE
2.	**Nkabu**	80	Iria ria Mwanki
3.	**Muiku water project**	300	Mwirithii
4.	**Nthambo Water project**	800	Gitua Mbugi
5.	**Magumoni**	7000	Gitua Mbugi
6.	**Kiamugono/Kithuga**	1520	Kithochi
7.	**Niwasco**	5000	Tungu
8.	**Ndigia**	2000	Tungu
9.	**Ntuntuni Mukungugu**	500	Tungu
10.	**Ndagani**	200	Tungu
11.	**Ndagani K.K**	200	Tungu
12.	**Karioko**	200	Tungu
13.	**Kirwire**	100	Thamia
14.	**Gitumbi**	50	Naka
15.	**Chuka Girls**	700	Naka

16. Chuka Boys	1200	Naka
17. Mugirirwa	1800	Kamiri
18. Manyaga	200	Manyaga
19. Kamugoro	300	Kithuci
20. Mukui	100	Manyaga
21. Ikuu boys	1200	Mwano
22. Kibiga	50	Kithuci
23. Gatua Karimba	1500	Tungu
24. Kamwene	2300	Nithi
25. Mugiaki	20	Kagijo
26. Umoja Young	40	Kithua
27. Kiamatumu	30	Nithi
28. Kigui	40	Bwee
29. Mwonge range	2000	Ruguti
30. Chuka university	20,000	Manyaga

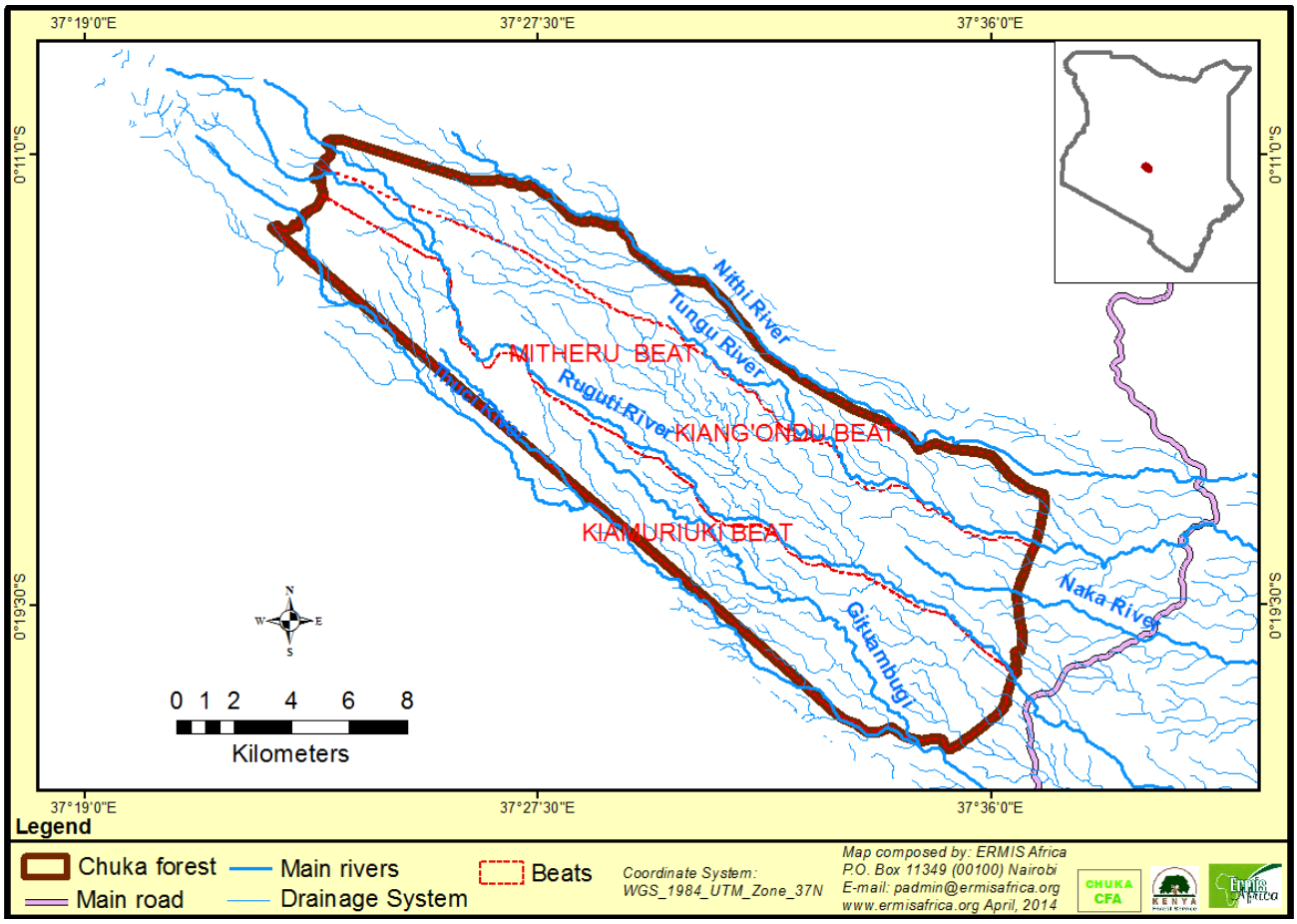


Figure 2.5 Map showing the drainage system in Chuka forest

Biodiversity

2.5.1 Flora

Chuka forest area like the larger Mt. Kenya forest has zones that are characterized by distinct vegetation cover that changes as the altitude changes from the farmland areas at the foot to the peak of Mt. Kenya. The vegetation of the Forest varies with altitude and is categorized into the following vegetation zones from the lower altitudes to high altitudes.

2.1.1.1 Plantation forest zone

This zone has 192ha and is 1% of total forest. Its found in the area between 2200m and 2400m. The main purpose is to supply commercial forest products to the forest industries located within the forest adjacent areas. Main commercial tree species planted include Vitex (35%), Eucalyptus (50%), Grevillea (13%) and Pines (2%). Other species in Chuka plantation areas include mixed indigenous species like *Croton megalocarpus and Markhamia lutea.*

2.1.1.2 Indigenous forest

This zone starts at 2000m to 2400m and is dominated by *Podocarpus latifolia, Newtonia buchananii, Ocotea usambarensis, Ficus natalensis, Syzygium quineensis, Fagara macrophylla among others..*

2.1.1.3 Bamboo Zone

This zone is found between 2560 and 3200m a.s.l and is dominated by bamboo trees (*Arundinaria spp*). However in some areas the bamboo zone may also contain some indigenous trees mainly the *Podocarpus latifolia.*

2.1.1.4 Moorland

This lies between 3000m and 3500m and is mainly covered with giant heath, African sage (*Artemisia afra)* and several Gentians (*Swertia spp*). It is also characterized by smaller trees in glades, such as the East African Rosewood (*Hagenia abyssinica)* and St. John's Wort *(Hypericum spp*). The trees in this zone are usually covered with moss and lichens (*Usnea spp*).

The table 2.2 below shows some of the plant species in Chuka Forest.

Table 2.2 Main tree species found in Chuka forest

Common name	Scientific name	Local Name	Uses
	Natural forest plant species		
East African Yellow wood	*Podocarpus latifolia*	Muthengera	Timber
African sage	*Artemisia afra*		Medicinal
Gentians	*Swertia spp*		Medicinal
East African Rosewood	*Hagenia abyssinica*	Mirana	Medicinal
St. John's Wort	*Hypericum spp*).		Ornamental, medicinal
Bamboo	*Arudinaria spp*	Mirangi	Ornamental artifacts, building, fencing
Camphor	*Ocotea usambarensis*	Muthaiti	Timber, Furtniture
Croton	*Croton macrostachus*	Mutuntu	Medicinal,
Croton	*Croton megalocarpus*	Mukinduri	Medicinal,
Mitzeeri, /coastal golden leaf	*Bridelia micrantha*	Mukwego	Fencing, Medicinal
Abyssinian coral tree	*Erythrina abyssinica*		
	Cussonia holstii		Medicinal
Nile tulip/Nile Trumpet/Siala tree	*Markhamia lutea*		Ornamental
African tulip tree	*Spathodea campanulata*		Medicinal, timber, food
Cape Ash	*Ekebergia capensis*		
East Africa cedar	*Juniperus procera*	Mitarakwe	Timber
Meru oak	*Vitex keniensis*	Muuru	Timber
	Shrubs/Herbs		

Prunus	*Prunus africana*	Mwiria	Timber, Medicinal
	Plantation forest tree species		
Pine	*Pinus patula*		Timber
Eucalyptus	*Eucalyptus saligna*		Timber
Eucalyptus	*Eucalyptus grandis*		Timber
Meru oak	*Vitex keniensis*		Timber
Grevillea	*Grevillea robusta*		Timber

2.5.2 Fauna

Chuka forest is home to a wide diversity of fauna. Mammals with a conservation interest in the forest include African elephant (*Loxodonta africana*), leopard (*Panthera pardus*), Buffalo, Bongo (*Tragelaphus euryceros*) and the black fronted duiker (*Cephalophus nigrifrons hooki*). Other animal species found in the forest include the Cape buffaloes *(Syncerus caffer),* duiker (*Neotrragus moschatus),* bushbuck (*Tragelaphus scriptus*), deffassa water buck *(Kobus ellipsiprymnus),* mountain reedbuck *(Redunca fulvorufula),* bush pig *(Potamochoerus porcus),* the common zebra *(Equus burchelli),* eland (*Tragelaphus oryx*), steinbok *(Raphicerus campestris),* Harveys red duiker (*cephalophus Harveyi) and* common duiker (*Sylvicapra grimmia altivallis).*

Several primates are found the forest, the most common being the black and white colobus (*Colobus guereza*) and Sykes monkey (*Cercopithecus mitis*), papex monkey and the olive baboon (*Papio anubis*) which is common on the forest margins where it is a nuisance to farmers from nearby communities.

The only large carnivores other than the leopard (*Panthera pardus*) found within the ecosystem are the spotted hyena (*Crocuta crocuta*) and the striped hyena (*Hyena hyena*). Other small carnivores found in the forest include; genet (*Genetta tigrina*), civet (*Civettictis civetta*) and several species of mongoose including the slender mongoose (*Herpestes sanguineus*), marsh mongoose (*Atilax paludinosus*), the white tailed mongoose (*Ichneumia albicauda*) and the Egyptian mongoose (*Herpestes ichneumon*).

The Forest is a habitat for several small mammals. The most commonly sighted include the giant pouched rat (*Cricetomys gambianus),* giant cane rat (*Thryonomys swinderianus),* mole rat (*Tachyoryctes rex),* zorilla *(Ictonyx striatus albescens,* tree hyrax (*Dendrohyrax arboreus*), the Huet's bush squirrel, (*Paraxerus ochraceus kahari*), the red-legged sun squirrel (*Heliosciurus rufobrachium)*, the aardvark (*Orycteropus afer*) and the porcupine *(Hystrix cristata).*

The forest is part of Mount Kenya which is an important bird area (IBA). Some of the bird species found within the forest are; Ayres' hawk eagle (*Hieraaetus dubius),* crowned hawk eagle *(Stephanoaetus coronatus),* hartlaub's turaco *(Turaco hartlaubi),* Jackson's francolin *(Francolinus*

jacksoni), scaly francolin (*Francolinus squamatus),* silvery cheeked-hornbill (*Ceratogymna brevis),* bronze-naped pigeon *(Columba iriditorques),* rufous-breasted hawk *(Accipiter tachiro).* Other birds include the harmer Kop *(Scopus umbretta),* green ibis *(Lambribis olivaceae),* olive pigeon *(Colomba arquatrix),* giant kingfisher *(Megacerryle maxima),* crowned hornbill (Tockus alboterminatus) and grey-headed kingfisher *(Halcyon leucocephala)* among other common birds.

Reptiles have also been recorded including monitor lizard (*Veranus niloticus*), agama lizard (*Agama agama*), African python (*Python sebae*), spitting cobra (*Naja nigricollis*) and African turtle (*Trionyx triungis*) (MKFRMP, 2010).

Table 2.3:Scenic feature & forest resources with Chuka forest

Potential eco-tourism sites	
POTENTIAL	**LOCATION**
Camp site	Nthereru/Ndereru, Kiria, Muthiria, Nyoni, Soniu, Karima, Gatwikiru
Water Falls	Mwita,Tungu/Ntuntuni, Manyaga, Kithuci, Kiambumbu, Kanyithi,
Caves	Mwita/suleiman, Ruguti, Tungu
Lodge	Kiang'ondu
Breeding Zones (elephants)	Gitogoto, Gaketha/Ituntu
Swamps	Iria ria Mwanki, Ndereru, Kithaje, Thamia, Irimba ria Mugumo, Muthanje wa Mutube, Muthanje wa Naka, Gwa Kibanga, Mwano, Cuniu, Kathiti, Kiria, Muthiria Nyoni, Kathaiti.

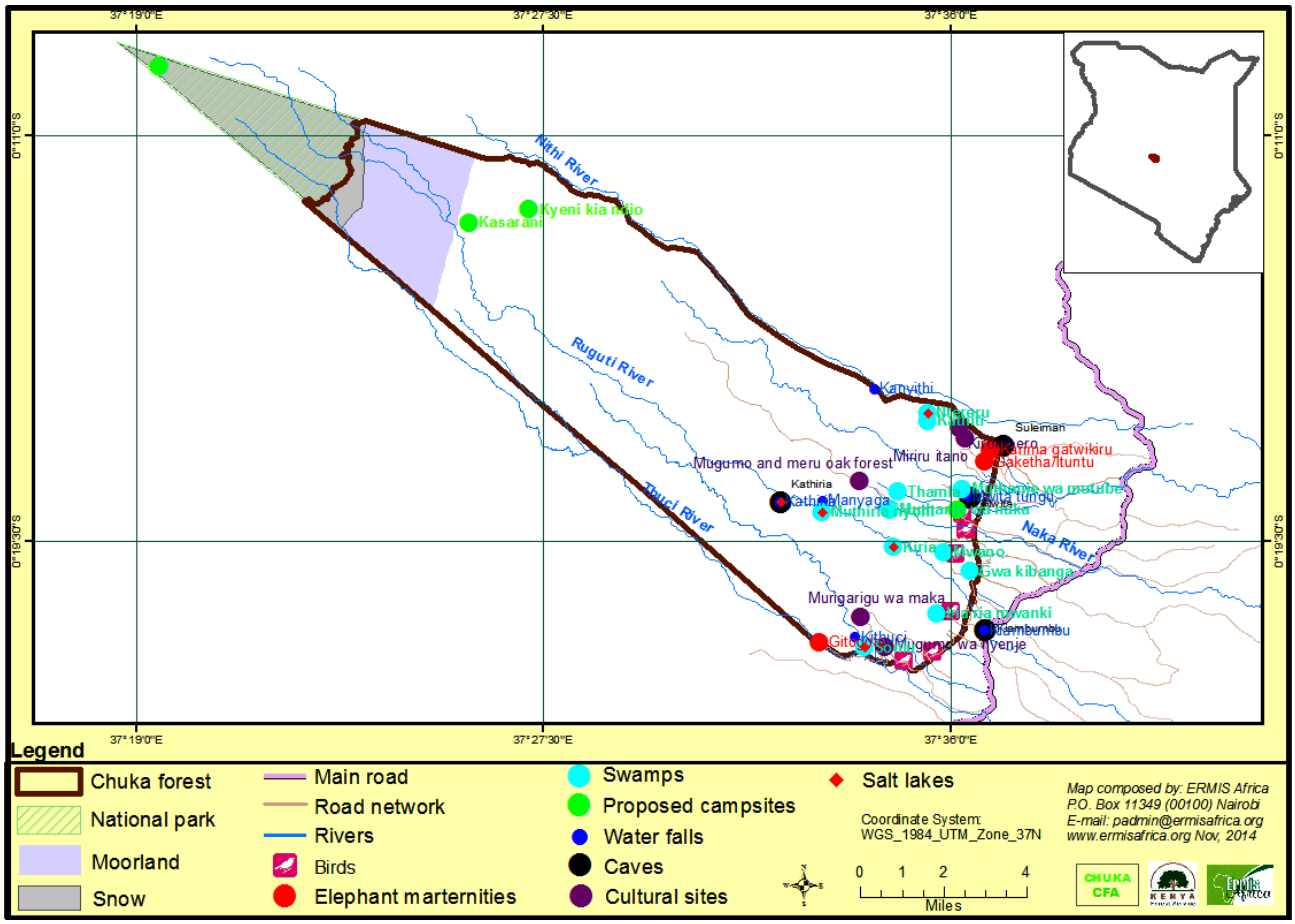


Figure 2.6: Potential eco-tourism sites & Natural resources in Chuka forest

Forest infrastructure and equipments

Road networks within Chuka forest

In order to achieve the forest management objectives for Chuka Forest, proper road network is essential for effective forest monitoring and management operations: particularly to reduce on overgrazing, illegal firewood cutting and patrolling to control illegal logging. This requires well maintained roads. Table 2-4 shows the current status of roads in Chuka forest station.

Table 2.4 The current status of roads in Chuka forest

ROADS	ESTIMATED DISTANCE (KM)	STATUS
Kiamuriuki	40	Poor road
Kiang'ondu	35	Poor road
Thuita	7	Poor road
Kirege	5	Poor road

Njuri	5	Poor road
Mubukuro	1	Poor road
Gitumbi	2	Poor road
Mitheru	20	Poor road
Nkabu	0.5	Poor road
Munguni	2	Murram road
Gaketha	1.5	Murram road
Munene	2	Poor road
Mwano	2.5	Poor road
Ituntu	0.5	Poor road
Ndindini	4	Poor road
Gitwe	6	Poor road
Mwonge	2	Poor road

Infrastructure and equipment

This includes the infrastructure and equipment currently at the station and the required ones. Infrastructures include; camp and picnic sites, buildings (residential and non-residential offices), forest guard outposts, fence, and water structures and storage facilities. The equipment include; vehicles, machinery, firefighting equipment and fire towers, power generators, electricity, solar, flow measuring devices and communication equipments.

The infrastructure and equipment within Chuka Forest are in the table 2-5 & figure 2.6 below.

Table 2.5: Infrastructure and equipment within Chuka forest station

Type of infrastructure	Name	Current status	Recommendation
Forest office block	1	Good condition	Upgrading of forest block
Store	1	Good condition	1 more
Foresters house	1	Good condition	One more for assistant
Forest rangers house (permanent).	1	Good condition	Construct 14 more permanent
Forest rangers house prefab	13	In poor situation	Decommission
Landhini Tractor	1	Serviceable	Add 4WD vehicle
Firefighting motorbike	1	Serviceable	4 more for policing
UHF Radios	0	Not Available	10 required
Wheelbarrows	0	Not Available	10 needed
Spades	0	Not Available	50 needed
Fire beaters	0	Not Available	90 needed
Watering Cans	0	Not Available	70 needed
Pangas	0	Not Available	120 pieces
Forked/ Jembes	0	Not Available	90 needed
Planting lines	0	Not Available	80 units needed
Rakes	0	Not Available	120 required

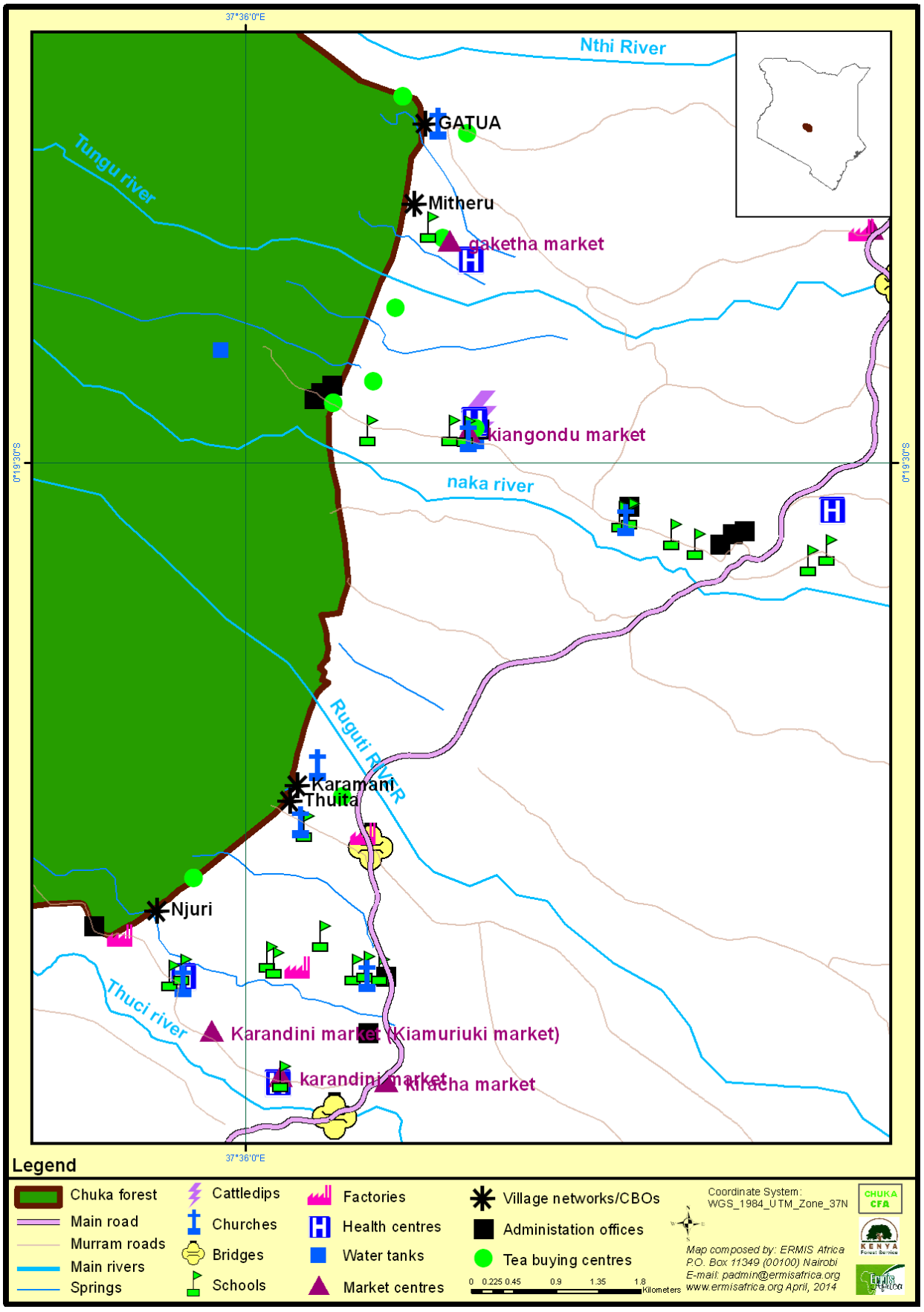


Figure 2.7: Map on infrastructure and resources adjacent to Chuka forest

Human resources in the station

Chuka forest falls under the Mt. Kenya East zone under the ecosystem conservator. The station has a total workforce as shown in table below.

Table 2.6 Human Resource at Chuka Forest

No.	Designation	Current No. of Staff	Recommendation
1.	Forest Manager	1	1
2.	Assistant Forest manager	0	1
3.	Registrar Clerk	0	2
4.	Accounts Clerk	0	1
5.	Office Assistant	1	2
6.	Storeman	0	1
7	Drivers	0	3
8	Rangers	14	24
9	Nursery workers	1	10
10	Field workers	0	10

CHUKA FOREST HISTORIC TRENDS

Chuka forest was gazetted in 1932 and since then it has been managed primarily for conservation. It has three beats namely Kiang'ondu where the station is situated, Mitheru beat and kiamuriuki beat. The main activities that are being carried out within the forest are bee keeping, herbal medicine collection, collection of firewood and also cultural activities. --Chuka, people of Meru attach a lot of culture and customs to forest and have a lot of rituals that are carried out in the forest. They have several stories, folk tales and poems associated with the forest. The area is under indigenous forest and no open spaces for PELIS program.

SOCIO- ECONOMIC STATUS

Methodology

Socio-Economic survey was undertaken by a team consisting of 16 enumerators who were trained for the data collection prior to the commencement of the exercise. The team was able to visit all the 6 locations adjacent to Chuka Forest.

The data collection process involved conducting village meetings, observations and administering questionnaires at household level to collect information on the socio economic status of the community. In addition, consultative discussions in form of Focused Group Discussions were conducted at 6 different locations adjacent to Chuka forest. The team also carried out Sketch Mapping with the community members which were later used in locating all the resources found in the area. The data collected was then used to assess perceptions concerning various activities to be undertaken around the forest.

Forest Adjacent Communities

2.1.1.5 Community characteristics

The largest ethnic groups found in the area are the Chuka people and the second largest is Muthambi ethnic group spread in varying proportions across the locations. Other ethnic community is the Meru community followed by Embu and Kikuyu. The majority of the communities around Chuka forest are food crop farmers and cash crops with a small proportion on livestock rearing due to the high land fragmentation and frequent droughts which wouldn't allow for large herds and as such the community relies on the forest for grazing areas of the animals reared.

The Chuka forest is surrounded by a total of around 60 villages aggregated into 20 sub locations spanning into the 6 locations from the two sub counties - Meru south and Maara. See table 2.7)

Table 2.7 List of villages surrounding Chuka Forest

Subcounty	Location	Sublocation		Villages
Meru south	Kiangondu	LEVEL 1 Kiangondu	LEVEL 11 Mucwa, Chuka town	Bagakia, Bakia, Baruo, Karioko, Kiangondu, Ntuntuni, Mutiri, Ntumara, Kibumbu, Ntuguni,
	Magumoni	Nthambo, Njuri,		Kiamuriuki, Gitogoto, Njuri, Kibiga, Kabakini, Kiricho
	Mugwe	Kirege	Mugirirwa	Nkabu, Mubukuro, Kiriguni, Kianyungu, Iramba, Gitumbi, Kirege
	Mwonge	Karamani,	Mwonge	Ciakarugu, Kangoro, Karamani, Kariani, Karigini, Kirigi, Gikwego
	Thuita	Thuita	Kathatwa	Igoki, Mugaani, Thuita, Gacoka,

				Gitonguni, Muiku, Mutuguni
Maara	Mitheru	Gatua, Ruguta		Gaketha, Nkironi, Muthenge, Munguni, Kigui, Intuntu, Gitugati, Ngong, Kiini, Kiaibio, Gitugati, Giampampo,Gachugu, Mugona, Giankanja, Kamachere, Ikame, Kathituni, Kanyakini, Kiamuchumbi, Kaunju

2.1.1.6 Participation in the socio-economic survey

The entire process of PFMP development was participatory. The participants in the socio-economic survey were drawn from all the locations adjacent to Chuka forest. However, participation in the survey varied from location to location with Magumoni and Mitheru locations recording the highest number of respondents accounting for 21% followed by Mwonge at 19% and Kiangondu at 16% of all respondents. Thuita location recorded the lowest participation at 8% of the respondents. (See figure 2-7 below)

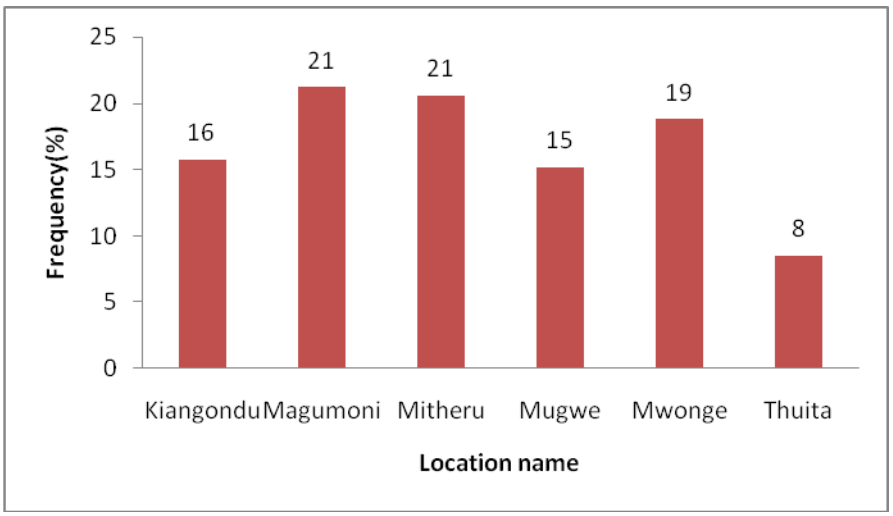


Figure 2.8: Participation of the community in socioeconomic survey

Characteristics of the Respondents

A total of 165 respondents residing in 6 locations were interviewed (see table 6.3). Out of this, 58% were male while 42% were females. Majority of the respondents were between the ages of 30-75 years with the age groups 46-60 comprising the largest proportion at 40% of the respondents while respondents below 30 years comprised the smallest proportion (5%) of the respondents (see the figure 2-8).

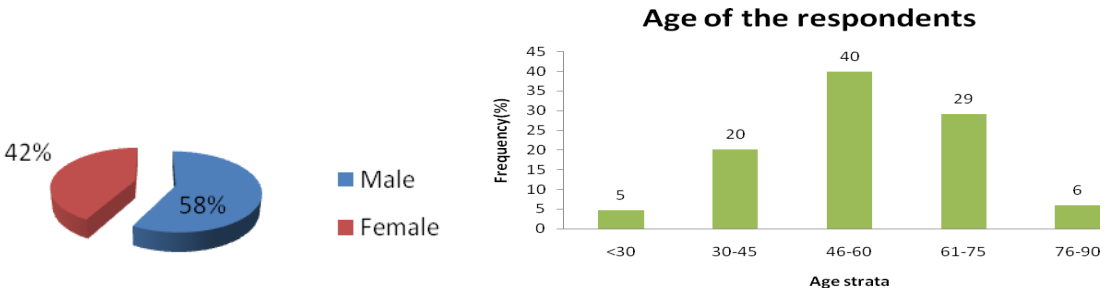


Figure 2.9: Gender and age distribution among respondents

The majority (83%) of the households is headed by men while small proportions (17%) of households are headed by women. (See figure 2-9).

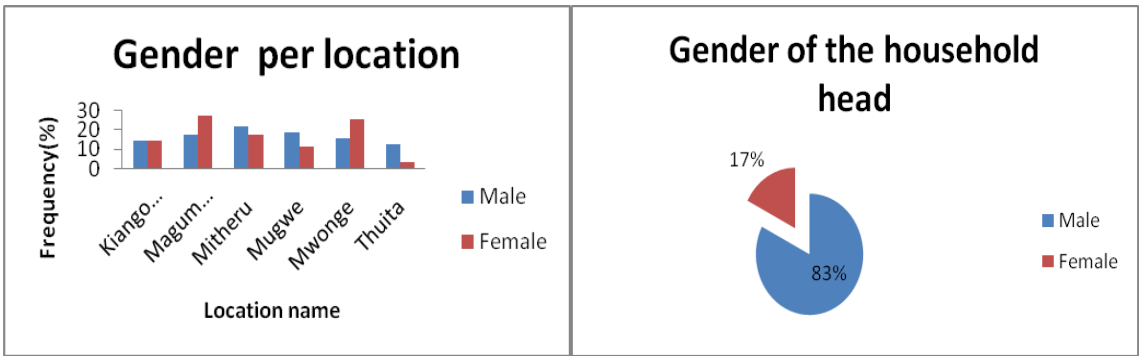


Figure 2.10: Gender of the head of household

Education level varied among the respondents with the majority (66%) having had primary education only, followed by secondary education at 20% and middle level colleges at 11% with less than 2% being university graduates from Kiangondu, Mugwe.and Mwonge locations (see figure 2-10).

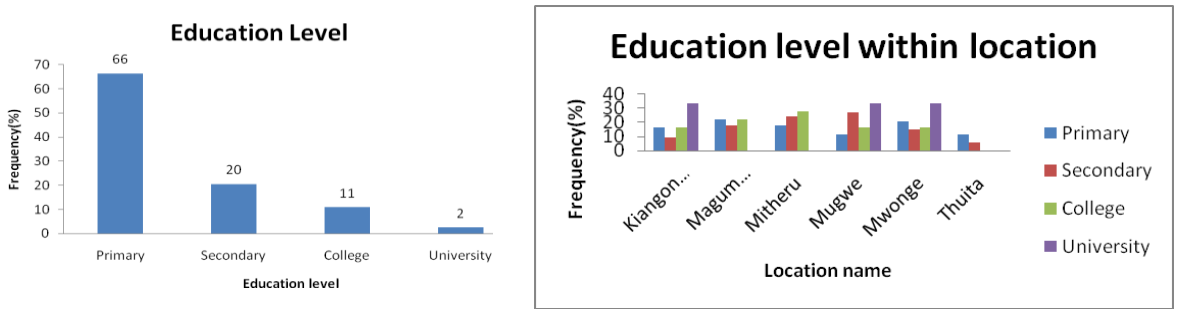


Figure 2.11: Level of education among the respondents

The majority 47% of the respondents interviewed were farmers and students. Other occupations documented include businessmen 4% and civil servants 3%. Majority of those on business were from Magumoni and majority of the civil servants were from Kiangondu location (See figure 2.11).

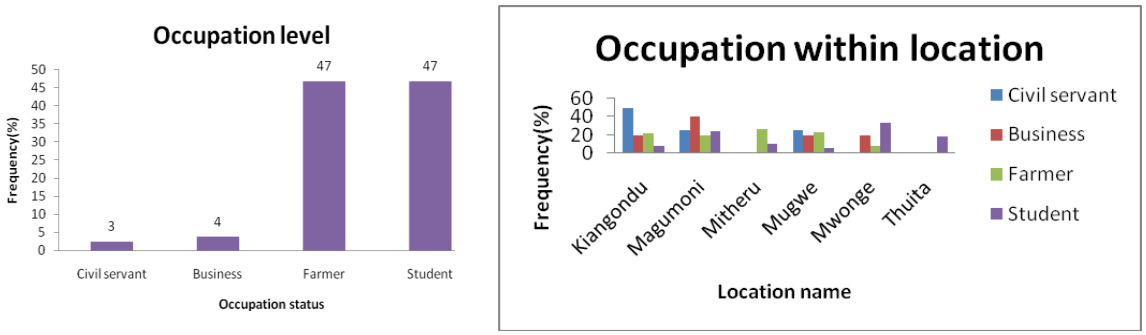


Figure 2.12 Occupation of the respondents

All of the respondents were land owners with title deeds.

Local economic Activities

The main economic activities conducted by communities living around the forest are farming and livestock keeping. The following were identified as the current activities and benefits to the community from the forest.

1. Fodder grass
2. Fuel wood
3. Herbal Medicines
4. Building Poles/other materials
5. Water
6. Forest soil
7. Bee keeping
8. Salt Fountain
9. Timber
10. Water abstraction
11. Building post
12. Wild vegetables

Food crop farming and Cash crop farming are the major sources of income in Chuka while other forms of farming such as fruit and cash crop farming are significant sources of income too. It is important to note that the communities adjacent to Chuka forest have embraced nature based enterprises (albeit as supplementary income sources) such as bee keeping and running tree nurseries as sources of income (see the figure 2.12 below).

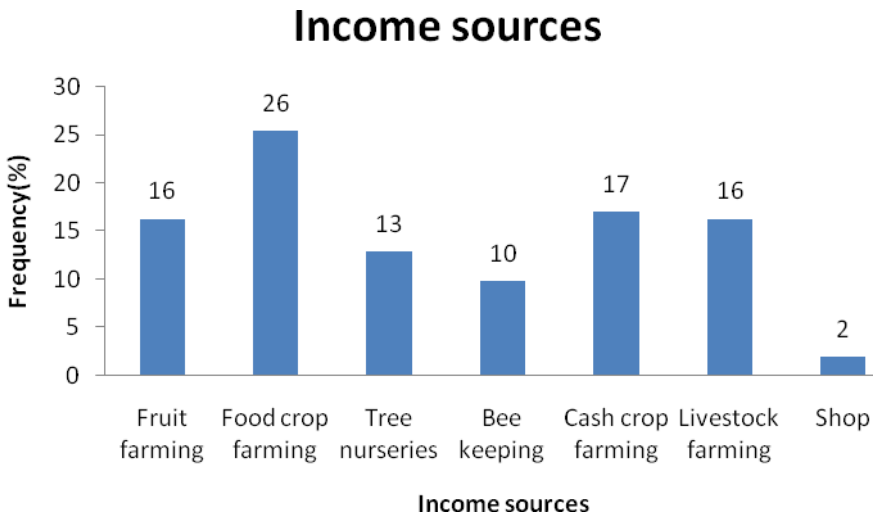
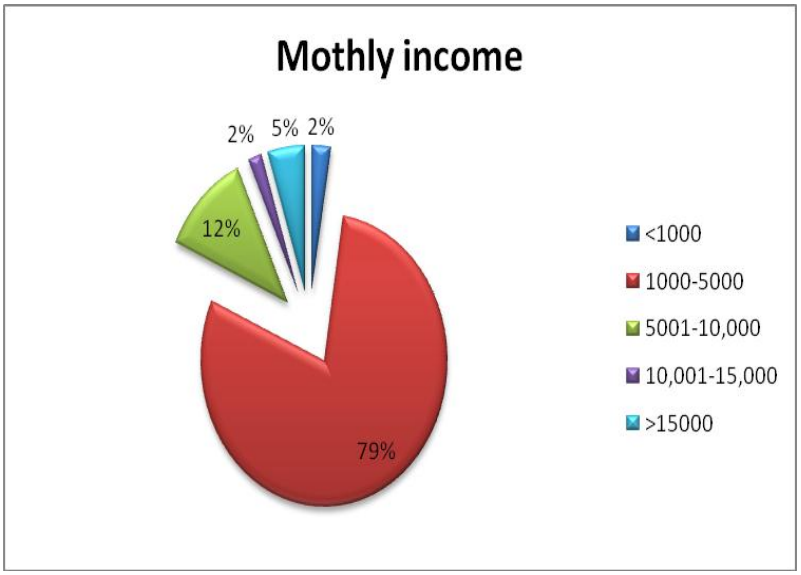


Figure 2.13 Sources of income for the respondents

The survey showed that 79% of respondents earn between KES1000 and KES5000 per month while 12% earn between KES 5,001 and KES 10,000 while only 5% earn more than KES 15,000 per month and majority are from Magumoni and Mugwe locations (see figure 2-13). The low income levels recorded during the survey may be due to the respondents deliberately underestimating their earnings.



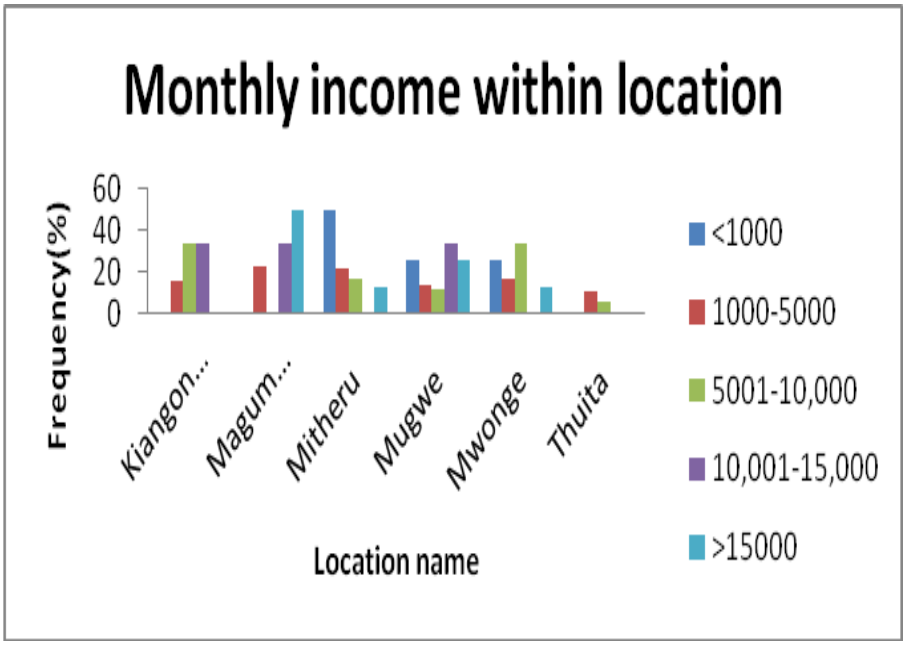


Figure 2.14 Respondents monthly income levels

Energy Sources

Firewood is the most common source of energy with 76% of households using it as the primary source of energy followed by charcoal at 15% and only 9% using electricity as source of energy. Firewood is used for entirely cooking while electricity is used for ironing and lighting (see the figure 2-14).

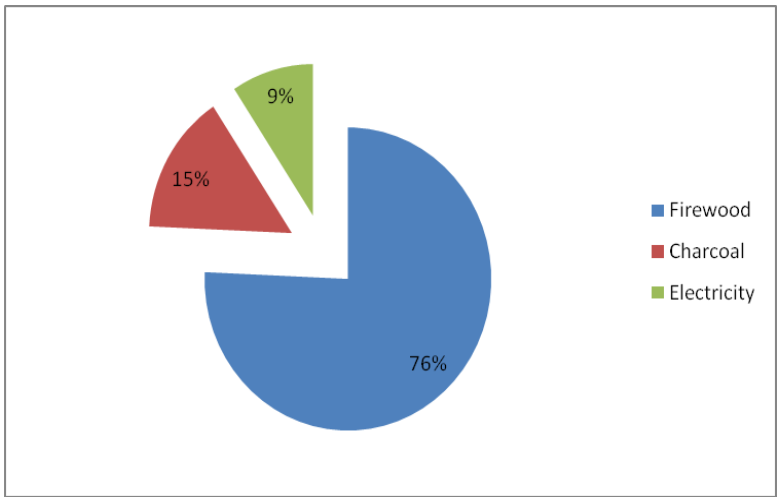


Figure 2.15 Energy sources and their uses among forest adjacent communities in Chuka

None of the community members interviewed reported to use biogas, paraffin or agricultural wastes as fuel for cooking.

Water sources

The major water source type for household use among the respondents is river which accounted for 49% of all repondents followed by wells at 20% and tap water at 14%. Other water sources recorded include springs at 13% and dam at 5% as shown in figure 2-15 below.

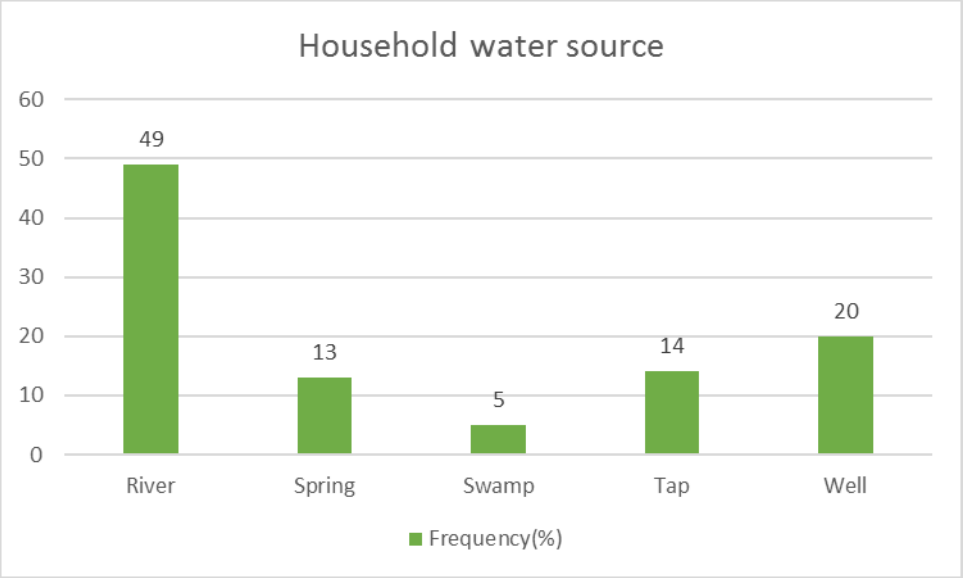


Figure 2.16 Water sources for household use

Similarly water for livestock is mainly from the river (95%) with only 5% using tap water. On the other hand majority (54%) of the residents rely on the rain for farming, 45% use river water and a small proportion (0.6%) use spring water (see figure 2-16).

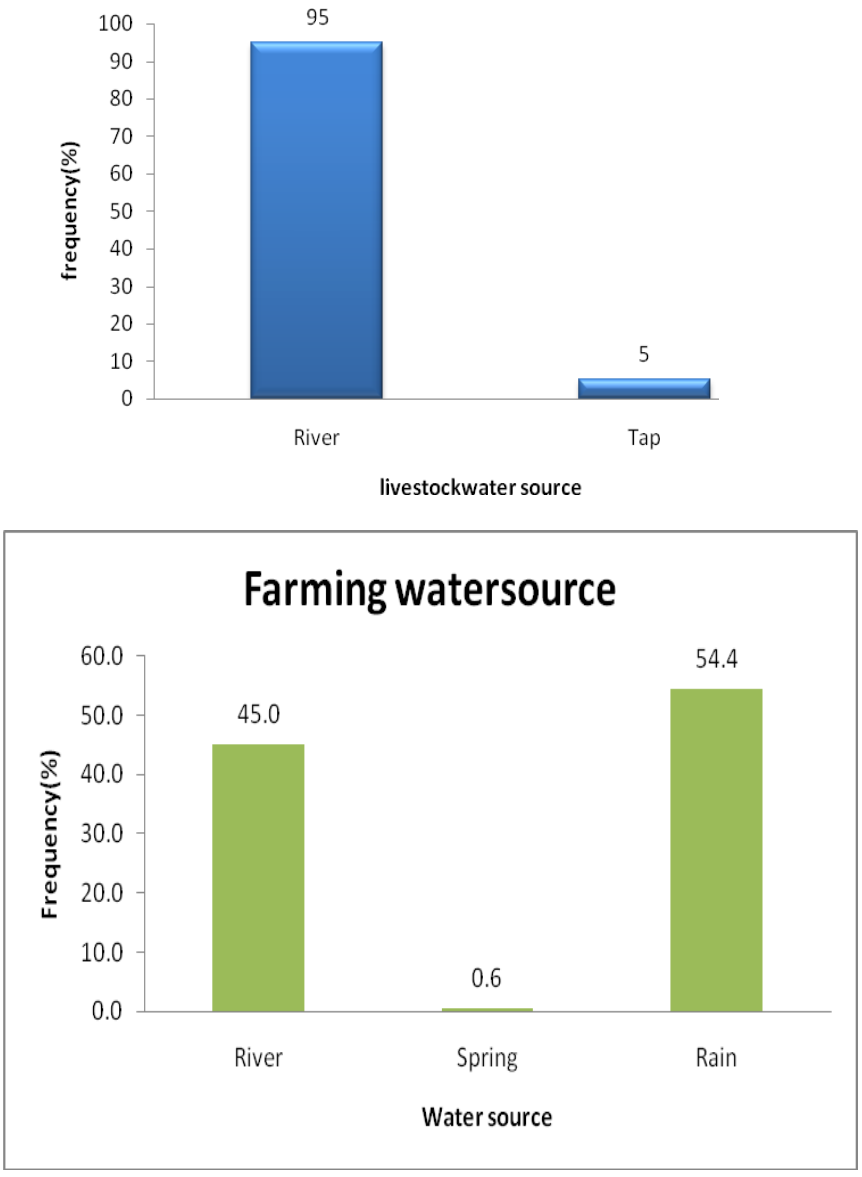


Figure 2.17 Water sources for livestock and farming

Stakeholder Analysis

Chuka forest and adjacent villages have a wide array of stakeholders who are involved in development activities that address environment and livelihood issues. The stakeholders consist of a wide cross-section of government agencies, local and international NGO's, and local communities.

The local communities identified 20 local development partners working in the area on issues of agriculture, forestry, water, education, health and social development. The development partners include:

- Tharaka Nithi County government
- Ministry Of Environment, Water & natural resources
- National Government Administrative Office (NGAO)
- Kenya Forests Service (KFS)
- Kenya Wildlife Service (KWS)
- National Environment Management Authority(NEMA)
- Kenya Forest Research Institute(KEFRI)
- Green Belt movement
- TIST
- Nyayo Tea Zone
- Tea factories
- Communities
- Water Resource Management Authority (WRMA)
- Mount Kenya East Environmental Conservation Association (MKEECA)
- National Drought Management Authority(NDMA)
- Ministry of Agriculture Livestock and Fisheries
- Ministry of tourism
- Ministry of Energy
- Financial Institutions i.e. KCB
- Catholic church (CARITAS)
- ACK church
- EAPC Church
- Chuka University
- United Nations development Programme (UNDP)
- Global Environment Facility (GEF)
- Rhino Ark
- Upper Tana Natural Resource Management Project

Government agencies perform varying roles in the management, conservation and protection of Chuka forest and in the control of forest resources utilization. Table 2-8 below presents a summary of stakeholders and their roles and responsibilities in Chuka forest management.

Table 2.8 Analysis of Main stakeholders and their roles & responsibilities in Chuka Forest

STAKEHOLDER	STATUS	ROLES	RESPONSIBILITY
KFS	Active	Sustainable management of forest resources	Protect, maintain and conserve the forest
KWS	Active	Protect wildlife	Protect wildlife Provide social co-operative responsibility
Nyayo Tea Zone Coporation	Active	Liaise with KFS in environment conservation	Assist in enrichment planting Rehabilitation of degraded sites through enrichment planting
NEMA	Active	Environment conservation	Protect the environment against any threats
Green zones	Active	Conservation of indigenous forest	Plant trees Raise seedlings
MKEPP/Upper tana	Active	Community sensitization on importance of forest	Training farmers

The communities adjacent to Chuka Forest are organized into groups (forest user groups) that have clearly defined roles and responsibilities in the management, conservation of Chuka Forest as well as in controlling the utilization of forest resources. There groups and their roles/responsibilities are as shown in table 2-9 below.

Table 2.9 User groups within Chuka Forest and adjacent communities with their activities

GROUP'S NAME	ACTIVITIES	MEMBERS	LOCATION
Mwiriithia	Nursery, Tree planting, Table banking, Nursery establishment, Selling of seedlings	7	Magumoni
Mwimenyereri	Nursery, Tree planting, Table banking, Nursery establishment, Selling of seedlings	8	Magumoni
Gaceria	Nursery, Tree planting, Table banking, Nursery establishment, Selling of seedlings	7	Magumoni
Mugamba/Muthiria	Bee Keeping	17	Magumoni
Nkomani/Kathinwa	Bee Keeping	25	Magumoni
Kiangondu Network	Nursery establishment, Bee keeping, Poultry farming, Tree planting	360 (15 Kiangondu groups)	
Kanguu	Nursery	15	Kirege
Ikira Better Life	Nursery	10	Kirege
Mwano	Nursery, Tree planting, Bee keeping	15	Karamani
Gankoya	Nursery establishment, Bee keeping	16	Karamani
Nkwao	Tree Nursery establishment, Bee keeping, Tree planting	16	Karamani
Mwirithia Youth Group	Nursery, Tree planting	28	Kirege
Kamili Bee Keepers	Nursery, Bee keeping,	18	Kirege
Muthiria Nyoni	Nursery, Bee keeping, Daily Goat rearing	22	Kirege
Kasarani	Nursery, poultry farming	25	Kirege
Green Kenya E.C.group	Nursery, Table banking	15	Kirege
Kigwa Mbogo	Nursery	15	Mitheru
Karandini	Nursery	15	Mitheru
Chuka Timbers	Nursery, timber harvesting	20	Chuka town
Nthambo Network	Nursery, bee keeping	42	Magumoni
Mitheru Bee Keepers	Nursery, Bee keeping, table banking	65	Mitheru
Ruguti	Nursery, bee keeping, table banking	37	Karamani
Njuri Network	Nursery, table banking	40	Magumoni

Kabindi	Nursery, tree planting	8	Magumoni
Kamwonge	Nursery, tree planting, table banking, poultry farming	10	Magumoni
Mwireri	Nursery, tree planting, table banking, grazing	10	Magumoni
Mwichuiri	Nursery, tree planting, table banking, grazing	9	Magumoni
Kirombero	Nursery, table banking	15	Mitheru
Ntuamaruu	Nursery	16	Mitheru
Kagijo	Nursery	19	Gatua
Ikindu	Nursery	12	Gatua
Kanithi	Nursery	12	Gatua
Gankongoroto	Nursery	10	Gatua
Kathaiti	Nursery, table banking	15	Gatua
Turagwini	Nursery, Road repair	20	Gatua
Ndigia Bee Keeping	Nursery, bee keeping, poultry farming	86	Kiangondu
Ndindini Bee Keepers	Nursery, bee keeping	36	Kiangondu
Ndereru	Nursery, table banking	18	Mitheru
Thuita network	Nursery, pig farming, fish farming	48	Magumoni
Chuka Timber Manufactures	Furniture, Conservation projects	50	Chuka town
Chuka University	Research and development, Cooperate social responsibilities	100	Chuka town

Values of the forest reserve

Chuka forest value include tangible benefits in terms of revenue from forest utilization and supporting livelihoods to intangible benefits such as biodiversity conservation, climate moderation, research and educational values. These values are further discussed in the following sections.

Forest Revenue

Chuka forest generates revenue from its commercial forest plantation harvesting. It has an enormous potential of generating more revenue for KFS if plantation program is well planned and implemented. This is not the case currently as conservation is favored to production.

The following is revenue collected for the most important products and services in Chuka forest for the last 4 years.

Table 2.10 Summary of Revenue collection in Chuka forest for the last 4 years

(Source: KFS, Tharaka Nithi)

YEAR	TOTAL REVENUE	SOURCE
2010	4,896,792.60	Plantations/timber, fuelwood & other income sources
2011	297,816.00	Plantations/timber & other income sources
2012	176,900	Other income sources
2013	2,832,950.00	Plantations & other income sources
2014	239120.05	Plantations/timber, fuelwood & other income sources
TOTAL	8,443578.65	

NB: Other Income encompasses a combination of various products and services including; Poles, Seedlings, fodder, fees/licenses for water way leaves, Rent e.g. for Ground rent for high voltage power line (way leave), water tank areas.

Livelihood

Chuka forest supports the forest adjacent communities who rely on forest products and services for their livelihood including water, firewood, grazing resources, bee keeping, and medicinal herbs.

Water catchment

The forest is an important water catchment area 6 permanent rivers namely; Nithi, Tungu, Ruguti, Thuci, Naka and Giatuambugi which supply water to the community for both household use and for livestock. The rivers feed the Tana River drainage system which support the livelihoods of other communities downstream as well as generate power to the national grid. Further, the rivers are of high livelihood importance where small scale subsistence oriented economic activities depend on their water discharge.

Biodiversity reservoir

Chuka forest has a rich biodiversity of flora and fauna. Mammals with a conservation interest in the forest include African elephant (*Loxodonta africana*), leopard (*Panthera pardus*), giant forest hog (*Hylochoerus meinertzhageni*), Bongo (*Tragelaphus euryceros*) and the black fronted duiker (*Cephalophus nigrifrons hooki*). Some of the flora include giant heath, African sage (*Artemisia afra)* and several Gentians (*Swertia spp*). This diversity of flora and fauna makes Chuka forests a rich biodiversity reservoir.

Eco-Tourism

The forest has some potential of eco-tourism which is yet to be exploited including nature trails, scenic view site, springs and caves.

Cultural Significance

Chuka forest has cultural shrines which were used for conducting cultural rituals such as prayers for rain and cleansings. Although these shrines are no longer used, they could be used to showcase the culture of the adjacent communities.

Examples – Ndigia, (Mugumo and Meru oak forest), Mugumo wa Nyenje at Kiamuriuki, Miriru Itano at Mitheru (Prayers site), Murigarigu wa Maka at Kiamuriuki (Meeting point/prayers), Kirombero at Mitheru(prayers).

Threats facing the forest

Chuka forest is faced with numerous problems which are inter-woven and connected or related to policy, environment, security and livelihood. Based on the results from socio-economic analysis, the communities adjacent to the forest have negatively impacted the forest in diverse ways and varying magnitude. Sections of forest areas adjoining the communities have been seriously deforested and degraded through encroachment.

The threats facing Chuka Forest are varied in both nature and magnitude. The major threats however are from anthropogenic activities such as encroachment, illegal timber poaching, fire hazards, The challenges faced by the Chuka forest, which if unchecked could lead to unjustifiable destruction of this fragile ecosystem are as follows:-

External Threats

2.1.1.7 Illegal grazing

Illegal grazing is common where animals are released into the forest in large numbers. It occurs mostly on the production zone of the forest. This is mainly due to the porous nature of the reserve boundary giving illegal grazers ease of access. This problem is exacerbated by

frequent droughts and erratic rainfall in the area which leaves the farmers without alternative pastures for their livestock. Illegal grazing especially in the grassland areas of the forest has led to reduction in vegetation cover exposing the soil to erosion and other forms of degradation. Locations in Chuka facing this threat include: Mitheru, Gatua, Karamani, Kirege Kiangondu, Gitogoto, Kiamuriuki, Njuri and Thuita.

2.1.1.8 Forest fires

Forest fire risk posed by poachers, arsonists and marijuana growers is a major challenge in Chuka forest. They result out of accidents such as during honey harvesting and/or the activities of marijuana growers going out of hand when using fire to prepare plots which they then seed with marijuana. Forest fires impact negatively on the vegetation structure of the forest thereby reducing the habitat value and water catchment functions of the forest.

This threat is common in the bamboo zone of the forest. The communities from the locations of Mitheru, Gatua, Karamani, Kirege Kiangondu, Gitogoto, Kiamuriuki, Njuri and Thuita.are directly impacted as they are involved in the subsequent fire suppression activities.

2.1.1.9 Over-reliance on the forest

The adjacent communities rely on the forest resources for livelihood. Some of the community members engage into coffee and tea farming but other areas are not conducive for these activities. Community members in such areas face challenges of unemployment and declining productivity of agricultural land leaving them vulnerable to take up activities that have adverse effects on the forest (mainly consumptive exploitation).

2.1.1.10 Poor water resource utilization and degradation of catchment areas

In regard to water resources, the threat is tied to the threats discussed above and water utilization techniques of the surrounding communities. For example, increased siltation is observed in rivers as a result of soil erosion in areas where the forest is destroyed by fires, deforestation or overgrazing. In addition lower river volumes and flows may also be experienced due to the destruction of water catchment and riparian areas within the forest. Over abstraction is a major cause of reduced river flows downstream.

2.1.1.11 Human wildlife conflict

Human wildlife conflicts are experienced in the community areas around the Chuka forest characterized by crop destruction by wild animals and snake bites (forest Cobra, Green Mamba, Black Mamba, Bush viper) on humans within the intervention zone of the forest. The forest is undergoing fencing and as such wild animals may not freely move from the forest to the adjacent farmlands causing great losses to farmers. Baboons cause the greatest nuisance and destruction of crops. Some of the destructive animals include elephants especially the

community neighboring the elephant corridor or elephant maternity. Some of the affected areas include: Gatua and Mitheru locations.

2.1.1.12 Poaching and illegal logging

In Chuka forest these vices are present in a small scale. Animal poaching is not as high since the forest is still inhabited by some of the endangered animal species. The plantation trees which mature quickly into timber and building posts reduces dependency on indigenous trees . Some of the communities practicing this activity are within the following locations: Mitheru, Gatua, Karamani, Kirege Kiangondu and Gitogoto. Some of the poached animals include DikDik, Bush Back , Bush pig, Colobus monkey, Nkoroi. Illegal logging of camphor and podo has also been a threat for a long time.

Management constraints

Proper management of the forest is important in the mitigation of the threats discussed above. However there are several constraints that make it difficult to effectively implement management plans or enforce regulations towards mitigating the impacts of the threats. These constraints include;

Replacement of lost beacons

Lack of clarity on parts of Chuka forest boundaries has also resulted to encroachment by local communities into the forest. The maps for the forest should be updated to reflect the changes in the boundaries and land use in order to help the forest managers and the community to protect the forest.

Inadequate planning for resource utilization

At present the structures set up to regulate or control the utilization of resources in Chuka forest are weak As a result, the communities may easily enter the forest and extract resources disregarding the impact it has on the forest. There are inadequate plans for the exploitation/utilization of the various forest products and projections of forestry activities on a long term basis has lead to unsustainable exploitation of forest resources.

Inadequate knowledge and capacity within the community

The community members have little knowledge in regards to their rights to the forest and its resources. Inadequate community education on conservation, low understanding on CFA roles and responsibilities in co-management of forest further reduces their capacity to effectively participate in the management of the forest. Although Chuka CFA is in place, it is has not yet been given the legal mandate to manage Chuka forest and they have not yet

undergone all the required capacity building training that they need to effectively participate in the management of the forest.

Poor infrastructure and equipment

The station lacks adequate infrastructure and equipment to enable them carryout their duties effectively. For example the roads servicing the forest station and allowing access to the forest for patrols and policing are poorly maintained. Equipment crucial for communication and record keeping for monitoring the forest are also inadequate.

Human resource development constraints

Human resource development concerns the institutions and the individuals who are responsible for implementing this plan for sustainable forest management. Society has gone through many changes during recent years, and the responsible institutions and individuals to respond to these changes for effective forest management are lacking. The current work force is inadequate so there is need to acquire more.

CHAPTER 3

3 PLANNING CONSIDERATIONS

POLICY AND LEGAL FRAMEWORK

Sustainable conservation and effective management of any given forest in Kenya will depend on the following factors:-

1. Accurate situation analysis of the forest
2. Management measures planned to tackle the problems affecting the landscape and
3. Policy, legal and constitutional framework to enable (2)above

KFS, WRMA, KWS and the local community are the key partners in the management of Chuka forest. The policies and laws under which they operate on are briefly analyzed below. Included also are some other national regional and global policies and agreements which may indirectly or directly influence the management of the forest.

The Forest Policy and Legislation

The Draft Forest policy and the Forests Act 2005 provides for community participation in forest management. The goal of the policy is to enhance the contribution of the forestry sector in the provision of economic social and environmental goods and services. The Forests Act also addresses the needs of the local communities and provides for partnership in the management of state forests.

The forest policy regulates the manner in which the Act will operate. Kenya's first forest policy was formulated in 1957 through White Paper No. 85 then subsequently restated in 1968. A new Forest policy has since been prepared (through Session Paper No. 1 of 2007) awaiting parliamentary approval. It emphasizes and regulates the manner in which the adjacent communities and other stakeholders are involved in management and conservation efforts of the forest.

The repealed Forest Act Cap 385 was in total contrast with the new Forests Act of 2005 where the management of state forest was the main consideration. The new Act created the KFS, a Semi-Autonomous Authority responsible over all forests. The Act requires that all forests be managed through approved management plans and provides for participation of stakeholders. Communities living adjacent to Forest Reserve have a provision to enter into a management agreement with the Kenya Forest Service. In drafting this plan cognizance of the provisions of the draft Forest Policy (Sessional paper No.1 of 2007) and the Forests Act 2005 were considered.

The Wildlife Policy and Legislation

Wildlife conservation, as we know it today, dates back to 1898 when law controlling hunting was first enacted immediately after Kenya became a British Protectorate. These laws regulated hunting, hunting methods and trade in wildlife with some endangered species being fully protected.

In 1907 the British Government established the Game Department to administer the Game Reserves, enforce the hunting regulations and protect settler farmer communities' property and crops from wildlife. In 1945 the Royal National Parks of Kenya Ordinance was promulgated to provide for the establishment of national parks.

The first wildlife policy in Kenya was the "Sessional Paper No. 3 of 1975 entitled "A Statement on Future Wildlife Management Policy in Kenya." In 1976, the Wildlife (Conservation and Management) Act was enacted to give effect to the Policy. This Act amalgamated the then Game Department and the Kenya National Parks to form a single agency, the Wildlife Conservation and Management Department (WCMD), to manage wildlife. Subsequently, through an Amendment to the Act in 1989, the Kenya Wildlife Service (KWS) was established to replace WCMD.

Kenya Wildlife Service (KWS) is mandated to conserve wildlife within and outside protected areas. It also supports community initiatives towards conservation and plays an advisory role to the communities by providing flexible regulations that enable the generation of optimum returns from wildlife through non-consumptive uses.

The current Wildlife Act was enacted in 2013 to provide for the protection, management and conservation of wildlife as a vital national and global heritage, which also makes great contribution to sustainable development. This is achieved through the maintenance of a system of national parks, national and forest reserves. The act also provides for the community involvement in Wildlife conservation through formation of Wildlife community associations and compensation scheme in case of destruction from human wildlife conflict among others.

Environmental Management and Coordination (EMCA) Act of 1999

The Environmental Management and Coordination Act (EMCA) No. 8 of 1999, embraces all environmental management issues in the country.

The National Environment Management Authority (NEMA) is established under this Act as the principal instrument of government in the implementation of all policies relating to the environment. It also addresses the environmental concerns and safeguards against environmental degradation within and outside protected areas.

The Act provides the legal framework for the implementation of National Environment Action Plan (NEAP), which gives due regard to ensuring that people live in a healthy environment. It also emphasizes maximum participation by stakeholders in the development and implementation of policies, plans and processes for the management of the environment.

Water Policy (Sessional Paper No. 1 of 1999) and Water Act 2002

The main objective of the water policy is the supply and the distribution of water resources throughout Kenya. It recognizes that increased human activity in the catchment area has reduced forest cover and hence is a threat to water resources.

Water Act lays out a mechanism for development of a national water resources management strategy, for the protection, management, use, development, conservation and control of water resources. The national strategy shall encompass a mechanism for determination of important water catchments as a link to the forest sector. The strategy devolves the authority over the conservation of such catchment to local stakeholders who manage the catchment in collaboration with the water management authority, also established under the Act. The strength of this Act is in its endeavor to promote participatory forest management in water catchment areas. This is achieved through the devolution of roles and responsibilities to the stakeholders namely

- Water based institutions
- Irrigation and drainage
- Water Resources Management Authority (WRMA)
- Water Services Board
- Water regulatory Board

The constitution of Kenya 2010

In implementing the Kenya new Constitutional dispensation, the Government and people of Kenya with the support of stakeholders are developing new laws and reviewing existing laws in line with the provisions of the Constitution. This means that many acts shall have either be repealed or reviewed. Some of this Acts are as follows:-

3.1.1.1 Grass Fire Act

The Grass Fire Act Cap 327 Revised 2012, provides for protection of the vegetation by regulating burning of bushes, shrubs, grass, crops and stubble through issuance of permits to carry out planned burning processes within protected area, Trust land and in private lands. Controlled burning, as a natural resource conservation measure, helps in controlling pests, invasive plant species and improving pasture.

3.1.1.2 County Government Act

This Act provides for the election, functioning, control of, tasks and powers, etc. of county governments as provided for under Article 176 of the Constitution. It also provides for a wide variety of matters relating to public administration at local level such as civic participation, access to information, public communication and the protection of minorities.

A county government is responsible for planning and development of its county in accordance with the principles and objectives set out in Part XI of this Act. The Act provides for facilitation of the development of a well-balanced system of settlements and ensuring productive use of scarce land, water and other resources for economic, social, ecological and other functions across a county; and the achievement and maintenance of a tree cover of at least ten per cent of the land.

LINKS TO OTHER DEVELOPMENT & PLANNING PROCESSES

County Planning

The new country's constitutional dispensation provides that the County shall be responsible in development planning process through a devolved planning structure to replace the District Development Committee (DDC) with County Planning Committee. This planning consideration shall incorporate all the Government Departments and state corporations, working in Maara and Meru south sub counties where the forest lies and beneficiaries exist respectively.

Vision 2030

This is the countries development blue print covering the period 2008-2030. It aims at making Kenya a newly industrializing middle income country providing high quality life for all its citizens by the year 2030. The vision comes after a successful implementation of the Economic Recovery Strategy for Wealth and Employment Creation (ERS). The vision is based on three "pillars" namely; the Economic pillar, the Social pillar and the Political pillar. The economic pillar aims at providing prosperity of all Kenyans through an economic development programme aimed at achieving an average Gross Domestic Product (GDP) growth rate of 10 % per annum for the next 25 years.The social pillar seeks to build "a just and cohesive society with social equity in a clean and secure environment". The political pillar aims at realising a democratic political system founded on issue-based politics that respects the rule of law, and protects the rights and freedoms of every individual in theKenyan society. The *Kenya Vision 2030* is to be implemented in successive five-year Medium Term plans with now the second phase of such plan covering the period 2013 – 2017.

International and Regional Agreements

The Government of Kenya is a signatory to international/regional treaties and conventions on conservation of threatened, endangered, endemic species and fragile ecosystems. The management plan will recognize the roles and responsibilities of the implementing stakeholders in the coordination of the relevant multilateral environmental agreements (MEAs); Convention on Biological Diversity (CBD), the Global Forest Principles (GFP), Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Ramsar Convention, , UNFCC, East African Community Secretariat (Cross border natural resource management).

Convention on International Treaty on Endangered Species (CITES)

The regulations of CITES are statutory and ensure that trade in specimens of wild animals and plants do not threaten their survival. There are several CITES agencies in Kenya. Trade in CITES listed species require clearance from the authorized offices. Chuka forest is a home for some of the animal species such African elephant (*Loxodonta africana*), leopard (*Panthera pardus*), giant forest hog (*Hylochoerus meinertzhageni*), Bongo (*Tragelaphus euryceros*) and the black fronted duiker (*Cephalophus nigrifrons hooki*). Other animal species found in the forest include the Cape buffaloes *(Syncerus caffer),* duiker (*Neotrragus moschatus),* bushbuck (*Tragelaphus scriptus*), deffassa water buck *(Kobus ellipsiprymnus),* mountain reedbuck *(Redunca fulvorufula),* bush pig *(Potamochoerus porcus),* the common zebra *(Equus burchelli),* eland (*Tragelaphus oryx*), steinbok *(Raphicerus campestris),* Harveys red duiker (*cephalophus Harveyi) and* common duiker (*Sylvicapra grimmia altivallis).*

Plan strategies that impact on the exploitation and / or trade of specimens of CITES species will take cognizance of CITES requirements as directed by the relevant authorities.

Convention on Biological Diversity (CBD)

The Convention on Biological Diversity stipulates that it is the responsibility of national states to conserve their biological diversity and to use their biological resources in a sustainable manner. It further notes that it is vital to anticipate, prevent and attack the causes of significant reduction or loss of biological diversity at source, and that in situ conservation of ecosystems and natural habitats is a fundamental requirement for the conservation of biological diversity.

Kenya has undertaken activities that are consistent with the goals of the Convention, and has for example taken measures to develop a national strategy for the conservation of biological diversity and has established a system of protecting the endangered species both in the protected and dispersal areas. The interest of CBD is enshrined in the existing laws and policies.

Millennium Development Goals (MDGs)

In September 2000, the United Nations general Assembly adopted the Millennium Declaration on a core of development issues including development and poverty reduction. The resolution included freeing people from the abject and dehumanizing conditions of extreme poverty, creating national and global environments for development and elimination of poverty, gender equality and empowerment, promotion of good governance among member states, promotion of trade and debt relief, and to address the special needs of small island developing countries and landlocked developing countries.

The resolutions including specific indicators of progress with respect to Implementation of the United Nations Millennium Declaration proposed eight goals as follows:

- Eradication of extreme poverty and hunger
- Achieve Universal primary education
- Promote gender equality and empower women
- Reduce child mortality
- Improve maternal health
- Combat HIV.AIDS, Malaria and other diseases
- Ensure environmental sustainability
- Develop a Global partnership for development

These goals are envisaged to be attained by the year 2015 that responds to the world's main development challenges. All the goals cited are relevant for the area covered by the plan.

United Nations Framework Convention for Climate Change (UNFCCC)

This international agreement aims to reduce both carbon dioxide emissions and the presence of greenhouse gases. Countries that ratify the Kyoto Protocol are assigned maximum carbon emission levels and can participate in carbon credit trading. Emitting more than the assigned limit will cause the violating country to be penalized by lowering its emission limitation in the consecutive period.

The Kyoto Protocol separates countries into two groups. Annex I includes developed nations, while Non-Annex I refers to developing countries. Emission limitations are only placed on Annex I countries. Non-Annex I nations participate by investing in projects that lower emissions in their own countries. For these projects, they earn carbon credits. These credits can be traded or sold to Annex I countries, which allow them a higher level of maximum carbon emissions for that period.

Chuka Forest is important in sequestering the carbon as they have a huge chunk of natural forest.

Global Forest Principles (GFP)

The Global Forest Principles are a non-legally binding authoritative statement of principles for a global consensus on management, conservation and sustainable development of all types of forests in the world. The Forest Principles arose from the realization of the importance of forest resources and concern over the threats to these resources worldwide. The principles apply to all types of forests, natural and re-established, in all geographic regions and climatic zones.

3.1.1.3 Forest Principles

1. Encourage forestry development by promoting participation of local communities, indigenous people, industries, labor, NGOs, forest dwellers and women in the development, implementation and planning of national forest policies;
2. Advocate that national policies and strategies should provide a framework for increased efforts in management, conservation and sustainable development of forests and forest lands;
3. Stress that decisions on management, conservation and sustainable development should be based on a comprehensive assessment of economic and non-economic values;
4. Develop policies and legislation that will ensure that unique vegetation types are conserved for cultural, spiritual, historical, and religious needs, as well as for biodiversity value;
5. Incorporate the process of environmental impact assessment into national policies, especially where actions are likely to have significant adverse impacts on critical forest resources.

Chuka Forest is in line with those principles as evidenced by involvement of the local community in developing this participatory plan which on implementation will ensure sustainability of the forest.

Chuka forest forms part of the Mt. Kenya National reserve surrounding the National Park. The park was established in 1949 to protect the region surrounding the mountain and currently lies within the forest reserve which encircles it (KWS, 2009). In April 1978 the area was designated a UNESCO Biosphere Reserve (UNEP,1998). The national park and the forest reserve, combined, became a UNESCO World Heritage Site in 1997(UN, 2008) due to its special cultural and physical significance. The park was for the following importance: tourism

for the local and national economies, preservation of an area of great scenic beauty, conservation of biodiversity within the park and to preservation of the water catchment for the surrounding area.

CHAPTER 4

4 MANAGEMENT VISION, GOALS & OBJECTIVES

Participatory Management plan for Chuka forest offers an opportunity for the involvement of local communities and other stakeholders in the planning, management and utilization of the forest with the aim of improving livelihoods, ecosystem health, and equitable distribution of resources to the benefit for all. The plan therefore will ensure:

- Conservation goals are attained with minimum conflicts between the managing institution, communities and other stakeholders involved in safeguarding the interests of the forest reserve.
- Inclusion of forest adjacent communities through the CFA and other stakeholders in the decision making process for sustainable forest management.
- Improvement of rural livelihoods
- Equitable sharing of costs and benefits accrued from the management the forest. Stakeholders have formal agreements that are mutually enforceable, define their respective roles, responsibilities, benefits and authority in the management of Chuka forest (FMA).

Vision for Chuka forest

"An intact and fully functioning forest eco-system with maximum benefit to human-kind"

Plan purpose

The purpose of this plan is to ***"sustainably conserve, protect and utilize Chuka Forest ecosystem including its biodiversity*** **and** ***intrinsic values*****".** The achievement of the above goals and purpose will be achieved through the following objectives.

Management Objectives

The management objectives of this plan are in line with what is stipulated in the Forest Policy, Session paper No.1 of 2007.

The management objectives of this plan therefore are to -:

1. Contribute to poverty reduction; create employment, improve livelihood through sustainable use and contribute to the conservation and management of forests and trees.

2. Contribute to sustainable land use through soil, water and biodiversity conservation and tree planting though the sustainable management of forests and trees.
3. Promote the participation of private sector, communities and other stakeholders in forest management to conserve water catchment areas, create employment, reduce poverty and ensure the sustainability of the forest sector.
4. Promote farm forestry to produce timber, wood fuel and other forest products.
5. Promote forest extension to enable farmers and other stakeholders to benefit from forest management approaches and technologies.

Zonation

The zonation of Chuka forest was carried out by identifying clear external as well as internal physical boundaries based on available data and set criteria taking cognizance of regional, and local considerations.

The current Forest zonation criteria are based on vegetation type/land usage. The vegetation type dictate the type of management and conservation interventions put in place. Based on these zones, the forest management plan has been developed in consultation with the stakeholders by defining the program specific objectives, strategies and activities that will be implemented.

Based on participatory dialogues with the local communities using FGDs and sketch mapping as well as GIS Analysis –supported by Topographic maps sheet, aerial photos and Google maps conducted at ERMIS Africa Laboratory, Chuka forest depicted 3 zones i.e. Natural forest zone, productive zone, intervention zone

The plan proposes above mentioned zones in and around the forest with different characteristics as shown in table 4.1 while figure 4-1 shows their spatial distribution.

Table 4.1 Criteria and management options for various management zones

ZONE		CRITERIA	MANAGEMENT OPTIONS
Natural forest zone	Bamboo sub zone	Area consisting of climax vegetation Important biodiversity Water catchment area Herbal medicine Wildlife habitat Ecotourism sites	Studies and research Protection and minimal non-consumptive use Eco-Tourism
	Moorland sub zone outside the park	Area comprised of predominantly grass and scattered with a few alpine trees. Water catchment area Wildlife habitat area	Studies and research Protection and minimal non-consumptive use Eco-Tourism
Productive zone		All areas under tree plantations	Establishment of tree plantations for production of timber and poles
Intervention zone		Areas adjacent to the forest reserve currently under settlement with small	On-farm tree planting Crop and livestock husbandry

	holder farms.	Tree seedlings production Problem animal control Bee-keeping and other IGAs Awareness creation

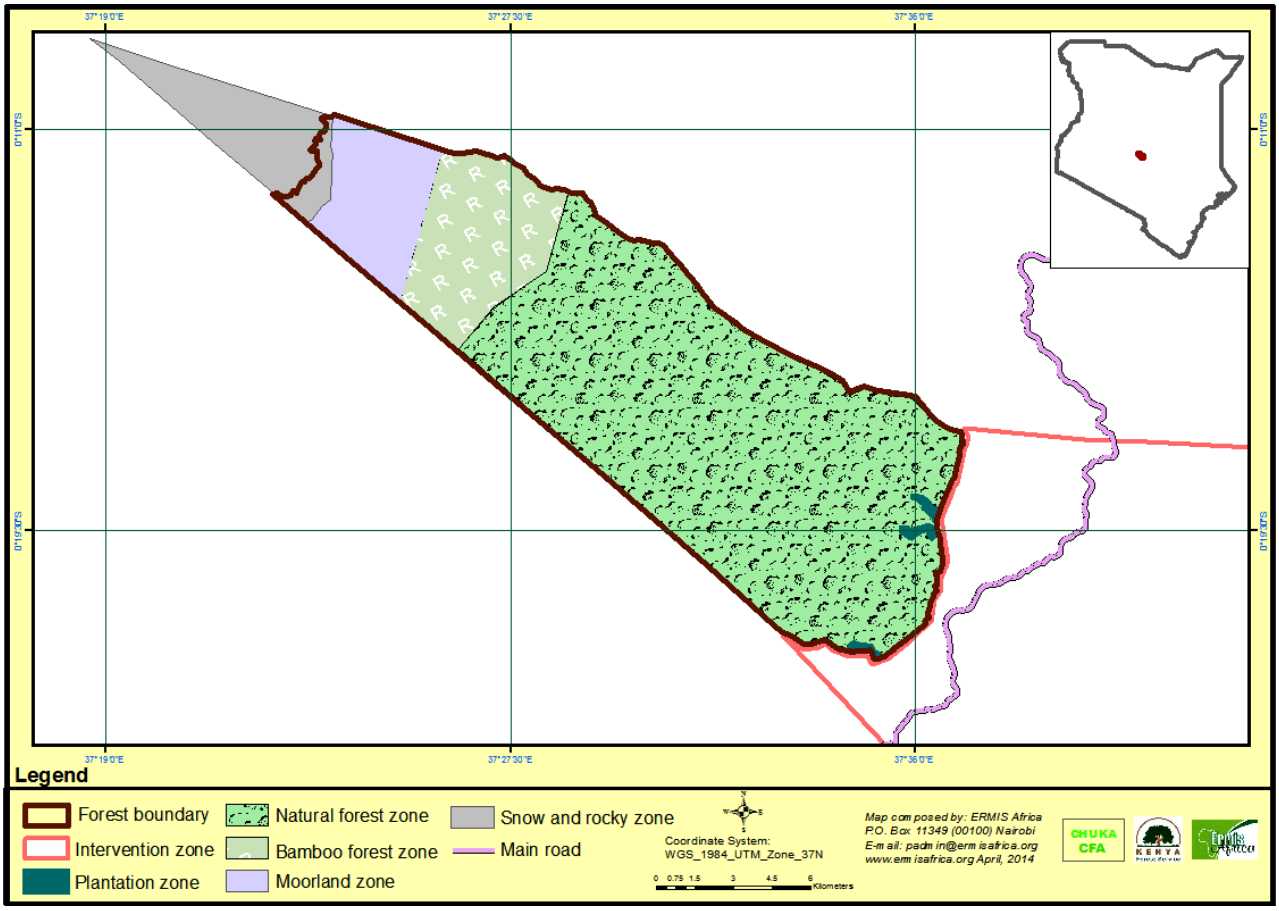


Figure 4.1 Map showing Chuka forest zones as per community traditional knowledge

CHAPTER 5

5 PROGRAMME AREAS OF INTERVENTIONS

Prescriptive Programmes

Five management programmes are presented below and for each; challenges, specific objectives, time frame, and lead agencies are given.

Each activity has been given a priority time frame rating from year 1–5 to indicate how soon it should be tackled in accordance with corresponding years in the plan. The time frame is also categorized in terms of 3 months time or quarters i.e. the intended plan shall be indicated to be done in a particular year and shall be specified on a 3 months basis or Quarterly (from Q1Y1-Q4Y5) as shown in the table below. The 5 year plan will be implemented containing 20 quarterlies to implement this C-PFMP.

Table 5.1 Quarterlies for the implementation of Chuka PFMP for 5 years

Year	Quarterlies			
Year 1 (Y1)	Y1Q1	Y1Q2	Y1Q3	Y1Q4
Year 2 (Y2)	Y2Q1	Y2Q2	Y2Q3	Y2Q4
Year 3 (Y3)	Y3Q1	Y3Q2	Y3Q3	Y3Q4
Year 4 (Y4)	Y4Q1	Y4Q2	Y4Q3	Y4Q4
Year 5 (Y5)	Y5Q1	Y5Q2	Y5Q3	Y5Q4

The five year plan will be implemented under five programmes with various components as discussed in the following sections.

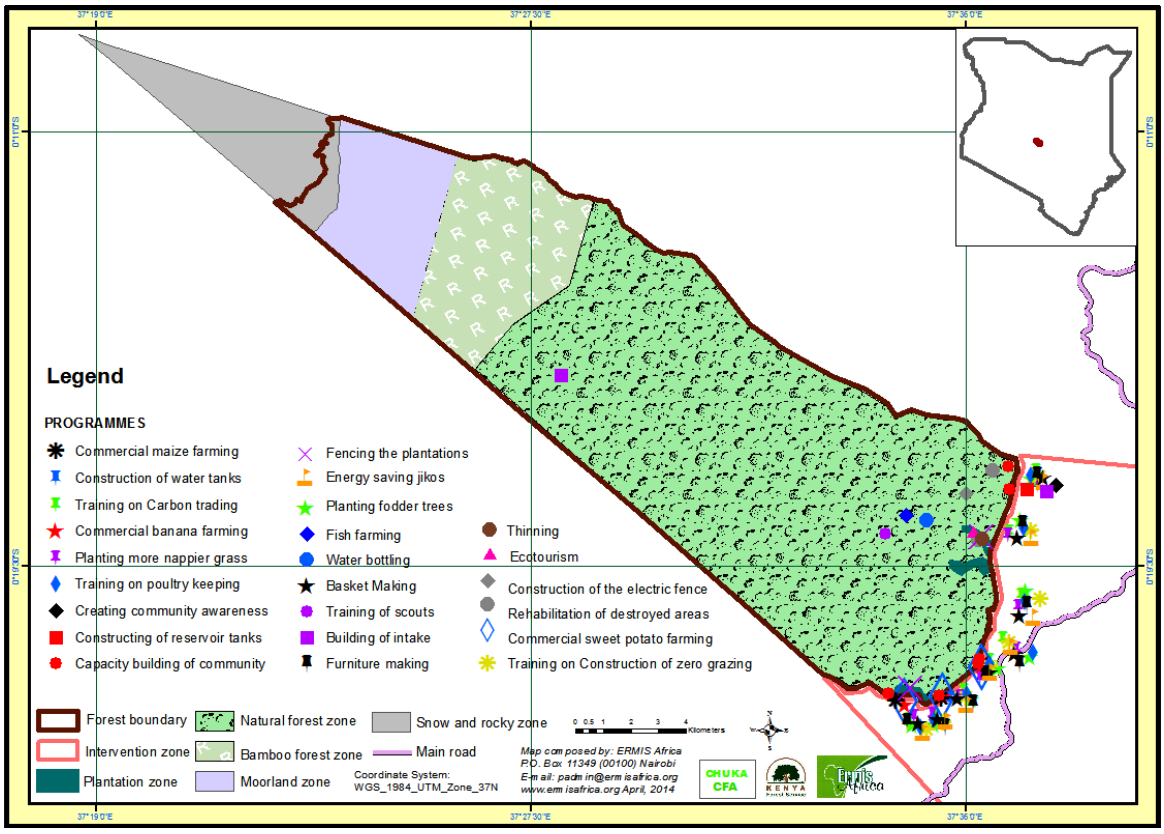


Figure 5.1: Map showing the proposed programmes in the three zones within Chuka forest

Forest conservation programme

The Forest conservation programme will have three components i.e. forest Conservation, Forest Protection & Security Management, and Eco-tourism Development.

Forest Conservation

Chuka Forest has great importance as a unique ecosystem which contains a number of flora and fauna species. The forest is surrounded by a rapidly increasing urban and rural population which is highly dependent on it for subsistence and commercial needs. Levels of unsustainable forest use have intensified, with increasing human population resulting in higher levels of resource degradation. These threats stem from an underestimation of the many values of biodiversity, and of the important contribution the forest makes to local livelihoods through the goods, services and other attributes its aesthetic importance.

5.1.1.1 Challenges to Forest Conservation Program

The main challenges to forest conservation include

i. Community inadequate knowledge on the contribution the forest makes to local livelihoods through the goods, services and other attributes due to its aesthetic importance.

ii. Forest fires

iii. Inadequate plans for to regulate the utilization of resources from the forest

iv. Requires more clarity on the boundaries of the forest

5.1.1.2 Objectives & Activities

The main objective of this programme is to; Promote the conservation of Chuka forest resources and preserve the integrity of the forest biodiversity.

Table 5.2: Objectives & activities for forest resources conservation

Specific objective	Strategies	Activity	Lead agencies	Time frame	BUDGET
Reduce pressure in utilization of various forest resources	Promoting the use of alternative energy sources to reduce reliance on fuel wood	Organize and facilitate village level training workshops on alternative sources of energy e.g. biogas and solar	Min of Energy, KFS, MKEECA, Tharaka Nithi County Government	Y1Q1	800,000
	Promoting the use of energy efficient fuel wood stoves (jikos)	Organize and facilitate village level training workshops on energy saving jikos	Min of Energy, KFS, MKEECA, Tharaka Nithi County Government	Y1Q1	900,000
		Train community members on the construction of energy saving jikos	Min of Energy, KFS, MKEECA, Tharaka Nithi County Government	Y1Q1	200,000
	Establish woodlots to provide alternative sources of fuel wood	Identify the sites to establish woodlots within the intervention zone	KFS, MKEECA, Tharaka Nithi County government	Y1Q1	300,000
		Establish woodlots at the identified sites	KFS, MKEECA, Tharaka Nithi County government	Y1Q1	200,000
	Promote zero grazing to alleviate forest illegal grazing	Organize and conduct awareness forums on zero grazing in the community	KFS, MKEECA, Tharaka Nithi County government, MoALF	2 MONTHS Y1Q1	400,000
		Organize training activities for interested	KFS, MKEECA, Tharaka Nithi	Y1Q1	500,000

		community members on establishing zero grazing units	County government, MoALF		
		Assist interested members to acquire capital to establish zero grazing units	KFS, MKEECA, Tharaka Nithi County government, MoALF	1 MONTH Y1Q1	1M
Improve local awareness of biodiversity values and advise county authorities to embrace green economy	Increase community and stakeholders awareness on biodiversity values, forest conservation and green economy.	Mobilize the Community to attend awareness meeting -Training on green value chains that promote conservation	MKEECA/KFS	YIQ2	1M
		Production of education materials and teaching aids e.g. posters, booklets, video clips e.t.c	MKEECA, KFS, Tharaka Nithi County Government	YIQ2	200,000
		Organize and facilitate awareness creation in village level barazas	MKEECA, KFS, Tharaka Nithi County Government	1MONTH YIQ2	1M
Realign the forest boundaries	Delineate and realign the forest boundaries	Create awareness in the community and conduct consultative village level meetings on the boundary alignment	KFS, MKEECA , Tharaka Nithi County government, relevant stakeholders	YIQ3	500,000
		-Survey and align the forest boundary. -Replace missing beacons. -Plant trees along the boundary.	KFS, MKEECA , Tharaka Nithi County government, relevant stakeholders	2 MONTHS YIQ3	500,000

		Create awareness in the community on the realigned forest boundaries	KFS, MKEECA, Tharaka Nithi County government	YIQ3	100,000
Undertake restoration of degraded natural forest	Establish tree nurseries to supply indigenous and exotic tree species per year with a special emphasis on Ocotea usambarensis propagation	Identify the sites for establishing the nurseries in each location	MKEECA, KFS/KEFRI	1 MONTH Y1Q4	200,000
		Construct water reservoirs 225M^3 Purchase of 16M3 storage tanks	MKEECA/ KFS	Y1Q4	20M
		Purchase equipment/farm inputs for the nursery including jembes, pangas, fork jembe, watering cans, rakes e.t.c.	MKEECA, KFS	Y1Q4	1.5M
		Train 6 nursery attendants	MKEECA, KFS/KEFRI	1 MONTH Y1Q4	100,000
		Obtain seeds and wildlings to stock the nurseries	MKEECA, KFS, KEFRI	1 MONTH Y1Q4	300,000
	Replant the deforested areas with indigenous trees	Identify and map areas of priority for rehabilitation	MKEECA, KFS	1 MONTH Y1Q4	100,000
		Conduct tree planting exercise twice per year (during the rainy seasons)	MKEECA KFS	Y1Q4	2M

Forest Protection & Security

Human pressure in the form of unsustainable utilization and harvesting of forest products is one of the causes of forest degradation in Chuka forest. The forest has been met by various challenges that have decimated it quantitatively and qualitatively. This has had implication on both fauna and flora in terms of their richness and diversity.

5.1.1.3 Challenges to Protection & Security of Chuka Forest

Some of issues cited that are of concern to protection and security of the forest are:

1. Human-wildlife conflict, especially the destruction of food crops by wild animals,
2. Degradation of the reserve driven by Camphor poaching in the forest,
3. Forest fires

5.1.1.4 Objectives and Activities

The main objective of this program is; To reduce significantly levels of illegal practices in the forest so as to conserve its biodiversity..

Table 5.3 Objectives and activities for forest protection and security program

STRATEGY	ACTIVITY	LEAD AGENCIES	TIME FRAME	BUDGET
Increase awareness levels on illegal forest activities and appropriate legislation	Conduct village level awareness creation meetings on negative impacts of illegal activities on forest resources	KFS, Tharaka Nithi County government	1 MONTH Y2Q1	400,000
	Conduct village level awareness creation meetings on all relevant legislation and policies on forests	KFS, Tharaka Nithi County government	Y2Q1	600,000
Involve forest adjacent communities in forest protection	Conduct awareness creation meetings at village levels on forest policies and community's right to participate in forest management and conservation as well as their user rights	MKEECA, KFS, Tharaka Nithi County government	1 MONTH Y2Q2	800,000
	Identify 40 youths (10 per location) to constitute 4 Community forest patrol units (scouts)	MKEECA, KFS, Tharaka Nithi County government	1 MONTH Y2Q2	200,000
	Train the youth units on forest policing	MKEECA, KFS, Tharaka Nithi County government	2 MONTH Y2Q2	800,000
	Introduce local incentives for reporting or catching poachers, loggers and other illegal users in villages adjacent to the forest	MKEECA, KFS, Tharaka Nithi County government	1 MONTH Y2Q2	200,000
Improve the effectiveness of	Conduct follow-up and refresher training for	MKEECA, KFS, Tharaka Nithi	1 MONTH Y2Q3	500,000

patrolling	scouts & forest rangers on skills needed for effective forest protection.	County government		
	Develop a rewarding system for the scouts and forest rangers	MKEECA, KFS, Tharaka Nithi County government	1 MONTH Y2Q3	200,000
	Acquire appropriate patrol equipment including communication equipment (VHF, Mobile phones) to improve effectiveness and efficiency of patrols Improve road networks	MKEECA, KFS, Tharaka Nithi County government	Y2Q3	2M
Take measures to prevent and control forest fires	Create awareness in the community on the dangers and impacts of forest fires	KFS, MKEECA, Tharaka Nithi County government	1 MONTH Y2Q4	200 000
	Identify 40 youths (10 from each location) to establish a community firefighting unit	KFS, MKEECA, Tharaka Nithi County government	1 MONTH Y2Q4	100,000
	Purchase firefighting equipment and tools Establish fire towers in each beat	KFS, MKEECA, Tharaka Nithi County government	1 MONTH Y2Q4	5M
	Conduct a two week training for the firefighters together with forest guards & scouts to equip them with necessary skills	KFS, MKEECA, Tharaka Nithi County government	1 MONTH Y2Q4	250,000
	Create fire breaks in the forest to control fire spread	KFS, MKEECA, Tharaka Nithi County government	2 QRT Y2Q4	500,000

Eco-tourism Development

Ecotourism was first defined as *"travelling to relatively undisturbed or uncontaminated natural areas with the specific objective of studying, admiring, and enjoying the scenery and its wild plants and animals, as well as existing cultural manifestation (both past and present) found in*

these areas". Although the origins of the concept of ecotourism are not certain, the 4 principles of ecotourism as identified by Hetzer (1965) are:-

1. Minimizing environmental impacts
2. Respecting the host cultures
3. Maximizing benefits to local people and
4. Maximizing tourist satisfaction

The unique biodiversity of Chuka forest is an important asset with the potential to generate revenue in a non-destructive way and add value to the forest resource. However, development of infrastructure and facilities is required to make the forest an attractive eco-tourist destination and to create opportunities for eco-tourism.

5.1.1.5 Challenges in Eco-Tourism

Some of the cited issues/challenges critical to the development of tourism in Chuka forest are:-

1. Inadequate resources to undertake detailed feasibility appraisal to identify tourist attraction sites,
2. Inadequate expertise for enterprise development and marketing,

5.1.1.6 Objective and activities

The main objective is to promote the establishment of community based eco-tourism within Chuka Forest for increased revenue and improved livelihoods of local communities.

Table 5.4 Objectives and activities for eco-tourism program

STRATEGY	ACTIVITY	LEAD AGENCIES	TIME FRAME	BUDGET
Conducting feasibility study to ascertain the eco- tourism potential of the forest	Mapping and appraisal of sites with potential for (eco)-tourism	MKEECA, KFS, Tharaka Nithi County Government, Min. of tourism, KWS, NEMA, WRMA, CU	1 MONTH Y3Q1	450,000
	Identify and document (eco)-tourism players already or potentially able to invest in Chuka forest	MKEECA, KFS, Tharaka Nithi County Government, Min. of tourism, KWS, NEMA, WRMA, CU	Y3Q1	500,000
Establish and support planning structure for community	Appoint a team drawn from all relevant stakeholders to spearhead the	MKEECA, KFS, Tharaka Nithi County Government, Min. of tourism,	Y3Q1	350,000

based eco-tourism	planning and establishment of eco-tourism enterprises	KWS, NEMA, WRMA, CU		
	Organize training and exposure visits for the Community-based (eco)-tourism Team	MKEECA, KFS, Tharaka Nithi County Government	Y3Q2	800,000
	Organize meetings to formulate strategies for developing eco-tourism enterprises	MKEECA, KFS, Tharaka Nithi County Government	Y3Q2	300,000
Initiate partnership building with potential investors and relevant stakeholders	Organize a strategic forum for investors interested in Chuka forest, including in (eco)-tourism sub-sector	MKEECA, KFS, Tharaka Nithi County Government	Y3Q2	600,000
	Organize a strategic forum to Link existing and emerging locally-based and foreign (eco)-tourism prospectors with financial institutions	MKEECA, KFS, Tharaka Nithi County Government	Y3Q3	300,000
Establish appropriate infrastructure and facilities to support eco-tourism	Improve existing forest access roads or establish new ones where there are none	MKEECA, KFS, Tharaka Nithi County Government, Min. of tourism, KWS, NEMA, WRMA	YR3&YR4	5M
	Develop nature trails to various sites in the forest and climbing trails for use by mountain climbers to the peak	MKEECA, KFS, Tharaka Nithi County Government, Min. of tourism, KWS, NEMA, WRMA	6 MONTHS Y3Q3-4	2.5M
	Develop eco-lodges and other accommodation facilities/campsites	MKEECA, KFS, Tharaka Nithi County Government, Min. of tourism, KWS, NEMA, WRMA	2 YEARS YR3 &YR4	18M
	Recruit and train local forest/tour guides	MKEECA, KFS, Tharaka Nithi County Government, Min. of tourism, KWS,	Y3Q3	800,000

Establish mechanisms for community benefits from eco-tourism	Establish a benefit sharing mechanism between investors, county government, KFS, the community and other relevant stakeholders	MKEECA, KFS, Tharaka Nithi County Government, Min. of tourism, KWS, NEMA, WRMA	Y3Q4	300,000
	Train the community on enterprise development in areas necessary to support the eco-tourism activities	MKEECA/KFS Tharaka Nithi County Government, Min. of tourism, KWS, NEMA, WRMA	Y3Q4	1.5M
Marketing ecotourism ventures	Establish networks for marketing eco-tourism enterprises i.e. engaging an investor in enterprise development	MKEECA/KFS Tharaka Nithi County Government, Min. of tourism, KWS, NEMA, WRMA	Y1-Y5	200,000
	Exploring existing markets for forest-based products and develop database	MKEECA/KFS Tharaka Nithi County Government, Min. of tourism, KWS, NEMA, WRMA	Y3Q4	200,000

Link ventures to existing tourism networks

The Chuka CFA indicated that depending on the level of expertise, resources and commitment required to establish and run the eco-tourism enterprises (to be determined after the initial feasibility studies), the community might consider engaging an investor to develop all the enterprises and enter an agreement on how the community would benefit e.g. by sharing in the profits, employment for local community members etc.

Community Development Programme

Community Development Programme in Chuka Forest has been developed to be implemented in the intervention zone. Subsistence use of Chuka Forest is probably the greatest single threat to its unique biodiversity, but it is the aspect of the forest which is most valued amongst forest-adjacent villages. Local communities are dependent on the forest for a range of their livelihood needs including:-

- Source of fuel wood
- Poles/timber
- Fruits
- Medicinal plants
- Fodder
- Food crop farming
- Bee Keeping
- Water abstraction
- Fish farming (Trout)

As adjacent populations increase, forest resources are dwindling, leading to degradation and adverse impacts on biodiversity. However, forest dependency leading to unsustainable utilization is a symptom of poverty and as such it is important to address the causes of poverty, rather than its effects.

5.1.1.7 Challenges to Community development Program

1. Limited capital and incentives to start IGAs
2. Limited technical know how
3. Limited land for implementations
4. Inadequate market information for finished products and services

5.1.1.8 Objectives & Activities

The main objective of this programme is; to contribute to conservation of Chuka forest by supporting implementation of livelihood activities on farm and NBFP in the forest.

This objective is aimed at addressing the causes of poverty amongst forest-adjacent communities This will include interventions seeking to support sustainable livelihoods, with a particular focus on the poorer members of the community who tend to be most forest-dependent.

Particular attention will be given to supporting and promoting income generation activities which either utilize the forest in non-destructive ways, or provide an alternative source of income or forest products from outside the forest to reduce pressure on forests.

Table 5.5 :Proposed development programmes from Kiangondu, Kirege & Karamani locations

ZONE	THREATS	ACTIVITIES	INPUT	REQUIREMENT ESTIMATES	PARTNERS/ DONORS
INTERVENTION	Fuelwood	-Use of energy saving jikos	Training from expert	3,000 per jiko x 200 members 600,000	DANIDA, JICA, French Embassy, CDTF, CDF & KFCA
	Water shortage	Construction of tanks Drip irrigation	-Materials -Labour	4M	WRMA KFS CFA
		Rehabilitation of riparian areas through pegging	-Beacons -Labour	2M	WRMA KFS CFA
		Tree planting along the catchments	-Seedlings -Labour	1M	WRMA KFS CFA
PLANTATION ZONE	Poaching	Recruitment & training of scouts	-Trainers & trainees facilitation -Venue hire	200,000	KFS, CFA
	Food insecurity	Agro-forestry	-Labour -Fertilizer -Seedlings	1M	KFS, CFA
	unsustainable firewood collection	-Thinning Biogas Solar	-Labour -Revenue	200,000	KFS, CFA
		-Training on use & adoption of alternative energy source	Trainers & trainees facilitation -Venue hire Purchase of energy saving stoves	2M	KFS, CFA
NATURAL FOREST	Forest fires	Recruit & train scouts on fire fighting	-Trainers & trainees facilitation	2M	KWS,CFA,KFS

		-Venue hire -Purchase of fire fighting equipments		
Illegal poaching of wild animals	Recruiting & training forest guards -Establishment of forest guard post	- Trainers & trainees facilitation -Venue hire	3M	KWS, CFA.KFS
Illegal grazing	Construction of zero grazing unit	-Training -Construction materials	2M	KWS, CFA, KFS
Increased poverty	Practice Bee-keeping	-Beehives	500,000	CDF, CFA, COUNTY, OTHER DONORS
	Fish farming	-Fish pond, -pond liners, fingerlings, fishmeal	2M	IFAD,ICIPE, MOA,
	Venturing into Ecotourism	-land surveying for appropriate sites for eco-tourism	1M	CFA, KFS
		-Establishment of eco-loudges	2M	CFA, KFS
		-Road repair & maintenance	4M	CFA, KFS
	Water bottling	Packing machine	500,000	County, CDF, KFS, KWs, CDTF & CFA
	Other IGAs like Furniture making, toothpick making, basket making,	Capital Labour manpower, transport, marketing	2M	KFS& CFA
	Quarrying stones, hardcore, dust	Labour, transport, tools, licence	1M	CFA, KFS, County Govt.
	Carbon trading	Tools, training	500,000	GEF, KFS, CFA and Upper Tana County Govt.

Table 5.6: Proposed development programmes from Thambo, Thuita & Njuri locations

ZONE	THREAT	PROPOSED ACTIVITY	INPUT	ESTIMATED COST
INTERVENTION ZONE	1. Water shortage	Rehabilitation of the catchment by: -Pegging the riparian areas (4km) Planting of trees	-Beacons -materials -manpower	4kmx1000m x 50/beacon; 100m 4 pple x 7days x 300 1bag cement@800, ballast 4WB x 300, sand 6WB x 150
		Rain water harvesting by : -Construction of water tanks (100m3) at Njuri -Purchase plastic tank 60,000l	-materials -manpower -plastic tank	4000x30x1500 = 18,000 = 180x300 10,000 100 = 54,000/ 1 tank @ 4million 1expert x 30days x 500; 3 casual x 30 days x 300 1 tank @ 100,000/=
	2. Firewood shortage	Reduce forest pressure by: -Establishment of woodlots	-manpower	100hhx2000x1manx300
		-Training on use & adoption of alternative energy sources	Biogas (15 5 /location) -training personnel -trainees 100 / location Energy saving jikos -training personnel -trainees	15biogas x 100,000 2 experts x 3days x 1000 300x3x300 15jikos x 1500 2 experts x 3days x 1000 300 3 x 300
	3.Fodder shortage	Establish more alternative sources by: -planting more nappier grass	planting materials 10m x 10mplot/hh x 200hh	100m2 = 400 clonesx5/stem x 200 0.5 x 0.5
		-planting fodder trees	-Certified seeds (Callindria sp, sespania sp)	300 stem 1 ¼ ha x 5/= x 200hh
	4.Poverty due to	Generate more income through:	-0.4ha plot x stems/hh	1000stems x 50 = 50,000

	limited income sources	-Commercial banana farming	-manpower 20hole/day/man -manure 1wb/hole fertilizer 1kg/4holes	50x300 = 15,000 1000WB x 100=100,000 250x400 =2,000 50
		-Commercial sweet potato farming	-shamba 0.4ha terracing -planting material 9 stems / m^2 10stems @ 5	3days x 1man x 300 4000x 9 x 5 = 18,000 100
		-Commercial maize farming	Manure 100g/hole 9 holes / m2 Fertilizer 5g/hole Buldock (chemical) 1g/stem Follier feed 400ml/20l pump	4000x 9 = 36,000 x 100g/100 100g 36,000x5g= 180kg x 80 = 14,400 1000 50 36000 x 1g = 36kg 1000 100/=
PRODUCTION ZONE	1.Forest fires	-Opening up firebreaks (5km x 5 plantation)	-Manpower	25km x 1000 x 300 = 2om 375,000/=
		-Training scouts/community on fire fighting tactics	-Training personnel -Trainees (2 trainees per area = 6)	2 personnelx7days x2000 = 28,000/= 6x7daysx300 =12,000/=
	2.Illegal logging	-Recruiting & training guards and scouts on forest patrolling	-Training personnel -Trainees 6 (2 per area)	2 personnelx7days x2000 = 28,000/= 6x7daysx300 =12,000/=
	3.Overgrazing / illegal grazing	-Fencing the plantations	-Posts	54km x 1000 x 200/post 2 = 5,400,000/-
		-participation of administration in guarding	-sensitization of local authority	300,000
	1. Destruction of plantations	-Construction of an electric fence	-posts	54km x 1000 x 200/post 2 =

	by wildlife		-electric wire -manpower	5,400,000/- 54kmx1000 = 27000 posts = 2 5post/day = 5400 days x 300/=
	5.Limited land for production	-Opening up plantations for PELIS	Potato seeds, maize seeds, sweet potato planting material, pumpkin seeds	500,000
NATURAL FOREST ZONE	1. Underutilized opportunities	-Training on participation into carbon trade	-Training-personnel -Trainees (300/100/area	2 personnel x 1dayx2000 =4,000 300x1dayx300=90,000/=
		-Planting more trees to increase carbon cover	Manpower (200ha for rehab-bilitation)	1200x1500seeds/ha/100 =1800x300 =5,4000,000
	2. Degraded glades	-Planting indigenous seedlings on the degraded areas (wildlings)	-manpower	1200 X 1500 Seeds 100 = 18,000 x 300
	3. Forest fires	-open up firebreaks (7m x 2 ½ km)	-Manpower	25km x 1000 x 300 = 2om 375,000/=
	4. Illegal logging	-Enforcement of laws against illegal logging -Training on forest conservation -Training scouts/guards to conserve forest -Involve community in conservation	- training personnel - trainees -Community sensitization and awareness creation	2 personnel x 1dayx2,000 300 people x1dayx300 400,000

Table 5.7: Community Development programmes for Gatua and Mitheru locations

THREAT	PROPOSED ACTIVITY	INPUT	ESTIMATED COST
	INTERVENTION ZONE		
Water Shortage	1. Building of intake, 2. Trenching, fitting of pipes and back filling 3. Constructing of reservoir tanks	- Capital required for purchasing materials - Manpower (labour) - Technical support - Authorization (permit)	1.Quarry stones 9x9 1350RF @ 40 Sand – 3 lorries @ 20,000 Ballast ¼, ½ mixed 3 lorries @ 15,000 Athi river cement 200 bags@800 Reinforced bars y10 20@800 Y12 40@1000 Hoopwire 2 rolls @ 4000 Bindingwire 6 rolls @ 450 Water proof 200kgs@400 Timbers 1x1 600 R.F @ 25 3x2 600 R.F @ 25 Oval nails 10kgs 2 ½ @160 5kgs 3" @ 160 Hardcore filling 2 lorries@8000 Empty bags 200 lorries @ 40 Wash out pipe 12" @ 14000 Sluice valve 12" @ 14,000 Outlet pipe 12" @ 14,000 Sluice pipe @ 18,500 Sleeve 1@12,000 labourcharge@ 25% of total cost miscellaneous 5% of total cost 2. 12"pipe Class D 85 x 4,000 10" pipe Class D 167 x 12,000 Class C 581 x 8000 3. Building stones 225mm 2 lorries@16000 Electing stones 2 lorries @13,000 Building sand 3 lorries @ 20,000 Ballast ¼, ½ 4 lorres@15,000 Hardcore filling 2 lorries @ 8000 Cement 200 bags @ 800 Waterproof cement 200kgs@400 Y10 bars 50 pieces @ 800 Y16bars 50 pieces @ 800

			Binding wire 6 rolls @ 450 Timber 6x1 300 R.F @ 25 3x2 300 R.F @ 25 Trops 200pcs @ 150 Pipe 8"metallic @ 70,000 Washout pipe 8"class D @10,000 Outlet pipe 8 @ class D @10,000 Sluice valve outlet 8' class D @70,000
Forest degradation	1 Rehabilitation of degraded areas 2. training of scouts 3.Capacity building of community (20pax per network)	1.Nursery water source tools & equipment water storage tank capital Nursery attendants 2. Capital technical support form /ID card 3.Card 4.Technical support	1. Polythene tubes 5000 @8 Water tanks (5000L) 8 tanks@30,000 Watering cans 16x500 Horsepipes (1 per nursery)8pipes@600 Wheelbarrows (1 per nursery) 8 @ 2000 Forked jembe (2 per nursery) 16@700 Spades (2 per nursery) 16 spades @ 600 Pangas (2 per nursery)16 @ 800 Fertilizer compound (150kg/nursery)@2500 2. Trainer's fee@10,000x2scoutsx6days Training venue@3000 per dayx6days Refreshment/meals@400/day/6daysx16pax Stationery Uniform - 16raincoats@1200 - 1pairs gumboots@700 - 16 whistles@200 - 16torches@300 - 16cellphone@3,000 - 16panga@800 - Scouts identification cards@100 3.trainers fee @3,000/dayx3x8days Community facilitation300pax x 20x8groups
Wildlife-human conflict	1.construction of the electric fence(KFS/KWS 2.community labour during construction 3. Creating community awareness	-capital -labour -technical team -security -facilitation	1.KWS/KFS 2.Community labour 5 paxx300x8 3. 4 workshops – 100pax x 300/dayx4
Poaching	Increase regular	1.Capital for	

	patrols of forestguard/ scouts Replanting trees(40ha) Creating community awareness	scouts allowances – trainers and trainees 2. nurseries for seedlings community 3 Organized meetings facilitators	 2. 40hax1,000seedlingsx20 Labour @ 15,000perha x 40 Manual labour@150x40,000 planting@5/= per seedlings x 40,000 transport 4 workshops 100pax x 4x300 facilitators@3,000x3x4
Forest fires	Maintaining the breaks Capacity building for fire responders Community awareness Erection of fire towers Purchase of fire fighting equipments	Capital Trainers Community workshops	2M 500M
Livelihood improvement	Income generating activities Alternative energy (energy saving jikos) Ecotourism; permitting, construct campsites, marketing	Bee keeping; Fish farming Demonstration sites Campsite construction	3M 3M 10M

Human Resources, Infrastructure & Equipment Programme

The following are components to be implemented under this Program

- Component 1: Infrastructure & Equipment Development
- Component 2: Human Resources Development

Infrastructure & Equipment Development

In order to achieve the forest management objectives for Chuka Forest, a certain level of infrastructure and equipments are required. Roads, buildings and vehicles are all essential to sound management of the forest, but they cannot be constructed, purchased or maintained without considerable financial expenditure. For administrative functions, the provision of adequate office space, equipment and computers is required.

5.1.1.9 Objective and activities

To establish/maintain the infrastructures and provide equipment necessary to achieve the multiple objectives of forest management.

Table 5.8 Status of the infrastructure and equipments in Chuka forest

Items/particulars	Current Status	Actions Required	Lead Agencies	Time frame	Estimated Cost
Maintaining road networks	Poor	To grade the roads To repair culverts, bridges	KFS, KTDA County Government KWS	Immediately	25M
Maintain office building and providing equipment	Poor	Reconstruct the office building	KFS	Immediately	3M
Capital Equipments , tools and	Poor	Purchase a vehicle, Communication	KFS	Urgent	2M

implements		system e. g VHF radio and Supplies for production			
Machinery & other Equipments	Poor	Purchase machinery and provide funds for maintenance and repairs	KFS	+1	3M
Staff Housing	Poor	Refurbish staff houses	KFS	Urgent	2.6M

Human Resources Development

Human resource development concerns the institutions and the individuals who are responsible for implementing the C-PFMP for sustainable forest management. The persons involved in the management of Chuka forest need not only to be in adequate numbers but also to possess the appropriate skills and competence to carry out their roles and responsibilities. As such, developing the human resource in Chuka may involve the hiring of additional staff as well as organizing and facilitating the training of the personnel in relevant areas.

Table 2.5 showed the current staff at the Chuka Forest station office and the CFA, the optimal number in each designation and the deficit that need to be filled for optimal effectiveness and efficiency. Besides providing for the required staff, other aspects like training and motivation will be included in the human resource development programme to ensure that the staff are capable of handling their duties effectively.

Water Resource Management Programme

Chuka forest is the source of 6 permanent rivers namely; Nithi, Tungu, Ruguti,Thuci, Naka and Giatuambugi all of which feed into the Tana river drainage basin. As such, a Water Resource Management program is required to guarantee and enhance efficiency in water access and use. The strategies that address the following challenges shall be put in place:-

5.1.1.10 Objectives and Activities

The overall objective of this programme is; To conserve the water catchment, develop water infrastructure and rehabilitate the riparian zones in Chuka forest and beyond in order to enhance water availability.

Table 5.9 Summary of activities to be undertaken under Water Catchments Program

Specific Objective	Strategy	Activities	Lead Agencies	Time	BUDGET
Enhance Protection and conservation of Water Catchments	Rehabilitation of degraded water catchment areas in and outside the forest	Identify and map degraded sites with Gituambugi, tungu, Bwee, Nithi rivers Prepare a rehabilitation plan Plant indigenous seedlings per year to restore forest cover in degraded areas and around river catchments	WRMA, local WRUAs, KFS, MKEECA, NEMA, CU	5 YEARS YR1-YR5	3.5M
	Prevent/reduce soil erosion along the rivers	Plant trees and other cover crops/grass along the rivers to reduce erosion	MKEECA/KFS	5 YEARS YR1-YR5	12.5M
		Construct gabions in the heavily eroded areas (gulleys).	MKEECA/KFS	2.5YRS YR3-YR5	4.2M
	Protection of the few water springs available	-Plant indigenous tree species around the spring catchments	MKEECA/KFS	Y5	1M
Develop & manage Water infrastructure	Increasing Water supply to households	-Building of more water intake, -Trenching, fitting of pipes and back filling -Constructing of reservoir tanks at each intake	WRMA, local WRUAs, MKEECA, County water office	Y5	2M
	Promoting rainwater and runoff harvesting	Conduct awareness creation on rainwater and runoff harvesting	WRMA, local WRUAs, MKEECA, County water office	Y5Q1	700,000
		Install RWH systems for vulnerable /needy members to act as demonstration sites 1 per location for RWH systems	WRMA, local WRUAs, MKEECA, County water office	Y5Q1	700,000
		Establish at least 8 demonstration sites per location for small scale runoff harvesting.	WRMA, local WRUAs, MKEECA, County water office	1 YEAR YR5	3.5M
		Construct 8 water pans (1 per network) per year over 5 years to increase water access	WRMA, local WRUAs, MKEECA, County water	2 YEARS YR4-YR5	2.8M

			office, KFS, NEMA, county government		

6 CHAPTER 6: PLAN IMPLEMENTATION

Crosscutting issues

The implementation of the PFMP will be guided by a framework of principles which will be consultatively developed by the management committee. The principles will be crucial for the sound planning, implementation, monitoring and evaluation of the PFMP.

Gender Equity

Gender will be mainstreamed within the CFA and management committee. Equitable representation of women, men, youth and vulnerable groups will be ensured in every aspect of implementing the PFMP. Community awareness, education and training will be conducted to ensure all the interest groups with the community are integrated within the implementation structures of the PFMP.

HIV AIDS

HIV/AIDS will be mainstreamed as a common practice adopted both locally and internationally. Representatives affected shall not be discriminated nor looked upon when implementing this Management Plan. This shall further be improved to include representatives from people affected/living with HIV/AIDS in the CFA and Management Committees.

Marginalized groups

Marginalized groups or disadvantaged groups including indigenous people living adjacent to Chuka forest shall not be discriminated when implementing this management plan. This may further be enhanced by having on board a representation of members of the society who identify themselves as marginalized, vulnerable, indigenous or those who are disadvantaged in other means known to the general public, in the CFA and the Management Committee.

Indigenous knowledge

Indigenous knowledge contributes to the conservation and the enhancement of biodiversity. However, holders of such knowledge or indigenous communities tend to be left out of the conservation and management process, even though many indigenous groups not only live in the forest, but also rely on the forest ecosystem for subsistence. Indigenous communities may be best suited for conservation management as they depend of the resources of the forest, and therefore have a clear incentive to manage the forest sustainably.

In this regard, this management plan shall take into consideration the views of such indigenous knowledge holders, with view of putting them into practice, so long as such practice shall not jeopardize the management objectives laid down in this management plan.

Resource mobilization

Financial Management

KFS receives both recurrent and development funds for conducting administrative roles and operational activities. Commensurate with the existing global financial crisis that has been felt within the national treasury, fund allocations are limited. The PFMP therefore recommends stringent financial management of the available funds.

Sound financial management plans will involve confining the expenditure within the budget lines and activities. Reviews will be done on an annual basis to dovetail the operations in accordance planned activities, available funds, and inflation rates at the time of review. As proposed by the policy that part of the revenues generated be retained, the station will benefit by optimizing revenue collection, retention and expenditure limitation to support the implementation of Chuka Forest PFMP.

Partnerships and Networking

Working partnership arrangements shall be established between government agencies and other stakeholder groups in civil society in order to implement actions. Experiences with other Forests in Kenya suggest that partnership arrangements between different government agencies and other groups in civil society can be an effective way to create joint responsibility and “ownership” of actions. No single body or organization has the sole right to plan, implement, and benefit from actions, and best results will come through collaborative efforts

Transparency & Accountability

Transparency and accountability will be observed by inclusion of all interest groups in decision making and implementation. Accountability will be ensure by publishing budgets and financial reports on the CFA notice-board to keep the community abreast with funding available, allocations, and activities. This approach is fundamental to developing, maintaining and improving rapport and trust among the institutions/organizations engaged in the implementation of the PFMP.

Funding

Supplementary funds will be raised by joint fundraising by the CFA and KFS and other development partners to meet the substantial funds required for the implementation of the PFMP. Key activities that KFS will need to fund include: purchase of capital equipment, plants and construction and rehabilitation of roads, buildings, outposts, fire towers and water supply system.

On the other hand, the CFA will require to fund community development projects such as non-consumptive forest-based enterprise e.g. eco-tourism, recreational sites, beekeeping, aqua-culture, and herbal medicine. In addition, they will need funding for on-farm activities that alleviate poverty and over reliance on the forest property including agro-forestry and water harvesting, soil and water conservation activities, dairy goats, zero grazing, horticulture activities.

Revenue projection

Revenue collections from Chuka forest have been on tremendous trend shifts for the last four years with 2010 recording the highest revenue collection followed by a tremendous drop in 2011 and 2012. The collection increased again by 2013 hoping the same trend will be maintained in the year 2014 and the following years. The projections are as shown on figure 6.1.

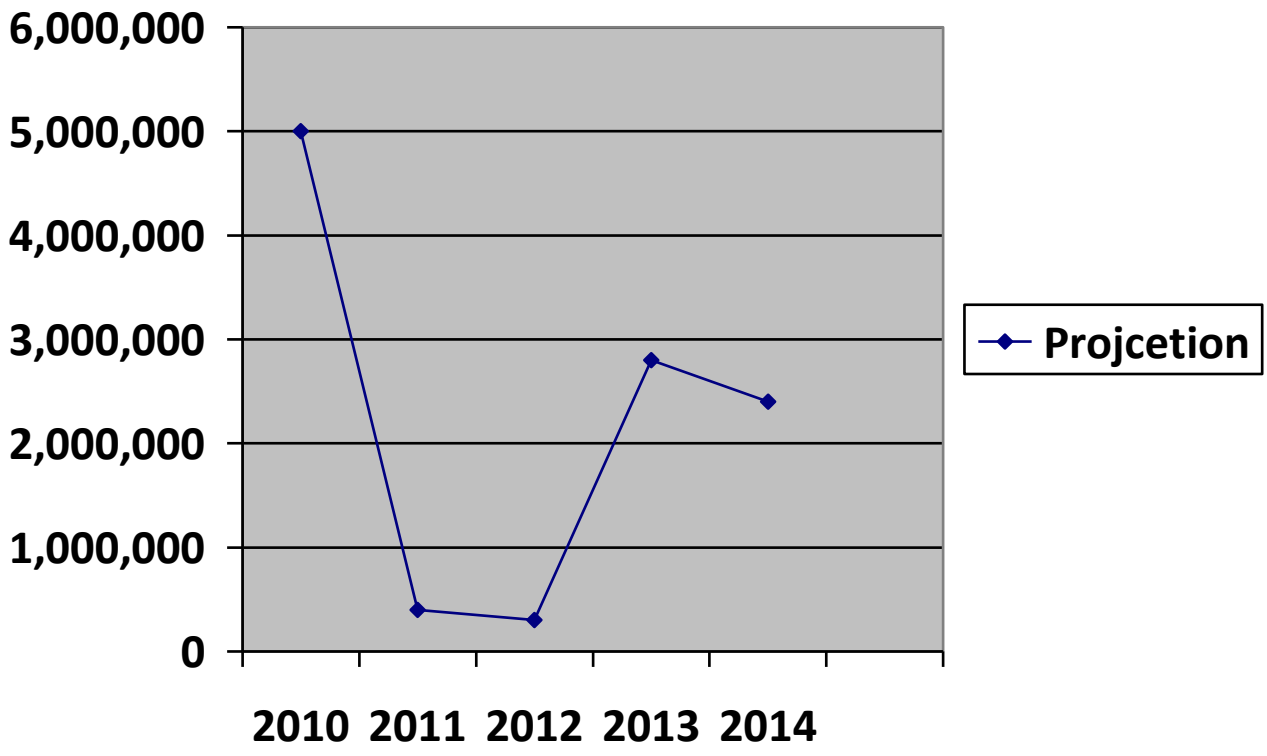


Figure 6.1: Revenue projections from Chuka forest

(Source: Chuka Forest Station)

Community Representation in Forest Management

MKEECA CFA is an umbrella body which brings together all social groups of different nature in Chuka area. As such there is open entry of community members into the CFA by joining any of the constituent grass root structures or User Groups. Proper guidelines should be drawn to

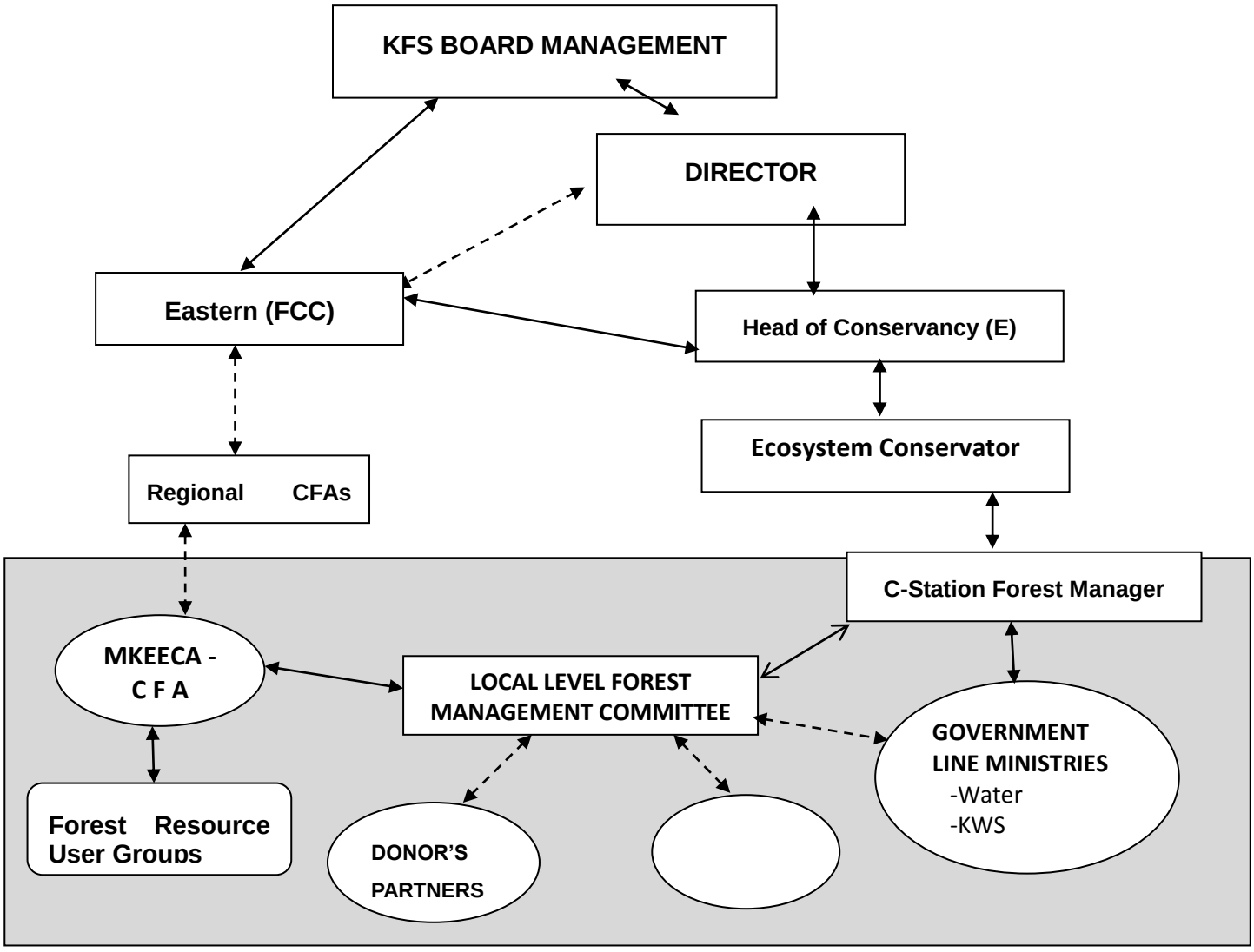
commensurate with the provisions within the Forest Act 2005 to allow for more than 30% membership of women in the CFA and also User Groups.

Revision of PFMP

This PFMP may be revised from time to time to make it conform to the existing challenges, development priorities and policy guidelines. Any revision will be conducted through participatory process to ensure continued ownership and therefore support in its implementation. In addition, the revision will be guided by the forest management agreement between KFS and MKEECA CFA and other relevant stakeholders.

INSTITUTIONAL ARRANGEMENTS FOR PLAN IMPLEMENTATION

This MKEECA-PFMP shall require proper organization structure and institutional arrangement to create implementation efficient by establishing synergy while avoiding duplication, parallelisms, double funding and conflicts.



specific mandate in the forest area and community domains. Sub-committees will be established to serve in the various management requirements.

7 CHAPTER 7: PARTICIPATORY MONITORING & EVALUATION (PM&E)

Sound Monitoring and Evaluation (M&E) system has been recognized as the bases for a successful PFM initiative in any given forest reserve. These M& E system would be tied to the work plans in the implementation mechanisms of management programs of the PFM process, but also anchored to a supportive and multi-stakeholder structure.

The M&E process in this C-PFMP would be guided by annual work-plans. In every financial year, a detailed work plan would be elaborated against achievable targets consciously articulated for each program against the original status. Realization of these targets will be monitored over the duration of the work-plan. Measurable indicators envisaged for every management action under each program will be evaluated at the end of the year and by extent, the realization of the management objectives.

Challenges/issues critical to implementation of PM&E

Some issues have critical to the successful development and implementation of a participatory monitoring and evaluation program have been identified as follows:-

1. Lack of capacity to develop achievable and measurable work-plans,
2. Inadequate or lack of established M & E mechanisms for undertaking monitoring and evaluations.

Objectives

In line with the overall objective of the Management Plan, implementation of the Participatory Monitoring and Evaluation Program will seek to achieve the following management objectives:

1. To strengthen the capacity of a multi-stakeholder planning team
2. To formulate and enhance the effectiveness of M & E mechanisms

Monitoring of the Five Programmes

Monitoring of the Forest Conservation Programmes

This elaborates the various indicators towards conservation of Chuka forest resources and preservation of the integrity of the forest biodiversity. The indicators are as shown on table 7.1.

Table 7.1: Monitoring indicator for forest conservation programmes

Specific objective	Strategies	Activity	Monitoring Indicators	Lead agencies
Reduce pressure in utilization of various forest resources	Promoting the use of alternative energy sources to reduce reliance on fuel wood	Organize and facilitate village level training workshops on alternative sources of energy e.g. biogas and solar	Date, time, venue, participation of meeting	Min of Energy, KFS, MKEECA, Tharaka Nithi County Government
	Promoting the use of energy efficient fuel wood stoves (jikos)	Organize and facilitate village level training workshops on energy saving jikos	Date, time, venue, participation of workshop	Min of Energy, KFS, MKEECA, Tharaka Nithi County Government
		Train community members on the construction of energy saving jikos	Date, time, venue, participation of training, Stoves constructed	Min of Energy, KFS, MKEECA, Tharaka Nithi County Government
	Establish woodlots to provide alternative sources of fuel wood	Identify the sites to establish woodlots within the intervention zone	Sites identified, GPS cordinates	KFS, MKEECA, Tharaka Nithi County government
		Establish woodlots at the identified sites	No. of seedlings, date of planting, Man power involved	KFS, MKEECA, Tharaka Nithi County government
	Promote zero grazing to alleviate forest illegal grazing	Organize and conduct awareness forums on zero grazing in the community	Date, time, venue, participation of forums	KFS, MKEECA, Tharaka Nithi County government, MoALF
		Organize training activities for interested community members on establishing zero grazing units	Date, time, venue, participation of training	KFS, MKEECA, Tharaka Nithi County government, MoALF
		Assist interested members to acquire capital to establish zero grazing units	Total capital acquired, Total members assisted	KFS, MKEECA, Tharaka Nithi County government, MoALF

Improve local awareness of biodiversity values	Increase community awareness on biodiversity values and forest conservation	Mobilize the Community to attend awareness meeting	Date, time, venue, participation of mobilization	MKEECA/KFS
		Production of education materials and teaching aids e.g. posters, booklets, video clips e.t.c	Education materials produced & distributed	MKEECA, KFS, Tharaka Nithi County Government
		Organize and facilitate awareness creation in village level barazas	Date, time, venue, participation of baraza meetings	MKEECA, KFS, Tharaka Nithi County Government
Realign the forest boundaries	Delineate and realign the forest boundaries	Create awareness in the community and conduct consultative village level meetings on the boundary alignment	Date, time, venue, participation of meeting	KFS, MKEECA , Tharaka Nithi County government, relevant stakeholders
		-Survey and align the forest boundary. -Replace missing beacons. -Plant trees along the boundary.	Date, time, participation if the activity, Beacons replaced, trees planted	KFS, MKEECA , Tharaka Nithi County government, relevant stakeholders
		Create awareness in the community on the realigned forest boundaries	Date, time, venue, participation of awareness meeting	KFS, MKEECA, Tharaka Nithi County government
	Establish a buffer zone around the forest to discourage encroachment	Establish a buffer zone (open glade) around the forest to discourage encroachment	Size & length of buffer, community involved	KFS, MKEECA, Tharaka Nithi County government
Undertake restoration of degraded natural	Establish tree nurseries to supply indigenous	Identify the sites for establishing the nurseries in each location	Sites identified, GPS cordinates	MKEECA, KFS

forest	and exotic tree species per year	Purchase 4-225M^3 litres water storage tanks	Type & number of tanks purchased, purchase receipt	MKEECA KFS
		Purchase equipment/farm inputs for the nursery including jembes, pangas, fork jembe, watering cans, rakes e.t.c.	Type & number of equipment purchased, purchase receipt	MKEECA, KFS
		Train 6 nursery attendants	Date, time, venue, participation of Training	MKEECA, KFS
		Obtain seeds and wildlings to stock the nurseries	Type & number of seeds	MKEECA, KFS
	Replant the deforested areas with indigenous trees	Identify and map areas of priority for rehabilitation	Areas identified, GPS cordinates	MKEECA, KFS
		Conduct tree planting exercise twice per year (during the rainy seasons)	Type & number of trees planted, Timing of activity	MKEECA KFS

Monitoring Forest Protection & Security Program

This elaborates the key monitoring indicators towards significant reduction of levels of illegal practices in the forest for conservation of its biodiversity. The indicators are as shown on table 7.2.

Table 7.2: Monitoring indicators for forest protection & security programmes

STRATEGY	ACTIVITY	Monitoring Indicators	LEAD AGENCIES
Increase awareness levels on illegal forest activities and appropriate legislation	Conduct village level awareness creation meetings on negative impacts of illegal activities on forest resources	Date, time, venue & participants of the meeting per location	KFS, Tharaka Nithi County government
	Conduct village level awareness creation meetings on all relevant legislation and policies on forests	Date, time, venue & participants of the meeting per location	KFS, Tharaka Nithi County government
Involve forest adjacent communities in forest protection	Conduct awareness creation meetings at village levels on forest policies and community's right to participate in forest management and conservation as well as their user rights	Date, time, venue & participants of the meeting per location	MKEECA, KFS, Tharaka Nithi County government
	Identify 40 youths (10 per location) to constitute 4 Community forest patrol units (scouts)	No. & names of youths per location	MKEECA, KFS, Tharaka Nithi County government
	Train the youth units on forest policing	Date, time, venue & participants of training	MKEECA, KFS, Tharaka Nithi County government
	Gate maintenance program	Date, time, venue & participants of training	MKEECA, KFS, Tharaka Nithi County government
	Introduce local incentives for reporting or catching poachers, loggers and other illegal users in villages adjacent to the forest	Type of incentives introduced	MKEECA, KFS, Tharaka Nithi County government
Improve the effectiveness of patrolling	Conduct follow-up and refresher training for scouts & forest rangers on skills	Date, time, venue & participants of the trainings	MKEECA, KFS, Tharaka Nithi County government

	needed for effective forest protection.		
	Develop a rewarding system for the scouts and forest rangers	Report on rewarding system developed	MKEECA, KFS, Tharaka Nithi County government
	Acquire appropriate patrol equipment including communication equipment (VHF, Mobile phones) to improve effectiveness and efficiency of patrols	No. & type of patrol equipment acquired; Sale receipts issued	MKEECA, KFS, Tharaka Nithi County government
Take measures to prevent and control forest fires	Create awareness in the community on the dangers and impacts of forest fires	Date, time, venue & participants of awareness meeting	KFS, MKEECA, Tharaka Nithi County government
	Identify 40 youths (10 from each location) to establish a community firefighting unit	No. & names of youths per location	KFS, MKEECA, Tharaka Nithi County government
	Purchase firefighting equipment and tools	No. & type of equipment purchased; Purchase receipt received	KFS, MKEECA, Tharaka Nithi County government
	Conduct a two week training for the firefighters together with forest guards & scouts to equip them with necessary skills	Date, time, venue & participants of the training	KFS, MKEECA, Tharaka Nithi County government
	Create fire breaks in the forest to control fire spread	Type, location & length of firebreak established; Date, time & participants of the activity	KFS, MKEECA, Tharaka Nithi County government

Monitoring Eco-tourism Development Programmes

This describes the various monitoring indicators towards promoting the establishment of community based eco-tourism within Chuka Forest for increased revenue and improved livelihoods of local communities. The indicators are as shown on table 7.3.

Table 7.3: Indicators for monitoring Eco-tourism Development Programmes

STRATEGY	ACTIVITY	Monitoring Indicators	LEAD AGENCIES

Conducting feasibility study to ascertain the eco-tourism potential of the forest	Mapping and appraisal of sites with potential for (eco)-tourism	No. & the specific sites mapped	MKEECA, KFS, Tharaka Nithi County Government, Min. of tourism, KWS, NEMA, WRMA
	Identify and document (eco)-tourism players already or potentially able to invest in Chuka forest	Report on the tourism player documented	MKEECA, KFS, Tharaka Nithi County Government, Min. of tourism, KWS, NEMA, WRMA
Establish and support planning structure for community based eco-tourism	Appoint a team drawn from all relevant stakeholders to spearhead the planning and establishment of eco-tourism enterprises	Date, time, venue & attendance of selection meeting; No. & Names of team selected	MKEECA, KFS, Tharaka Nithi County Government, Min. of tourism, KWS, NEMA, WRMA
	Organize training and exposure visits for the Community-based (eco)-tourism Team	Date, time, venue & participants of the training	MKEECA, KFS, Tharaka Nithi County Government
	Organize meetings to formulate strategies for developing eco-tourism enterprises	Date, time, venue & participants of each meeting held; No of meetings	MKEECA, KFS, Tharaka Nithi County Government
Initiate partnership building with potential investors and relevant stakeholders	Organize a strategic forum for investors interested in Chuka forest, including in (eco)-tourism sub-sector	Date, time, venue & participants of the forum	MKEECA, KFS, Tharaka Nithi County Government
	Organize a strategic forum to Link existing and emerging locally-based and foreign (eco)-tourism prospectors with financial institutions	Date, time, venue & participants of the forum	MKEECA, KFS, Tharaka Nithi County Government
Establish appropriate infrastructure and facilities to support eco-tourism	Improve existing forest access roads or establish new ones where there are none	No. of roads improved; No. of new roads established	MKEECA, KFS, Tharaka Nithi County Government, Min. of tourism, KWS, NEMA, WRMA
	Develop nature trails to various sites in the forest and climbing trails for use by mountain climbers to the peak	No. & location of nature trails & climbing trails established	MKEECA, KFS, Tharaka Nithi County Government, Min. of tourism, KWS, NEMA, WRMA
	Develop eco-lodges and other accommodation facilities/campsites	No. of eco-lodges established; financial partner in each project	MKEECA, KFS, Tharaka Nithi County Government, Min. of tourism, KWS, NEMA, WRMA
	Recruit and train local forest/tour guides	No. & names of scouts/tour guides recruited; Date, time, venue & participants of the training;	MKEECA, KFS, Tharaka Nithi County Government, Min. of tourism, KWS,
Establish mechanisms for community benefits from eco-tourism	Establish a benefit sharing mechanism between investors, county government, KFS, the	Report on the mechanism established; Copy of MOUs signed	MKEECA, KFS, Tharaka Nithi County Government, Min. of tourism, KWS, NEMA,

	community and other relevant stakeholders		WRMA
	Train the community on enterprise development in areas necessary to support the eco-tourism activities	Date, time, venue & participants in the trainings	MKEECA/KFS Tharaka Nithi County Government, Min. of tourism, KWS, NEMA, WRMA
Marketing ecotourism ventures	Establish networks for marketing eco-tourism enterprises i.e. engaging an investor in enterprise development	Report on type of network established; specific investors engaged	MKEECA/KFS Tharaka Nithi County Government, Min. of tourism, KWS, NEMA, WRMA
	Exploring existing markets for forest-based products and develop database	Database of available markets	MKEECA/KFS Tharaka Nithi County Government, Min. of tourism, KWS, NEMA, WRMA

Monitoring Community Development Programmes

This describes the various monitoring indicators towards the various development programmes proposed by the three FGD groups. Such indicators are as shown on the tables below.

Table 7.4: Monitoring indicators for development programmes by Kiangondu, Kirege & Karamani locations

ZONE	THREATS	ACTIVITIES	Monitoring Indicator	PARTNERS/ DONORS
INTERVENTION	Fuelwood	-Use of energy saving jikos	-HH currently using energy saving stoves	DANIDA, JICA, French Embassy, CDTF, CDF & KFCA
	Water shortage	Construction of tanks	No. & type of tanks constructed, Date of construction, HH served, Financial partner	WRMA KFS CFA
		Rehabilitation of riparian areas through pegging	Total hectares rehabilitated, No. & type of tree planted	WRMA KFS CFA
		Tree planting along the catchments	No. & type of tree planted	WRMA KFS CFA

PLANTATION ZONE	Poaching	Recruitment & training of scouts	No. recruited & trained, Date & venue of training	KFS, CFA
	Food insecurity	Agro-forestry	Type of crops planted, Hectares covered; No. & type of trees planted	KFS, CFA
	Illegal firewood collection	-Thinning	Total seedlings thinned; cost	KFS, CFA
		-Training on use & adoption of alternative energy source	Number trained, Date & venue of training	KFS, CFA
NATURAL FOREST ZONE	Forest fires	Recruit & train scouts on fire fighting	Number trained, Date & venue of training	KWS,CFA,KFS
	Poaching of wild animals	Recruiting & training forest guards -Establishment of forest guard post	No. recruited & trained, Date & venue of training, Location of forest guard post, GPS cordinates	KWS, CFA.KFS
	Overgrazing	Construction of zero grazing unit	No. of units constructed	KWS, CFA, KFS
	Increased poverty	Practice Bee-keeping	Total bee hives, Honey production, HH involved	CDF, CFA, COUNTY, OTHER DONORS
		Fish farming	Total fingerlings, HH involved, Annual sales	IFAD,ICIPE, MOA,
		Venturing into Ecotourism	Location of eco-lounge, Roads repaired	CFA, KFS
				CFA, KFS
				CFA, KFS
		Water bottling	Cost of the activity, annual turnover	County, CDF, KFS, KWs, CDTF & CFA
		Other IGAs like Furniture making, toothpick making, basket making,	HH in each activity, groups involved	KFS& CFA
		Quarrying stones, hardcore, dust	Total investment, turnover	CFA, KFS, County Govt.
		Carbon trading	Total trees planted, accrued benefits	GEF, KFS, CFA and Upper Tana County Govt.

Table 7.5: Monitoring indicators for development programmes for Thambo, Thuita & Njuri locations

ZONE	THREAT	PROPOSED ACTIVITY	Monitoring Indicators
INTERVENTION ZONE	1. Water shortage	Rehabilitation of the catchment by: -Pegging the riparian areas (4km) Planting of trees	Total area pegged, total beacons used
		Rain water harvesting by : -Construction of water tanks (100m3) at Njuri -Purchase plastic tank 60,000l	No. & type of tanks constructed
	2. Firewood shortage	Reduce forest pressure by: -Establishment of woodlots	Total area on woodlots, Total HH served
		-Training on use & adoption of alternative energy sources	Total trained, Date & venue of training
	3.Fodder shortage	Establish more alternative sources by: -planting more nappier grass	Total area on nappier grass
		-planting fodder trees	Type & no of fodder tree, total area on fodder trees
	4.Poverty due to limited income sources	Generate more income through: -Commercial banana farming	Total area on banana, total banana plants
		-Commercial sweet potato farming	Total area on sweet potato, total sweet potato plants
		-Commercial maize farming	Total area on maize, total maize plants
PRODUCTION ZONE	1. Forest fires	-Opening up firebreaks (5km x 5 plantation)	Total area on fire break
		-Training scouts/community on fire fighting tactics	Number trained, Date & venue of training
	2.Illegal logging	-Recruiting & training guards and scouts on forest patrolling	Number recruited, Date & venue of training
	3. Overgrazing / illegal grazing	-Fencing the plantations	Length & type of fence.
		-Participation of administration in guarding	Current participation
	4.Destruction of plantations by wildlife	-Construction of an electric fence	Total length of fence,

			financial partner
	5.Limited land for production	-Opening up plantations for PELIS	Total area on PELIS, Type of crops planted
NATURAL FOREST ZONE	1. Underutilized opportunities	-Training on participation into carbon trade	Number trained, Date & venue of training
		-Planting more trees to increase carbon cover	No. & type of tree planted, Total area covered
	2. Degraded glades	-Planting indigenous seedlings on the degraded areas (wildlings)	No. & type of tree planted, Total area covered
	3. Forest fires	-open up firebreaks (7m x 2 ½ km)	Length & size of fire break
	4.Poaching	-Enforcement of laws against illegal logging -Training on forest conservation -Training scouts/guards to conserve forest -Involve community in conservation	Number trained, Date & venue of training

Table 7.6: Monitoring indicators for development programmes by Gatua & Mitheru locations

ZONE	THREAT	ACTIVITIES	Monitoring indicators
INTERVENTION ZONE	Water Shortage	1.Building of intake,	Number of intakes built, location of intakes, HH served
		2. Trenching, fitting of pipes and back filling	Number of pipes trenched, fitted & back filled
		3. Constructing of reservoir tanks	Number of reservoir tanks constructed
	Forest destruction	1.Rehabilatation of destroyed areas through: - nursery establishment -planting of seedlings	Size & No. of nurseries established, Number of seedlings planted
		2. Training of scouts	No. of scouts trained, Date & venue of training
		3.Training of community on forest conservation (20pax per network)	No. trained, Date & venue of training
	Wildlife-human conflict	1.Construction of the electric fence(KFS/KWS	Length of fence constructed, area covered
		2. Creating community awareness on importance of electric fence	Date, venue, participation of awareness meeting
PLANTATION ZONE	Poaching	1. Increase regular patrols of forest guard/ scouts	No. of patrols per month
		2. Replanting of trees(40ha)	No. & type of trees planted
		3. Creating community awareness	Date, venue & participation of awareness meeting
	Forest fires	1. Establishing & maintaining the fire breaks	Length & type of fire break, area covered
		2. Recruiting & training the fire responders/scouts on fire fighting	No. recruited & trained, Date & venue of training
		3. Community awareness on fire fighting	Date, venue & participation of awareness meeting
		4. Acquire fire fighting equipments	Type & number of equipment acquired
NATURAL FOREST ZONE	Main logging (illegal)	Scouting Income generating activities -Alternative energy (energy saving jikos) - Ecotourism; -permitting, construct campsites, - marketing	Number of scouts recruited, Number & type of IGAs adopted

Monitoring of infrastructure & equipment programmes

This involves the indicators to monitor various proposed interventions on the available equipments and infrastructure in the forest and the forest station. Such indicators are as shown on the table below.

Table 7.7: Monitoring indicators for equipment & infrastructure programmes

Items/particulars	Current Status	Actions Required	Monitoring Indicators	Lead Agencies
Maintaining road networks	Poor	To grade the roads To repair culverts, bridges	No. & specific roads graded, No. of culverts & bridges repaired	KFS KWS
Maintain office building and providing equipment	Poor	Buildings needs reconstruction	Date for reconstruction	KFS
Capital Equipments , tools and implements	Poor	Stations needs a vehicle Communication system e. g VHF radio Supplies for production	Type & no. of equipment acquired	KFS
Machinery & other Equipments	Poor	Needs machinery and funds for maintenance and repairs	Type of maintenance & repairs made	KFS
Staff Housing	Poor	Need refurbishing	No. of houses refurbished	KFS

Monitoring Water Catchment Programmes

This provides the monitoring indicators towards the conservation of the water catchment, development of water infrastructure and rehabilitation of the riparian zones in Chuka forest and beyond for enhanced water availability. These indicators are illustrated in the table 7.8.

Table 7.8: Monitoring indicators for water resource management programme

Specific Objective	Strategy	Activities	Monitoring Indicators	Lead Agencies
Protection and conservation of Water Catchments	Rehabilitation of degraded water catchment areas in the forest	Identify and map degraded sites with Gituambugi, ntuugu, Bwee, Nithi rivers Prepare a rehabilitation plan Plant indigenous seedlings per year to restore forest cover in degraded areas and around river catchments	Report with specific locations & maps of degraded sites; Report of rehabilitation plan developed; No of seedlings planted per year	WRMA, local WRUAs, KFS, MKEECA, NEMA
	Prevent/reduce soil erosion along the rivers	Plant trees and other cover crops/grass along the rivers to reduce erosion	No. of tree seedlings & type of cover crops planted	MKEECA/KFS
		Construct gabions in the heavily eroded areas (gulleys).	No. & specific locations of gabions constructed	MKEECA/KFS
	Protection of the few water springs available	-Plant indigenous tree species around the spring catchments	No. & type of tree species planted, No. of tree survived	MKEECA/KFS
Water infrastructure development and management	Increasing Water supply to households	-Building of more water intake, -Trenching, fitting of pipes and back filling -Constructing of reservoir tanks at each intake	No. of intake created, length of pipes fitted, No. & location of reservoirs constructed	WRMA, local WRUAs, MKEECA, County water office
	Promoting rainwater and runoff harvesting	Conduct awareness creation on rainwater and runoff harvesting	Date, time, venue & participants of awareness meeting	WRMA, local WRUAs, MKEECA, County water office
		Install RWH systems for vulnerable /needy members to act as demonstration sites 1 per location for RWH systems	No. & type of RWH systems installed per location; Date, time, venue & participants of installation event per	WRMA, local WRUAs, MKEECA, County water office

			location	
		Establish at least 8 demonstration sites per location for small scale runoff harvesting.	No. & specific sites of the demonstrations per location	WRMA, local WRUAs, MKEECA, County water office
		Construct 8 water pans (1 per network) per year over 5 years to increase water access	No. of pans per location per year; Financial partners involved	WRMA, local WRUAs, MKEECA, County water office, KFS, NEMA, county government

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ANNEX 1: Village Level Meetings

The village level meetings involved communities from all the villages listed below: (Table 7.9)

Table 7.9: Administrative locations within Chuka forest & adjacent areas

Subcounty	Location	Sublocation			Villages
Meru south	Kiangondu	LEVEL 1 Kiangondu	LEVEL 11 Mucwa, Chuka town	LEVEL 111	Bagakia, Bakia, Baruo, Karioko, Kiangondu, Ntuntuni, Mutiri, Ntumara, Kibumbu, Ntuguni,
	Magumoni	Nthambo, Njuri,			Kiamuriuki, Gitogoto, Njuri, Kibiga, Kabakini, Kiricho
	Mugwe	Kirege	Mugirirwa		Nkabu, Mubukuro, Kiriguni, Kianyungu, Iramba, Gitumbi, Kirege
	Mwonge	Karamani,	Mwonge		Ciakarugu, Kangoro, Karamani, Kariani, Karigini, Kirigi, Gikwego
	Thuita	Thuita	Kathatwa		Igoki, Mugaani, Thuita, Gacoka, Gitonguni, Muiku, Mutuguni
Maara	Mitheru	Gatua, Ruguta			Gaketha, Nkironi, Muthenge, Munguni, Kigui, Intuntu, Gitugati, Ngong, Kiini, Kiaibio, Gitugati, Giampampo,Gachugu, Mugona, Giankanja, Kamachere, Ikame, Kathituni, Kanyakini, Kiamuchumbi, Kaunju

ANNEX II: Stakeholders Meeting & LPT SELECTION

A stakeholders meeting was held on 26TH May, 2013 At Mesacco Hotel, Chuka where LPT Composition was discussed and agreed upon. The following is a breakdown of the 21 LPT members selected to represent the 8 networks and the public administration (Table 7.10)

Table 7.10: The LPT Members selected

NAME	AFFILIATION
1. David Micheni	Njuuri Network
2. Loise Gatakaa	Njuuri Network
3. John Nyaga	Nthambo Network
4. Sophia Tirindi	Nthambo Network
5. Japheth Kabucha	Thuita Network
6. Danson Nyaga	Thuita Network
7. Kenneth Kamanda	Karamani Network
8. Dorothy Karimi	Karamani Network
9. Japheth Mwenda	Kirege Network
10. Hellen Kamami	Kirege Network
11. Antony Mutembei	Kiangondu Network
12. Joseph Kenya	Kiangondu Network
13. Jotham Kamundi	Mitheru Network
14. Harriet Mbae	Mitheru Network
15. Felix Mbae	Gatua Network
16. Ann Muthoni	Gatua Network
17. Silas Mugendi	Local Chief
18. Satanley Njagi	Local Chief

19. Simon Kathungu	Local Chief
20. Joseph Waweru	Corporal KWS
21. Kenneth Mugambi	Corporal KFS

(Source: ERMIS Africa 2014)

ANNEX III: General Community Involvement & Participation

Community from all the 6 locations participated in data collection as shown on table 7.11.

Table 7.11: Community participation in the data collection per location

LOCATION	NAME OF RESPONDENT	GENDER	VILLAGE
Kiangondu	1. Lodavika Kaari	Female	Ntuntuni
	2. Nkoroi Muriithi	Male	Bagakia
	3. Charles Kangai	Male	Bakia
	4. Mkenya Murua	Male	Baruo
	5. Violet Kangai Mboani	Female	Karioko
	6. Philista Mbaka	Female	Kauu
	7. Teresia Mbugua	Male	Kiangondo
	8. Stanley Mukuru	Male	
	9. David Mbaka Thaara	Male	
	10. Ikingi Nkanya	Female	Kiriguni
	11. Benson Muchiri	Male	Mtuntuni
	12. Riaini Murang'a	Female	Mutiri
	13. Teresia Gatungi	Female	
	14. Raurecia Muthoni	Female	Kiangondu
	15. Gilbert Gitonga	Male	
	16. Mutegi Philip Kinungi	Male	Ntumara
	17. Stella Kaari	Female	
	18. Josphine Kaari Mugo	Female	
	19. Japheth Gitari Riba	Male	Ntunguni
	20. Justus Mwindi Nabea	Male	Kibumbu
	21. Charles Gitonga	Male	Ntunguni
	22. Joyce Ciambuba	Female	Ntumara
	23. Jane Kaari Mati	Female	Ntuntuni
	24. Mutegi Harun	Female	Ntumada

	25. Timothy M. Mbaka	Male	Ntunguni
	26. Gitari J. Mbiulu	Male	Bamui
Magumoni	27. Mabisera Kanini	Female	Kirecho
	28. Joseph Muchangi Kinyua	Male	Karandini
	29. Lenah Njeri	Female	Njuri
	30. Cathrine Kanyua	Female	Njuri
	31. Enester Ciamutegi	Male	Kericho
	32. Susan Ciambaka	Female	Kiricho
	33. Jedidah Ciamati Muthuci	Female	Irii
	34. Paskwale Karambi	Male	Kabakini
	35. Ngeretha Thingithu	Male	
	36. Justine Muthee Ngera	Male	Kibiga
	37. Fred Baragu	Male	kibiga
	38. Mugambi Kiraithe	Male	Kiricho
	39. Jeniffer Ciakirimo	Female	Njuri
	40. Loise Gatakaa Gitonga	Female	
	41. Apio N. Nyaga	Female	Gitogoto
	42. Aquilino Lancaster Mwangi	Male	
	43. Nyaga Miti	Male	
	44. Sophia Cirindi Kanampiu	Female	karandini
	45. Micheni Ndaii	Male	
	46. Frankline Kithinji Nkune	Male	kiamuriuki
	47. Maricella Kajau Mutuiri	Female	
	48. John muthii nyagah	Male	Gitogoto
	49. Purity Kina Kamunyu	Female	Karandini
	50. Sarah Gatabi	Female	
	51. Jamlick Njagi	Male	Kiamuriuki
	52. Elosy Muthoni Rufendo	Female	
	53. Justine Njoka Kiraithe	Male	
	54. Githinji Michael	Male	
	55. Juliuas Kimathi Nyaga	Male	
	56. Frankline Mutegi	Male	
	57. Susan Kambura	Female	Njuri
	58. Kageni Riungu	Female	Muiku
	59. Diborah Kawira	Female	

	60. Hildar Muiru	Female	Thuita
Nthambo	61. Ndeke Ntiga	Male	Ntambo
Mitheru	62. Allan Mikwa	Male	
	63. Fredrick Nyaga	Male	
	64. Celestina Karimi	Female	Gachugu
	65. Rosemary Kaimuri Njagi	Female	Giampampo
	66. Wilfred Kaburu Njagi	Male	
	67. Margret Muthoni	Female	
	68. Ann Muthoni	Female	Gitugati
	69. Ann Kagendo	Female	
	70. fridah mukwanjiru	Female	Kaunju
	71. Anderson Miriti	Male	Kiaibio
	72. Jacob Nyaga Ibrahim	Male	
	73. Njagi Karaa	Male	kiambio
	74. Alibina Kanyua	Female	Kiamuchumbi
	75. Agness Kaari John	Female	Kiini
	76. Peter Kirimi Njagi	Male	Kong 'u
	77. Kenneth Kibara	Male	Ngong
	78. Julias mwenda	Male	
	79. Patrick Njagi Miriria	Male	
	80. Douglas Marete	Male	
	81. Felix Nyaga	Male	Gaketha
	82. Betha Ngugi Muchiri	Female	
	83. Mark Njagi Muchuna	Male	
	84. James Karimi Kamunde	Male	
	85. Solomon Njue	Male	gitugati
	86. Violet Murugi	Female	Intuntu
	87. Mbae Jeremiah	Male	kigui
	88. Charles Mugumbi	Male	Muguni
	89. Fridah Murugi	Female	
	90. Antony Mutembei Japhet	Male	muthenge
	91. Kingsford Nyaba Njambi	Male	karinga nkoru
	92. Miriam Mwende	Female	nkioni
	93. Albert Ireri Muthara	Male	gaketha
	94. Amos Kiraithe Gitari	Male	Munguni
	95. Prisca Kagendo	Female	
Mugwe	96. Phares Nyaga Nyiri	Male	kirege

	97.	Stephen Mugendi Willeys	Male	gitumbi
	98.	Eunice Ciamutesi Muthee	Female	iramba
	99.	Humphrey Ruiga	Male	kianyungu
	100.	Margaret Gatakaa Bitah	Female	
	101.	Nthaka M. Bundi	Male	kirege
	102.	Veronica Kanyamu	Female	kiriguni
	103.	David Kirimi Njeru	Male	kiriguni
	104.	Elizabeth Muthoni Mutegi	Female	mubukivo
	105.	David Gitonga	Male	Mubukuro
	106.	Morris Mugambi Mukuru	Male	
	107.	Mbungu Mwirichia	Male	
	108.	Esther Kangai	Female	
	109.	Kellen Ciagitari Mutegi	Male	
	110.	Antony Muchangi	Male	
	111.	Charles Mwenda Murithi	Male	Muloukuro
	112.	Dorothy Kageni Micheni	Female	Mwenji
	113.	Damaris Gichiku Nkoroi	Female	
	114.	John Mutembei Nyaga	Male	Nkabu
	115.	Phares Ithiki	Male	
	116.	Japheth Mwenda Alexanda	Male	
	117.	David Murithi Mbuba	Male	
	118.	Junius Njoka Imwara	Male	
	119.	Peter M. Mutua	Male	
	120.	Muthara Imwara	Male	Ukabu
Mwonge	121.	Kageni Mbaka Muthungu	Female	Ciakarugu
	122.	Kennedy Mugambi Kamanda	Male	Kandoro
	123.	Sammy Gitaru Kamotho	Male	Kangoro
	124.	Ashtor Mutegi njeru	Male	
	125.	Kenneth Murithi Kamanda	Female	
	126.	Fredrick Michen Laban	Male	
	127.	Mbundi Njeru	Male	Karamani
	128.	Patricia Ciakuthi Mutegi	Female	Kariani
	129.	Nathan Mitegi Mirinda	Male	

	130.	Lucyline Giakuthii Njagi	Female	
	131.	David Njeru Ntiba	Male	
	132.	Doreen Muthoni	Female	
	133.	Riara Njeru	Male	
	134.	Dorothy Mwende Nathan	Female	
	135.	Silas Mutegi Muchiri	Male	Karigini
	136.	Kathuhi M. Riba	Male	
	137.	David Njeru Mutegi	Male	Kirigi
	138.	Muteti Moris	Male	Kivigi
	139.	Catherine Muthoni Nyaga	Female	Kurigi
	140.	Fridah Kawira Kanga	Female	Karigini
	141.	Isaac Rugendo	Male	Kariani
	142.	Dorothy Karimi David	Female	Karigiu
	143.	Sussy Murugi	Female	Micheu
	144.	Cosmos Mutumi Danson	Male	Kuringi
	145.	Eunice Ciamata Ruguru	Female	Gikwego
	146.	Benard Mati Kamunti	Male	
	147.	Faith Ciambaka Borana	Female	
	148.	Kaari Mwiriga	Female	
	149.	Leah Kanini Erastus	Female	
	150.	Florence Njoka	Female	Kirigi
	151.	Edith Maina Nyaga	Female	Kivigi
Thuita	152.	Mugo Mujoro	Male	Mutuguni
	153.	Erastuce Nkoru Nyaga	Male	Igoki
	154.	Ephantuce Ngurue Murucha	Female	
	155.	Ikingi Muramba	Male	Mugaani
	156.	Dorothy Ciacukuru	Male	Thuita
	157.	Patrick Muriithi Michael	Male	Gakoka
	158.	Margret Kanini	Female	Gitonguni
	159.	Fredrick M. Muruku	Male	
	160.	Albert Micheni	Male	kithunguri
	161.	Marccas Ndeke Mati	Male	Muiku
	162.	Justin Mbungi	Male	
	163.	Mumbere Nkari	Male	
	164.	Mutegi Mboani	Male	

	165.	Stanely Mutegi	Male

(Source: ERMIS Africa 2014)

ANNEX IV: Current Community role in conservation

The communities from the six locations have been practicing agro forestry as illustrated in the table 7.12.

Table 7.12: Agro forestry within communities surrounding Chuka forest

LOCATION	SUBLOCATION	TREE SPECIES
	Ruguta	blue gum(Eucalyptus saligna),meru oak(Vitex keniensis),mango(Mangifera indica)
	Karamani	greveriah,cordia,vitex, bluegum(Eucalyptus saligna)
	Nthambo	blue gum(Eucalyptus saligna),mango (Mangifera indica)
Kiang'ondu	Kiangondu	eucalyptus(Eucalyptus globulus),blue gum(Eucalyptus saligna),avocado(Perseaamericana), mango(Mangifera indica), cedar(Juniperus procera), cypress(Grevellia robusta), meru oak(Vitex keniensis), greveliah
	Mukwa	cedar(Juniperus procera), avocado (Persea americana)
Magumoni	Magumoni	greveriah,mango(Mangifera indica),avocado(Persea americana), blue gum(Eucalyptus saligna), eucalyptus(Eucalyptus globulus), meru oak(Vitex keniensis)
	Kiricho	mango (Mangiferaindica),bluegum(Eucalyptus saligna)
	Njuri	blue gum(Eucalyptus saligna),mango(Mangifera indica),eucalyptus(Eucalyptusglobulus),avocado (Persea americana), meruoak(Vitex keniensis), jacaranda(Jacarandamimosifolia),cedar(Juniperus procera), greveliah
	Ntambo	meruoak(Vitexkeniensis),cypress(Grevellia robusta), bluegum(Eucalyptussaligna),mango(Mangifera indica), eucalyptus(Eucalyptusglobulus),greveliah,cedar (Juniperus procera)
	Nthambo	gruveliah,cedar(Juniperusprocera),bluegum (Eucalyptus saligna) ,avocado(Persea americana),meru oak(Vitexkeniensis),mango(Mangiferaindica), cypress (Grevellia robusta) , eucalyptus (Eucalyptus globulus)
	Thuita	eucalyptus(Eucalyptusglobulus),cypress(Grevellia robusta),bluegum(Eucalyptussaligna),greveliah, avocado(Persea americana), cedar(Juniperus procera)
Nthambo	Magumoni	mango(Mangiferaindica),bluegum(Eucalyptus saligna), cedar (Juniperus procera)

Mitheru	Gatua	avocado(Persea americana),eucalyptus(Eucalyptus globulus), greveriah, mikima (Grevellia robusta), blue gum(Eucalyptus saligna), mango(Mangifera indica), cedar(Juniperusprocera),cypress(Grevellia robusta), meruoak(Vitexkeniensis),jacaranda(Jacaranda mimosifolia),
	Ruguta	blue gum(Eucalyptus saligna), cedar(Juniperus procera), mango(Mangifera indica), cypress(Grevellia robusta),eucalyptus(Eucalyptusglobulus), greveriah, cordial,vitex,meruoak(Vitexkeniensis), avocado(Persea americana),
	Ruta	greveriah,mango(Mangifera indica) ,avocado(Persea americana), meru oak (Vitex keniensis)
Mugwe	Kirege	greveriah, mango(Mangifera indica), meru oak(Vitex keniensis) , blue gum(Eucalyptus saligna), cypress(Grevellia robusta),jacaranda(Jacaranda mimosifolia),eucalyptus(Eucalyptusglobulus), avocado (Persea americana), cedar(Juniperus procera), vitex, cordial,
Mwonge	Karamani	mango(Mangiferaindica),avocado(Perseaamericana), meru oak(Vitex keniensis),blue gum(Eucalyptus saligna),greveliah,cordial, vitex, eucalyptus(Eucalyptus globulus), cypress (Grevellia robusta), cedar(Juniperus procera)
	Kariani	Mango(Mangifera indica), cedar(Juniperus procera), cypress(Grevellia robusta), meru oak(Vitex keniensis), avocado(Persea americana), blue gum(Eucalyptus saligna), greveliah
	Maramini	avocado(Persea americana), mango(Mangifera indica), blue gum(Eucalyptus saligna)
	Mwonge	blue gum(Eucalyptus saligna), meru oak(Vitex keniensis),mango(Mangifera indica), greveliah, eucalyptus(Eucalyptus globulus),avocado(Persea americana), cedar(Juniperus procera),
	Kathatua	Greviliah
Thuita	Kathatwa	blue gum(Eucalyptus saligna),greveliah,fruit trees, eucalyptus(Eucalyptus globulus), cypress(Grevellia robusta), cedar(Juniperus procera), avocado(Persea americana)
	Magumoni	Eucalyptus(Eucalyptus globulus) ,avocado (Persea americana),mango(Mangifera indica) ,blue gum(Eucalyptus saligna)
	Thuita	Bluegum(Eucalyptus saligna),greveliah,avocado(Persea americana) ,mango (Mangifera indica), cordial, vitex, eucalyptus(Eucalyptus globulus), cypress (Grevellia robusta),

(Source: ERMIS Africa 2014)

ANNEX V: Photos Capturing some Key steps in the PFMP Development process

Figure 7.1: A photo during the PFMP initiation meeting at the Ecosystem Conservator's office Tharaka Nithi County

Figure 7.2: Photo during the first day of LPT Training at Messacco hotel Chuka town

Figure 7.3: Photo during the Training of enumerators for questionnaire administration

Figure 7.4: A photo during the presentation of the Zero Draft by the consultant