EFFECTS OF FOREST RESOURCE USE CONFLICTS ON CONSERVATION EFFORTS IN ENDERIT FOREST BLOCK IN MAU FOREST COMPLEX, KENYA

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A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT FOR THE AWARD OF DEGREE OF MASTER OF ARTS IN ENVIRONMENTAL PLANNING AND MANAGEMENT IN THE DEPARTMENT OF GEOGRAPHY AND ENVIRONMENT STUDIES,

UNIVERSITY OF NAIROBI, KENYA.

OCTOBER 2015

DECLARATION

This is my original work and has not been submitted for examination and award of any degree in any other University.

……..

KOECH R.K

(C50/63057/2011)

This project has been submitted for examination with our approval as the university supervisors

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DEDICATION

To my family, for your love, care and support.

ACKNOWLEDGEMENT

The completion of this research project is attributed much to assistance accorded to me by a number of institutions and individuals under the guidance of our Almighty God. First and foremost my sincere acknowledgements go to my supervisors Dr. Thuita Thenya and Dr. Shadrack Kithiia for their relentless support, timely guidance and close supervision. Their inestimable contribution is immeasurably appreciated. I would also like to appreciate Wangari Maathai Institute for offering me the research scholarship funds that enabled the success of this study, all my classmates as well as WMI conflict group members whose support was timely. I also thank my workmates for the unending support throughout this academic experience.

I also pass my sincere gratitude to family members for their support and encouragement during the entire project work.

May the Almighty God bless you all.

Above all, I have to acknowledge and appreciate the Almighty God for giving me this opportunity, life and good health to study and be able to carry out this project.

ABSTRACT

This research study, carried out in Enderit forest block in Eastern Mau Forest, sought to establish how forest resource use conflicts affect conservation efforts. The specific objectives of the study were to examine the types of forest resource use conflicts in the forests, identify the stakeholders involved in forest conservation and their focus and examine how the various forest conservation programmes impact sustainable conservation of the forest.

The study applied both qualitative and quantitative research methods. The qualitative methods were used to collect data that could not be subjected to statistical tests. These included relevant laws, by-laws, policies and community's opinions. On the other hand, quantitative research methods were used in areas where data collected were capable of being subjected to statistical analysis. This type of data was organized and presented in form of graphs, tables, averages, maps and other statistical presentations. The hypothesis of the study was tested using *chi* square.

The study findings established five main types of the forest resource use conflicts in the study area; Conflicts between forest adjacent communities and the Kenya Forest Service over illegal forest resource use; human-wildlife conflict; conflicts between pastoralists and peasant farmers; Conflicts between communities upstream and downstream due to scarcity and quality of water; Conflict between stakeholders involved in conservation, broadly classified as State Corporations, Non-Governmental Organizations, Educational institutions, local communities and private sector actors, due to different conservation objectives and interests.

The study established that despite the concerted efforts to conserve the block, the existing forest resource use conflict largely undermine sustainability of these efforts. The study therefore recommended that that for sustainable conservation of the forest block; the Government and all the stakeholders should put in place policy measures that aim at increasing income and generating off-farm employment activities for the forest adjacent communities. This would reduce forest dependency and consequently enhance biodiversity conservation.

Community Forest Association also should be empowered through capacity building to enable them carry out their various mandates appropriately. Policy to guide on resource sharing under Participatory Forest Management framework also needs to be put in place.

There is also need to strengthen enforcement of the existing laws. Related to this, K.F.S, working with C.F.A and other relevant stakeholders should strengthen forest management through intelligence gathering so as to profile illegal forest resource users for possible prosecution. Forest boundary also needs to be demarcated and measures taken to fence it. This would discourage further encroachment into the forest.

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CHAPTER ONE: INTRODUCTION

1.0 Background of the study

Forests resources are vital for human development. They provide sources of water and energy, regulate air, conserve soil and act as fertility agents. People, who live on or near forests wholly or partly depend on forests for their source of food, pasture for their livestock, cultural and religious purposes. The World Bank (2006b) estimated that more than 1 billion poor people worldwide depend on forests for their livelihoods and security.

According to Harwell, Farah and Blundell (2011), forests are nationally important as an economic asset, primarily for timber production and other forest products as well as for global goods such as biodiversity and carbon, which are increasingly being monetized. This strategic significance of the forest resources has exposed multiple and competing interests, which, according to Harwell *et al.,* (2003); Ongugo *et al.,* (2008), have resulted to frequent struggles by various interest group to control their access, use and benefits. These more often than not degenerate into forest resource use conflicts. Consequently, these conflicts lead to degradation of the forest resources and also undermine the efforts being carried out by various stakeholders to conserve the forests.

Anderson *et al*., (1996); Ayling and Kelly (1997); Ortiz (1999), reckon that majority of the world population compete for the natural resources to ensure or enhance their livelihoods. According to Chenier *et al.,* (1999), the dimensions, level, and intensity of these conflicts vary and in some cases the class dimension is so dominant pitting those who own the resource against those who own nothing but whose work makes the resource productive. Political dimension according to Fisher *et al.,* (1995) is also prevalent of forest conflicts especially where the states' keen interest in the resources is for a public good such as conservation or in maintaining the political alliances it needs to remain in power. The differences in gender, age and ethnicity, according to Hirsch *et al.,* (2001), may also inform the use of natural resources, bringing to the fore cultural and social dimensions of forest resource use conflicts. According to Perez and Scarlato (1999), even identification of natural resource problems may be contested in light of different information sources, world views, and values.

Conflicts over forests resources can take place at a variety of levels, from within the household to local, regional, societal, and global scales. Kant and Cooke (1999), point out that the intensity of conflict may also vary; from confusion and frustration among members of the community to violent clashes between groups over resource ownership rights and responsibilities. Forest resource use conflicts can be widespread but tend to be non violent, or if violence breaks out, it tends to be localized (Harwell 2003; Wulan *et al*., 2004; De Koning *et al.,* 2008).

Several authors have attempted to explain the main reason behind the forest resource use conflicts. Yurdi *et al.,* (2010) attribute forest resource use conflict to power struggle between the local communities and central government over the control of the forest resources. Kaimowitz (2003) argues that such power contests in some cases occur between members of different ethnic groups especially where the forest land is inhabited by multiple ethnic groups and minority populations. In such a case, access to forest and its resources are controlled by particular ethnic group to the disadvantage of the others thereby degenerating into conflicts (Kaimowitz, 2003).

Price (2003), on the other hand, attributes forest resource use conflicts to sharing of the proceeds of sale of forest resources especially timber. This scenario, according to Price (2003) is characteristic of those states that rely on sale of timber products as source of income. Conflict therefore result, when the benefits accruing from the sale are left to small group of political or business leaders. Ordinarily, the local communities bear the most of the associated social and environmental costs and would, in most cases demand that they be compensated directly or indirectly by benefiting from the exploitation. According to Price (2003), unequal distribution of the benefits often disrupts local communal and social structures, which can contribute to wider political, social, and economic instability and eventually unrests for example in Indonesia and Bolivia.

According to Peet and Watts (1996), forest resource conflicts can be attributed to the fact that the forests are embedded in a shared social space where complex and unequal relationships are established among a wide range of social actors. These may be export produces, farmers, ethnic minorities; government agencies among others (Peet and Watts, 1996). Peet and Watts (1996) further note that in other fields with political dimensions, the actors with the greatest access to power are also best able to control and influence forest decision in their favour.

Homer-Dixon and Blitt (1988), explains that the conflicts related to forests are mainly due to increasing scarcity caused by rapid environmental change, increasing demand, and their unequal distribution. Environmental change in this regard, according to Homer-Dixon and Blitt (1988) involves forest degradation while increasing demands have multiple social and economic dimensions, including population growth, changing consumption patterns, trade liberalization, rural enterprise development, and changes in technology and land use. Unequal distribution on the other hand relates to distribution among individuals and social groups or ambiguities in the definition of rights to common property resources. Homer-Dixon and Blitt (1988), further notes that the effects of such scarcity lead to constrained agricultural output, constrained economic production, migration, social segmentation, and disrupted institution which ultimately can either singly or in combination, produce or exacerbate conflict among groups.

Chevalier and Buckles (1995) explain that forests and other natural resources are used by people in ways that are defined symbolically. They are part of a particular way of life, an ethnic identity, and a set of gender and age roles. These symbolic dimensions of forest resources lend themselves to ideological, social, and political struggles that have enormous practical significance for the management of natural resources and the process of conflict management.

The nature of forest resource conflict in Kenya, according to Castro and Nielsen (2001), is mainly between the government and communities living within the forest. In such instance, the conflicts arise out of the Government need to conserve the forests and the communities' desire to use the forest resources to meet their needs. Ochieng (2000); Wass (2000) and Okoth, (2000), summarizes the main factors that contribute to conflicts in Kenya's forest sector as; population growth, continued dependence on the forest resources by many Kenyan communities, the existence of different land tenure regimes in the forest sector, and the inordinate share of the forest and forest resources acquired by the politicians and other political elites.

Despite the ongoing forest resource use conflicts, there has been an effort being carried out to preserve and conserve forests. This has been occasioned by the realizations that the ongoing conflicts will deplete the forest resources. Nonetheless, the conflicts have served to undermine these efforts and fuelled further destruction of the forests. In Indonesia, for

example, fires that were set deliberately in 1997-1998, scorched an estimated 9.7 million hectares of forests (Chokkalingam and Suyanto, 2001). Long-time residents were using fire in the process of clearing forests and scrub land, as a kind of legal tool to reclaim historic rights to land given in forest concessions; the struggle among companies, government and local people left both natural forests and plantations in ashes. According to Renner (2002), forest resource conflict have often rendered State agencies ineffective, peacetime efforts at the forest protection are suspended, and illegal loggers, even if not directly involved in the conflict, can proceed unchecked. For example in Democratic Republic of Congo, a series of civil wars in the 1990s created a power vacuum and broke down conventional forest management regimes, fostering illegal logging and other resource conflicts (Renner, 2002).

In Kenya, forest resource use conflicts have contributed to forest degradation that has almost reduced the once green country to a dry land. According to National Forest Policy, 2015, the country's forests cover currently stands at 6.99% of the total land area, which is way below the 10 per cent recommended by the Food and Agricultural Organization. Unless action is urgently done, this scenario, according to Ng'weno (2004) is bound to worsen due to the fact that the Kenya's population is growing rapidly which means that pressure to convert forests, to agricultural land will remain high. There are efforts being carried out at national and local level to conserve the forests. However, as Ongungo (2008) notes, these efforts are undermined by forest use conflicts and if they are not resolved, forest degradation will result into progressive reduction of forest cover as well as enhance forest resource use conflicts.

1.1 Statement of the research problem

Enderit forest, like other blocks in Mau Complex, has had a long history of conflict especially between the indigenous Ogiek community, who lay claim on the forest land on the basis of historical use and occupancy and the Government who claim ownership by virtue of the forest gazettement and declaration of 1942 under Forest Act (CAP 385) as explained by Sang, (2001). The forest resource use conflicts have been enhanced by political interests and ever increasing population. Consequently, demand for land to settle the landless, pasture and land for cultivation has also increased. These factors have resulted into encroachment into forest reserve and illegal use of forest resources.

According to ERMIS (2009), Eastern Mau Forest block was excised through a legal notice No. 142 affecting 35,301 ha. Enderit forest lost a total of 7,471.0 ha, which is currently

settled. Consequently, there was a considerable drop in forest revenue collected at the same period 10 years back. This is greatly attributed to the excision of the forests in the last decade.

In the last decade, the Government of Kenya, together with other stakeholders put concerted effort to rehabilitate the forest block. The Government stopped further encroachment of forest land and together with other stakeholders, rolled out ambitious programmes to rehabilitate the forest. This includes land reclamation from illegal settlers. Forest Act Cap 385 was repealed to strengthen protection of forest resources. These efforts, have not with a doubt realized results as far as conservation of the forest resources is concerned. Nonetheless, illegal forest resource use is still ongoing and threatens the sustainability of the conservation efforts.

The conservation efforts in the forest block shall therefore be dictated by the presence or absence of the forest resource conflicts. Implementation of forest conservation initiatives is costly. This therefore means that meaningful results should be realized to justify further use of the resources.

This present study therefore sought to examine the effects of the forest resource use conflicts on the conservation efforts in the study area so as to recommend mechanism to enhance sustainability of the conservation initiatives.

1.2 Research questions

This study was guided by the following research questions;

1. What are the various types of natural resource conflict in Enderit forest?
2. Who are the various stakeholders involved in the conservation activities?
3. What are the various forest conservation programmes and how do they impact sustainable forest conservation?

1.3 Objectives

The overall goal of this study was to examine how conflicts in forest resources use in Enderit forest affect forest conservation efforts. The following specific objectives guided the study.

1. To examine the types of natural resource conflicts in Enderit forest and identify the stakeholders involved in forest conservation and their focus in the Enderit forest

2. Examine the various forest conservation programmes by the different stakeholders and their impact on sustainable forest conservation

1.4 Working hypothesis

Ho: Forest resource use conflicts do not affect the conservation activities in the Enderit forest block

H1: Forest resource use conflicts affect conservation activities in the Enderit forest block.

1.5 Significance of the Study

The research was designed at a time when there are numerous conflicts in forest resources use in Kenya. Furthermore, the need to encourage conservation and the use of natural resources in sustainable manner is highly desirable. It is therefore hoped that the results and recommendations of the study shall be used to;

(a) Encourage relevant stakeholders to carry out conservation activities
(b) Provide significant information that can guide similar/other studies in the related fields,
(d) Provide useful information to policy makers such as Kenya Wildlife Society, Kenya Forest Service and other Government agencies including donor partners that guide in formulating appropriate policies and programmes to enhance conservation efforts.
(e) Increase local community awareness and participation in conservation programmes in Enderit forest.

1.6 Scope

This study relates to the broad field of natural resource management and aims at enhancing sustainable conservation of forests. As such, this study limits itself to the multiple and competing interests over forest resources and how these affect the existing conservation initiatives. Forest resources in this context relates to forest land, flora and fauna.

Spatially, the study was carried out in Enderit Forest, in Eastern Mau forest block, one of the seven blocks that comprise Mau Forest Complex. This selection was informed by the existence of variables relevant to this study. The block, for instance, is facing an increased threat of destruction from forest resources conflicts. According to ERMIS (2009), the block in the past decade lost a total of 7,471.0 ha of forest land to illegal settlements leaving a total of 13,177.4 ha. The imminent threat faced by the forest and given its ecological importance to the region, has attracted renewed interest to conserve it. Presently, there are various

conservation initiatives being carried out in the forest by Government, community and Non-Governmental Organizations.

The forest is surrounded by 12 settlement villages. Owing to logistical and time constraints, 3 villages adjacent to the forest were selected for the purpose of this study.

1.7 Definition of terminologies

Forest resource use conflict: Refers to the existence of multiple and competing interests by various groups over the use of forest resources

Forest conservation: Refers to preservation, protection, or restoration of forest resources.

Participatory forest management refers to forest management that allows every stakeholder to contribute to the decisions made. It does not exclude the parties or forest users.

Forest user group: refers to any group of individuals formal or informal who collects harvests or utilizes any part or product from a forest for subsistence or commercial purposes.

Forest Products: Refers to all the products underlined under the Forest Act, cap 385 which include charcoal, firewood, fruit, gum, leaves, timber, trees, grass, seeds and such other things declared to be forest produce by the Minister.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This section presents review of literature from various scholars. This shall enable further understanding of the natural resource use conflict and also contribute to the dialogue on the effects of conflict in forest resources use on conservation efforts in Enderit forest. The section further presents the theoretical framework upon which the research was founded as well as the conceptual framework.

2.1 Causes of forest resource conflicts; Global perspective

Forest resource conflicts are escalating and have become a significant issue in the conservation of forests worldwide. In Asia and the Pacific, forest resource use conflicts have increased the rate of deforestation of natural forests to 3.7 million hectares annually between 2000 and 2005 (Yurdi, *et al.,* 2010). Consequently, the region entered a time of great scarcity and instability, which affected the local communities and indigenous people who live and work at the forest frontier (Evans and Steven 2008).

According to Yurdi, et *al.,* (2010) three fundamental and interrelated factors underlie forest resource use conflict; contested tenure and overlapping claims, inadequate coordination among state agencies and conservation and economic development policies that prioritize global and national interests over local interests, needs, and aspirations.

Tenure can be described as conditions under which access to forest resources is acquired, retained, used, disposed of, or transmitted by individuals or groups of people. It defines the social relations among people and the rights they hold in relation to resources or property. According to Wiebe and Meinzeen-Dock (1998), Sustainable development and the efficient and equitable use of natural resources depends on the ways in which property rights are defined and distributed. For example, while individual or private property rights exclude other users from accessing property such as forests and trees, communal tenure is inclusive and encourages participation by the whole community (Wiebe and Meinzeen-Dock, 1998).

Tenure and claims over forests and land are highly contested worldwide (Yurdi et *al.,* 2010). The State retains full ownership of most land, supported by constitutional or dejure rights that can often trace their origin back to colonial periods and enjoys statutory monopoly over forests. Increased demand for food, perceived future food insecurity, and increased

commodity prices lead Governments to take unprecedented actions to boost agricultural expansion and to capitalize on productive sectors such as the logging, oil palm, and rubber sectors (Yurdi *et al.,* 2010). Further, for the Governments to attract investors or developers, they have to provide access to vast tracts of land on favorable terms. However, many local communities and indigenous people who live within the forest reserve, claim customary rights. Forest resource use conflicts in this case therefore emerge when the State do not recognize existence of customary rights. For example, in East Kalimantan Province (Indonesia), a government and military-backed logging company failed to recognize indigenous rights and indigenous peoples were excluded from forests to make way for logging operation, triggering serious conflict through the province (Yurdi *et al.,* 2010).

In southern India, according to Madhisidan (1992), assertion of state control over natural resources led to severe conflicts with local populations attempting to maintain their customary rights to resources. Jackson (1990) further expounds on Madhisan (1992). He states that all of India's nearly 500 protected areas are virtually islands surrounded by villages and agricultural land. Majority of the people are desperately short of the basic resources of life, such as firewood, building materials and grazing areas for their livestock. They are therefore forced to illegally access the forest and graze their livestock (Jackson, 1990).

The inadequate co-ordination among state agencies is the other factor responsible to forest resource conflicts according to Yurdi *et al.,* (2010). Conflict emerges when the different Government agencies have multiple interests over forest resources. In Kampong Speu (Cambodia), a rock mining company received a permit from the Ministry of Industry, Mining, and Energy (MIME) while the local communities received approval for their community forest from the provincial government. This poor coordination among government agencies at the provincial level can lay the groundwork for forest resource conflict at the local level (Yurdi *et al.,* 2010).

Conservation and economic development policies formulated at national or international level without consideration of potential local-level impacts underlie many forests around use worldwide. According Yurdi *et al.,* (2010), protected areas are often established without genuinely consulting resident local communities. Conservation, in this case, is largely based on a concept that does not reflect reality on the ground. Yurdi *et al.,* (2010) further notes that Government agencies often threaten to resettle residents or severely restrict livelihood

activities for the sake of conservation (for example, the cases of Kanchanaburi, Thailand and Phou Gnai, Lao PDR) (Yurdi *et al.,* 2010). Forest resource conflicts are aggravated by inadequate public accountability of powerful actors such as companies and lack of transparency in terms of decisions on land-based investments (Yurdi *et al.,* 2010).

2.2 Causes of forest resource: Regional perspective

In Africa, the main causes of conflicts over forest resources, according to Odhiambo (1996), are perceived to be at two levels: The first level occurs between national interest and local community interest. According to Odhiambo (1996) national interest is represented by the central governments usually through the agency of the forest departments. The national governments view forests as national resources which have to be used for the benefit of the entire nation. Thus, if industrialization is a priority issue at the national level, then the national governments will order the clearance of entire forests to give way to the establishment of industries (Odhiambo, 1996). The local community interest, on the other hand, is served by the sustainable management of forest resources for the benefit of local communities and the resources. The clearance of forests to promote industrialization does not therefore serve the local interests, but rather it disrupts the lifestyles of the communities, uproots them from their natural environment and results often times in the loss of their collective identities (Odhiambo, 1996).

The second level of conflict over forest resources is mainly because of the profit propelled business interests versus the subsistence interests of local communities. Odhiambo (1996) further argues that multinational, national and local trading companies, supported by government policies, see forests as sources of raw materials to be extracted in large quantities to promote industrialization and international trade. This counteracts the interests of local communities for whom forests and forest resources are a basis for subsistence (Odhiambo, 1996).

In both levels of conflict situations the community interest is threatened by an external interest. According to Odhiambo (1996), what differs is the intensity of the conflicts and their implications for sustainable resource management. Intra-communal conflicts tend to be less intense than conflicts that pit the community against external forces. Nonetheless, intra-community conflicts threaten the sustainability of the ecosystem (Odhiambo, 1996).

These conflicts at the government level have become more pronounced with the onset of economic liberalization, as governments compete to attract private sector investments (Odhiambo, 1996). In Uganda, for example, forest lands have been excised and allocated to individuals and companies for the establishment of industries and for settlement. When these excisions are done, little or no regard is given to the communities that live within the vicinity of these forests whose livelihoods depend on the sustainable management of these forests, and who are the major custodians of these forests and forest resources (Odhiambo, 1996).

The discussion on causes of forest resource use conflicts in the present study gives background of the through which the forest resource use conflict in the study area shall be analyzed.

2.3 Forest resource conflicts in Kenya

Forest resource conflict in Kenya has been on the increase in the past decade. According to Odhiambo (1996), poor co-ordination among Government agencies are partly to blame for forest resource use conflicts. For instance, while a Ministry responsible for environment and natural resources seeks to conserve the natural resources based within the forests for their innate value, the Ministry responsible for tourism and wildlife would require them as wildlife conservation habitats. The Ministry in charge of Industrialization on the other hand, looks at the forests as potential industrial sites, and is quite pleased to have the same excised off and allocated to industrialists. Ongugo *et al.,* (2008) however attributes forest resource use conflicts to three interrelated factors: unclear forest tenure, population pressure, and irregular re-settlement, loopholes in the forest excisions and ethnicity

2.3.1 Forest Tenure

There has been an increasing shift from communal land tenure system to private land tenure system. According to Wieben and Meinzen-Dick (1998), communal land tenure system accommodated the user rights of multiple parties whereas, as opposed to private whose user rights are individual. This shift, according to Ongugo *et al.,* (2004) has often been associated with privatization and development of land markets that do not favour those in society who are less endowed with capital assets. As a result of the change in land tenure arrangements, many customary rights of access such as grazing livestock, taking fallen branches for firewood or collecting medicinal plants from a forest may be considered as an offence (Rocheleau and Edmunds, 1997). Although these rights may be important for livelihoods

especially those of poor households, they are often seen as offensive by those who manage government forests.

Ongugo *et al.,* (2008), further notes that there are instances were tenure regime is not clearly stated. In such instances, some form of negotiation involving roles and responsibilities of the participating parties' become necessary.

Many forest adjacent communities believe that public forests belong to them (although legally, they are owned by the government). As a consequence, the community members have not accepted the legal position of the government ownership and still wait for the time when the forest would be returned to them as the rightful owners of the resource (Ongugo *et al.,* 2008).

This is particularly common in Kenya where many forest adjacent communities depend on the forests for land and other products. One overriding observation is that in the process of 'development' forestlands had been considered as wilderness or wasteland and were left without clear management plans. For example, while forest land in Kenya is managed as a public resource, decisions pertaining to their use usually do not reflect the public good theory which requires that public goods are managed in such a way that they benefit the local people more than those from outside (Kigenyi *et al.,* 2002).

Okoth-Ogendo (2000) attributes the unclear tenure to the frequent conflicts between local community, conservation programmes and institutions involved in the management of the forests.

The study shall explore whether the unclear tenure system in the Enderit is one of the drivers of forest resource use conflict.

2.3.2 Population pressure

Estimates show that 2.9 million people in Kenya (almost 10% of the population) live in the areas adjacent to indigenous forests and directly depend on forest resources for their livelihood and survival (Ongugo *et al.,* 2008). With an increase in the population, the demand for agricultural land increases and subsequently leads to increased conversion of forest land to agricultural land and commercial uses (Ongungo *et al.,* 2008). Malik (1984), argues that pressure on the environment for development and poverty alleviation is a factor of increased human population, poverty and need for livelihood activities.

The population trend vis a vis socio-economic characteristics would therefore be relevant in this present study because it defines their dependency on the forest resources.

2.3.3 Irregular re-settlement process

In the past decade, carving out of forests for human settlement, was on the increased as the government was very keen to settle the forest dwelling communities along the forest boundaries or within the cleared forest plantations (Ongugo *et al.,* 2008). However, there was a public outcry from section of community members who resisted the government's efforts. According to Ongugo *et al.,* (2008), this caused a lot of conflict between the community and the Government.

This study shall explore how the irregular re-settlement process in the study area has affected the forest resource use conflict in the area.

2.3.4 Loopholes in the forest excisions

The process of forest protection was introduced under the 'East Africa Forest Regulations, 1902' by the first Conservator of Forests. These regulations allowed for the gazettement of forests, and control of forest exploitation through a system of licenses and fines. The Government through the Minister for Natural Resources had the express authority to degazette the forest through a legal process of excision. These excisions are done with the intent of converting the area to other alternative land uses like settlement, private agriculture that do not foster tree cover. The forests are degazetted then surveyed and demarcated for the proposed use (Ongugo *et al.,* 2008).

According to Ongugo *et al.,* (2008), the excision process had unique loopholes which served to fuel forest resource conflicts. They were made without consultation with the stakeholders. In most cases, excision usually took place after the forests had already been illegally occupied and no environmental and socio-economic impact assessment done for the proposed changes in land-use leading to unsustainable land management (Ongugo *et al.,* 2008).

Mau Forest Complex, which is the subject of this research, has approximately 400,000 hectares of forest land divided into seven blocks. According to Siringi (2010), the complex has lost almost quarter of its size to human settlements, illegal logging, farming and host of other human activities. Siringi (2010) further observes that more than 25,000 settlers have illegally settled in the Mau Forest Complex. Majority of these are farmers who have totally

degraded and destroyed the environment to pave way for their settlement and farming. The on-going forest resource conflict, according to Siring (2010), is between the Government of Kenya and farmers/new settlers and Ogiek community who are believed to have lived in harmony with the forest biodiversity since time immemorial in the Kenyan forests.

The farmers/new settlers living in Mau were allocated land by the previous political regime and given land title deeds by the Government of Kenya while other group of settlers are believed to have encroached into the forest illegally (Siringi, 2010). In response to the various calls for the restoration of the Complex, the Government of Kenya took stringent measures to evict the communities living in the forest who then became internally displaced people (IDPs). The eviction of the communities was enforced by contingent of officers from the Kenya Wildlife Service after expiry of a government notice to vacate from the forest (Siringi, 2010).

The loopholes on the forest excision in Kenya have since been addressed. However, the effects of the earlier arrangements can be observed in the areas affected. This study shall therefore consider this in the study area, more so as it relates to the forest resource use conflicts in the area.

2.3.5 Ethnicity

Mau forest complex has a complex history that remains relevant to understanding of the current conflicts. Pre-colonially, the area was at the interface between successive militant expansion and contractions of the Kalenjin speakers (predominantly Nandi in northern sections and Kipsigis to the South) and Maasai to the East and South combined with Kisii settlement in far southwestern sections, and with the earlier occupants, the Ogiek forest-dwellers in between. During the colonial period white settlers entered the area establishing farms and forest industries sometimes bringing Kikuyu workers from the Central Highlands. Kikuyu influx continued during the Kenyatta administrations after independence and other ethnic groups have also established in smaller numbers.

These pre-colonial ethnic patterns are outlined in Nganga (2008), while the colonial ingress and egress is described in Morgan (1963) and Jones (1965). Settlement schemes for African farmers began before the 1950s, for example at Olengurone in the center of the southern Mau forest blocks, for displaced local and incoming population (Ominde, 1971) in an area of previous settlement and eviction (Hansard, 1950). Kalenjin settlers were encouraged during

the KANU era. Population growth in the Mau greatly exceeds the national level indicating that immigration continues (ProMara analysis of 2009 census data).

Land outside the Forest Reserves, including the forest excisions is largely under private title with a mixture of smallholders (often through government settlement schemes, including in the excisions) and larger landholders many of whom are influential government officials or politicians. Most land titles within the excisions are now regarded as illegal or irregular by government and are separately under legal challenge because of improper de gazettement of Forest Reserves (Government of Kenya, 2009a).

These changing patterns of land allocation, land use and resource access are a root cause of most intra and interethnic conflicts, though in the latter case political incitement is often a proximate trigger. As a result the area has experienced election related violence for more than 20 years

2.4 Conservation efforts: *A general overview*

Conservation can be defined to as preservation, protection, or restoration of the natural environment, natural ecosystems, vegetation, and wildlife and in this study, the forest. Njogu (2004) further expounds on two forms of forest conservation that is *in situ* Conservation done within the natural environment and *ex situ* Conservation done elsewhere in an artificial environment under artificial conditions (Njogu, 2004). This research shall only be limited to *in-situ* Conservation efforts.

The glamour for forest resource conservation has mainly been because of their present and potential use, maintenance of entire biosphere in supportive of human life and maintenance of biological diversity, in particular, of all presently living species. Convention of Biological Diversity (CBD), which was adopted in 1992, and has so far been ratified by 180 governments, takes the lead at the global level in conservation of biodiversity, forests inclusive. They prevail upon the governments to cooperate in conserving biological diversity, using biological resources in a sustainable manner and ensuring that the benefits arising from such use are equitably distributed (Njogu, 2004).

In Kenyan case, conservation of forests in Kenya has now become of crucial importance as the repercussions of forest depletion manifest, mainly through extreme variation of weather patterns. These unprecedented flooding, long spells of dry seasons, inordinately high

temperatures and unpredictable weather patterns have resulted in reduced crop yields in Kenya in the last few years.

2.5 Evolution of conservation initiatives

a) Conventional Conservation efforts

Conservation efforts have evolved over time in Africa. According to Kideghesho (2006), the pre-colonial conservation policies were derived from American Yellowstone model popularly known as 'fences and fines' or fortress conservation' approach. Under this model, according to Adams and McShane (1996); Lewis *et al.,* (1990) and Neumann (1988), destructive activities as hunting and deforestation were presented as cruel, barbarous and wasteful. Consequently, this justified the prohibitive action against access of wildlife and forest resources for social and economic importance. Essentially, conservation policies were designed to protect the interests of the whites, while grossly undermining those of the natives (Kideghesho, 2006). The suitability of an area for a protected area depended on its suitability for alternative uses by Europeans.

The post-colonial Africa countries maintained the colonial conservation policies and ideologies contrary to native expectations as noted by Kideghesho, (2006). More protected areas were created at the expense of local livelihoods. According to Bonner, (1993), law enforcement was observed with more vigilance including shoot-to-kill policy against poacher, for example, in some countries, such as Kenya and Zimbabwe. Two reasons that made the choice of maintaining colonial policies inevitable, according to Gibson (1999) include the fact that the resources were contemplated as important source of economic base for political power and resource for promised socio-economic development. The continuation of the flow of foreign aid packages, according to Nelson (2003) depended on deep respect for the wishes of western countries, including prominently international environmental organizations and their constituencies. This uncritical inheritance of colonial conservation policies endorsed continuation of local resentment toward the policies and conflicts between the local people and conservation agencies.

This approach, according to Kideghesho, (2006), failed to achieve meaningful conservation of the natural resources mainly due to increasing human resentment towards the policies and escalating negative impacts caused by human activities on forests as well as poverty, human population and inadequate Government budgets. Furthermore, the political, social and

economic costs of conservation initiatives fomented resentment toward conservation programme. Makombe (1993) captures the scenario in his sentiments that "People prevented from using their resource legally will then tend to ignore it, *eliminate* it, or use it illegally, to the disadvantage of the resources and those who might develop and use it legally."

Table 2.1: Examples of local resentment towards conventional conservation approach

Area	**Event**	**Local Communities' response**	**Source**
Simien N.P. (Ethiopia)	Imposed restrictions over access to firewood	Physical violence	IIED (1994)
Virunga N.P. (DRC)	Attempts to evict the local communities	Killing of 36 wardens	Machlis (1989)
Amboseli N.P. (Kenya)	Eviction of Maasai pastoralists in 1970s	Spearing of rhinos	Western (1984)
Etosha N.P. (Namibia)	Restriction of hunting imposed to Ovambo tribesmen during the colonial time	Marked freedom celebration in 1990 by cutting game fences and driving into the park armed with guns to hunt for meat	New Scientist 1991 (In IIED 1994)
Benoue N.P. (Cameroon)	Imposed restriction on land use and property damage	Encroachment and illegal hunting	Weladji & Tchamba (2003)

Source: Kideghesho, (2006)

Table 2.2 shows some examples on local resentment toward conservation policies in Africa.

b) Alternative Conservation approach

The collapse of the conventional conservation approach led to the emergence of alternative conservation approach popularly referred to as Community Conservation (CC) approach (Barrett and Arcese 1995; Berkes, 2003; Gibson and Marks 1995; Songorwa *et al.*, 2000). This approach was based on the premise that "if conservation and development could be simultaneously achieved, then the interests of both could be served" (Berkes, 2003) and "when a resource pays, the resource stays" (Pearce, 1997). These catch phrases commensurate with the "use it or lose it" philosophy (Baskin, 1994) underscoring that, the conservation efforts investing on biological solutions or repressive legislation whilst ignoring the socio-economic conditions of the people are doomed to failure. Barrow and Fabricius (2002) express this succinctly by stating that "ultimately, conservation and protected areas in contemporary Africa must either contribute to national and local livelihoods, or fail in their biodiversity goals."

Central to many CC approaches, provision of benefits is seen as a pragmatic way of motivating local people to align their behaviours with conservation goals (Borrini-Feyerabend *et al.,* 2002; Emerton, 2001; Makombe, 1993; Western, 2001). Essentially, the strategy sought to induce local people to "surrender access to, or curtail illegal off take of native species and their habitats" (Barrett & Arcese 1995).

Despite being ambitious, the growing consensus, academic literature reveals disappointing outcomes for most CC initiatives (Kideghesho, 2006). Some of the reasons for this failure include wrong assumptions underlying these programmes (Barrett and Arcese 1995; Gibson and Marks, 1995; Hackel, 1999; Songorwa, 1999); and limited budgets that make the initiatives too small to exert a reasonable influence over the forces threatening protected ecosystems (Wells and Brandon 1992). Other reasons are missing balance/link between the benefits and costs (Madzudzo, 1997); lack of interests among the communities (Songorwa, 1999); incompatibility between community development objectives and those of conservation (Berkes, 2003); and gender insensitivity (IIED, 1994; Songorwa, 1999).

According to Kideghesho (2006), sustainability of these programmes has also been questioned. Most of the programmes are donor-initiated and funded and lack sound strategies to survive in case of donor-pull-out (Songorwa, 2004b). The benefits from the initiatives are also likely to be reduced or terminated in an event of population increase and low tourism earnings due to ecological, political, policy and security factors (Barrett & Arcese, 1995). Reduction or termination of the conservation benefits will likely undermine the conservation objectives on the basis of 'no benefits, no conservation.' Furthermore, use of conservation benefits as a basis for local support to conservation may risk the conservation objectives in case more profitable economic options emerge (Hackel, 1999).

The foregoing discussions, it can be observed that the conservation initiatives have undergone a paradigm shift mainly driven by human attitude and perspectives. The present study shall analyze the existing conservation efforts in the study area more so whether they reflect the changing perspective of the forest adjacent communities.

2.6 Forest resource conservation in Kenya

The first forest legislation in Kenya was written in 1902 to provide protection for the mangroves and a strip of land along the railway line, which had already been overexploited to provide wood for railway sleepers and steam engines. The East Africa Forest Regulations (1902) were published after the appointment of the first Conservator of Forest. The first forest reserve in Kenya was established at this time and, by 1908, the current major forest blocks had mostly been declared forest areas with a government land status.

They were generally demarcated using natural features and included significant areas of land with no close-canopy forest cover. Subsequently, a distinction was made between forest gazetted as government forest and that declared as trust forest. Trust forests were declared in those areas where it was established that local communities were in effective occupation and making regular use of the area. Areas with sparse population and only infrequent land use were gazetted as Forest Reserves under government land (Ogolla and Mugabe 1996).

Surveying, demarcation and gazettement continued steadily over the succeeding decades until the Second World War, mainly in potentially productive areas. In 1943, the largest annual addition was made with the gazetting of Mount Kenya and the Aberdare forests. The few remaining large areas were added in the late 1950s and forests gazetted since then have all been relatively small. The Forest Ordinance was revised in 1941 to provide for the creation of nature reserves within forest reserves for total protection. A Forestry Advisory Committee was also established to advise the Governor on forestry matters, particularly to ensure that forest policies were well adjusted to meet the country's timber requirements. Following its recommendations, certain forest reserves within high agricultural potential areas were degazetted (IUCN 1995).

This was in order to make available more land for farming in specific areas. The first formal forest policy was published in 1957. It covered further reservation, protection of the forest estate and sustainable exploitation of forest resources. Afforestation and conservation of the forest in 'African areas' were to be encouraged, as was proper management of privately owned forest.

Independent African governments inherited the colonial forest management regime. However, this has changed over the years and socio-economic interests and political realities between state institutions and local people are now being recognized, following the occurrence of forest management conflicts (Beinart 1987; KWS 1990; RoK/MENR 1994a). In the postcolonial period, the forest policy was first revised in 1968 with few modifications. Its focus was on catchment protection and timber production, with strong government control over the sector.

Further, according to Njogu (2004) preservations were recommended. Since the publication of these policies, most forests on private land have been cleared for settlement and agricultural land use. The remaining indigenous forests within protected reserves have also been logged, greatly reducing the standing timber volume of commercial species. Charcoal burning has also caused severe damage (Njogu, 2004). Increasing human population around many forests has resulted in localized over-use of other forest products for sustenance and commercial purposes. Grazing in the forest, originally allowed because of its reduced fire risk, ran out of control, causing damage to young plantations and, in some cases, adversely affecting regeneration in natural forests. Forests on trust lands were also heavily exploited, with minimal management by former county councils (Njogu, 2004).

In the mid 1980s, the situation reached a crisis and all logging, charcoal burning and grazing activities were banned in gazetted natural forests, with the exception of some logging in the former Coast Province. Despite the ban, these activities have continued illegally in many forests, causing severe degradation. A proportion of gazetted forest continues to be lost through clear-felling, mainly for settlement and agriculture (IUCN 1995). A few forest areas, particularly those under the defunct local government, have also been gazetted. The most recent additions are the Taita Hill forests in 1991. The government gazetted a number of additional areas, including the Nguruman escarpment, the Maasai Mau forest and Tana River blocks, although not all of these are closed-canopy forests (Martin 1995).

2.7 Forest management policy

The current forestry management regime began at the end of the 19th century, when the country pursued the policy of preserving forest areas for protection purposes, as well as establishing high yielding industrial plantations. Management activities were supported by

organized forestry research programmes that started in 1934 with the primary objective of ensuring sustainable forest exploitation and the maintenance of environmental stability. Until early 1950, each forest reserve had an approved annual management plan. The Sessional Paper No. 1 of 1968 set out the Forest Policy for Kenya (RoK/MENR 1994a). The policy sought to demarcate and increase the total forested areas as much as possible. The policy expresses the intention that all major forests ought be managed by the central government, because a forest in one district or province may affect water and/or timber supplies in another.

However, former local authorities could establish forests for purely local purposes. Thus, the forest sector has been characterized by over-centralized decision-making management. This led to ineffective management, which is best illustrated by inadequate industrial plantation development and indigenous forest degradation (Njogu, 2004).

Over the past decade, according to Njogu (2004), forest management in Kenya has attempted to adapt to the current conservation paradigm by using terms such as 'community forestry', 'participatory forestry', 'joint forestry management' and 'collaborative forestry', denoting a kind of management that involves various stakeholders on the basis of sharing of rights, responsibilities, benefits and obligations between the people and the state. Nevertheless, the Government manages most of the forests through the Kenya Forest Service and in some cases the Kenya Wildlife Service.

Private individuals and companies also manage forests under their jurisdiction. However, in some cases, private institutions are involved in the management of government forest reserves. An example is the involvement of Lewa Downs Wildlife Conservancy in the management of Ngare Ndare forest, a case that has triggered off resentments from local communities. There are attempts to manage forests jointly, as in the case of Arabuko Sokoke Forest, which was collaboratively managed by the Forest Department, KWS, the Kenya Forestry Research Institute (KEFRI) and the National Museums of Kenya (NMK). There have also been attempts by communities to manage forests, for example, in Loita Forest in Narok County (Njogu, 2004).

The Forest Act No. 7 of 2005 has a prudent and credible proposal spelt out of fundamental departure from government ownership and control of vast forest estates of both indigenous forests and exotic plantations to more participatory management of forest resources by communities and the private sector. Under the law, communities living around gazetted forest reserves can establish and register forest user associations and apply to the Kenya Forest Service for joint management arrangements of the respective forests. The Act also provides for incentives to individuals and communities to establish arboreta and forests on privately owned land. A Key departure from the old law is the requirement that before the Government de-gazettes an existing forest reserve or section of it; it must consult with the affected communities and seek approval from the parliament. The expected of this process is enhanced forest conservation efforts.

The present research shall analyze the uptake of the current conservation paradigm and how it has impacted on the sustainable conservation.

2.8 Other relevant legislation

2.8.1 Forest Policy, 2014

Kenya's forest sector has experienced poor performance in the past, and improving forest governance has been an implicit objective in forest sector reforms over the past ten years. The Forests Act (2005) introduced participatory forest management, through the engagement of local communities, and the promotion of the private sector investment in gazetted forest reserves, accompanied by concomitant institutional and organization change, notably the establishment of the Kenya Forest Service (KFS), and the formation of Community Forest Associations.

The Forest Policy, 2014 proposes a broad range of measures, actions and strategic initiatives responding to the challenges faced by the forest sector. These include integrate good governance, transparency, and accountability, equity and poverty reduction into the forest. It also presents the issues and the policy recommendations that have been identified, analyzed and debated by the stakeholders. The policy will be the basis upon which the on-going governance, administrative and legislative reform process will be continued. It seeks to balance the needs of the people of Kenya with opportunities for sustainable forest

conservation, management and utilization. It is also particularly informed by the Constitution, National Land Policy, Transition to Devolved Government Act, 2012, Inter-governmental Relations Act, 2012, Land Act, 2012 as well as the National Climate Change Response Strategy, which underscores forestry's unique role in both climate change mitigation and adaptation.

The main features of the revised policy framework for forest conservation and sustainable management include: The enactment of a revised forests law to implement this policy, mainstreaming of forest conservation and management into national land use systems, clear division of responsibilities between public sector institutions where Ministry responsible for forestry provides an oversight role in national forest policy formulation, and regulatory function of the sector, thereby allowing Kenya Forest Service to focus on the management of forests on public land, and the role of the County governments in implementing national policies, County forest programmes including the delivery of forest extension services to communities, farmers and private land owners, and management of forests other than those under Kenya Forest Service.

2.8.2 Water Act, 2002

The Water Act, 2002 was passed by Parliament in July 2002 and provides for the management, conservation, use and control of water resources, and for the acquisition and regulation of water rights. The Act establishes two entities to deal with different aspects of the water sector, namely Water Resources Management Authority (WARMA) and Water Service Regulatory Boards. The board is responsible for water supply and sewerage, while the authority is mandated to develop guidelines and procedures for water allocation, monitor and reassess the national water management strategy, receive and determine application for permits for water use, regulate and protect water resources from adverse impacts, and management and protect catchments. The Authority designates catchments and establishes Advisory Committees to advise it on management at catchment level.

The Act also makes provision for the information of Water Resource Users Association (WRUA) as for co-operative management of water resources and for resolution of conflicts. WARMA is also required to develop catchment management strategies for each of the catchments so as to introduce strategic planning in order to reserve degradation of water

catchment. Enderit forest block is a major catchment of the Enderit River which feeds into Lake Nakuru National reserve. The study therefore shall seek to establish how the forest resource use conflict affects catchment and also the role played by WRUA and WARMA in addressing the conflict

2.8.3 Agriculture Act, Cap 318

This Act, aims to promote and maintain a stable agriculture, to provide for the conservation of the soil and its fertility and to stimulate the development of agricultural land in accordance with the accepted practices of food land management and good husbandry. Furthermore, the Act provides for administrative instruments to ensure a sound agricultural development.

The Act also empowers the Minister to gazette regulations to promote among others conservation and environmental management. For instance, under the Agriculture (Basic Land Usage) Rules address the issues of environmental management in rule 3 which seeks to protect slopes and rule 6 which protects river banks. Rule 3 seeks to protect land with a slope exceeding 35%, and states that any person who cultivates, cuts down or destroys any vegetation or grazes any livestock on any land which the slope exceeds 35% shall be guilty of an offence, unless he has the permission of an authorized officer. Rule 4 provides that any person who cultivates any land of which the slope exceeds 20%. Rule 5 provides that any person who cultivates any land of which the slope exceeds 12% but does not exceed 35% when the soil is not protected against erosion by conservation works shall be guilty of an offence.

Rule 6 provides that any person who, except with the written permission of an authorized officer, cultivates or destroys the soil, or cuts down any vegetation or grazes any livestock on any land lying within 2 metres of a water course, or in the case of a watercourse more than 2 metres wide, within a distance equal to the width of that watercourse to a maximum of 30 metres shall be guilty of an offence.

The provision of Agricultural Act, Cap 318, seeks to address the forest resource use conflict, particularly on the conservation of water channels. Therefore, strict enforcement of the

provision of this law shall address by far the forest resource use conflict. This study shall therefore seek to establish how far this has been implemented in the study area.

2.8.4 Forest Conservation and Management bill (2015)

The Forest Conservation and Management Bill 2014 establishes a service known as Kenya Forest Service and contains many innovative means of forest management, including a strong emphasis on partnerships, the engagement of local communities, and promotion of private investment aimed at correcting previous shortcomings. The overall spirit of Forests Management and Conservation Bill is devolution of authority and responsibilities in management of forest, and promotion of partnership through increased access of benefits to the communities.

2.9 Stakeholders (Actors and institutions) in forest conservation; General overview

In the discussion of forest conflicts and conservation, the stakeholders local actors and institution play significant role. Local actors, according to Njogu (2004) are individuals, informal groups of people, interpersonal networks or even organizations with specific interests in forest resources. According to Long (1992) several factors may form collective actors. Collective actors basically is a coalition of actors who share similar goals, interests, or values, or a certain definition of situation, and who agree to pursue certain courses of social action and in most cases some instances their interests can differ from those of the individual actors. According Long (1992) this definition implies the great significance of local actors in forest conservation mainly because they influence change in attitude by the people.

Institutions on the other hand according to Njogu (2004) are more stable social entities compared to local actors. They are formed (or have evolved) to regulate the interactions between actors and their environment. In Wilshusen (2003) cited by Njogu (2004), the institutions shape how social action occurs. They inform action through authority since they are guided by informal and formal rules, norms and procedures. This brings about the concept of institutionally-based power basically referring to the enactment of every day social practices linked to rules (Bourdieu 1977, cited by Wilshusen 2003). These rules, norms and procedures form what is commonly referred in modern day society as legal framework (laws, regulations and policies). According to Wardell and Lund (2003), the legal framework do not

necessarily determine use and access of forest resources as such , but form a structure of opportunities for negotiations of the rights.

The role of local actors and institutional mechanisms, especially in the state controlled forests, therefore is critical especially because of the common trend where the central government seeks to decentralize the control to local level. Both informal and formal institutions, according to Leach *et al*., (1999), affect the ways in which local actors access, use and utilize environmental resources. Wilshusen (2003) adds that in the natural resources environment, there are several institutions and actors and therefore their respective roles have to be understood against the social and historical background of the locality (Wilshusen, 2003).

Barrow (2002), in his study notes that stakeholder engagement is crucial to the success of forest conservation. This according to Barrow (2002) ensures that all information and knowledge are applied, experience and best practices are integrated and stakeholder expectations are met. Participation of stakeholders furthermore reduces the cost of conservation programmes. Sharing inputs, technological and capital inputs by governments and labor and local information inputs by communities reduces the cost of transaction of factors and also encourage a co-management regime between state and other stakeholders.

However, for the success of any conservation programme, all the stakeholders have to work under a governance framework, which provides a link between resources and stakeholders. This framework according to Zweede (2006) entails corruption control, service delivery, the rule of law, public accountability as well as legal framework.

The study shall therefore seek to understand the institutions and the level of social actors in Enderit forest and furthermore explore changes in the way forests are used and controlled in practice.

2.10 Stakeholders in Forest Conservation in Kenya

The concept of stakeholders in discussion of conflicts in forest resources use and conservation as advanced by several theorists seeks to identify who has what rights and who is affected or affects forests resources (Byers, 2000). This concept implies that resource ownership, access by non-owners and intervention practices in resource situation are the crux of the matter. This proposition according to Byers (2000), concludes that the involvement of

the community in forest resources conservation are corner stone of popular participation, conflict resolution and core incentive for sustainable forest conservation.

Stakeholders in Kenya are actively involved in conservation initiatives including tree planting as well as championing proper use of forest products. In her research, Wambui, (2002), asserts that, the involvement of stakeholders benefits the well-being of community dwellers since they (stakeholders), have taken interests in educating the community members on the benefits of forest conservation, as well as engaging in income generating activities such as farming, as well as researching for markets that are in need of the community dweller's farm products. This encourages growth of community participation programs and groups, while at the same time sharpening further their (communities and stakeholders) skills, on not only forest conservation measures, but also natural resource management. However, differences also arise among stakeholders based on the individual interests that the stakeholders have or get from engaging in forest conservation. Some of the stakeholders want a bigger share of what donor agencies donate to the communities, while some claim or want special recognition for the efforts made towards forest conservation. Therefore, clear regulations and responsibilities should be outlined wherever stakeholders are involved in management.

2.11 Role of County Governments in Natural Resource Management and conflict resolution

Article 62 (3) of the Constitution states that all natural resources are the control of the National Government. These natural resources include government forests, minerals and water among others. Further 4th Schedule Part 1 vest the role of protection of the environment and natural resources with the National Government. This role is geared at delivering a durable and sustainable system of development. However, Article 10 of the schedule gives responsibility of to the County Government to implement specific national government policies on natural resources and environmental conservation.

As earlier noted, management of the Forests in Kenya is guided by Forest Policy, 2014 and Forest Act 2005. The policy states that Kenya Forest Service will focus on the management of forests on public land, held in trust by National Government. The role of the County Governments is implementing national policies and County forest programmes including the delivery of forest extension services to communities, farmers and private land owners.

2.12 Theoretical Framework

There are two main theories behind the resource use conflict that have been proposed by scholars. One points to scarcity (sometimes called the neo-Malthusian view, named after the English demographer Thomas Rovert Malthus) and the other points to abundance.

a) Theory of Scarcity (Neo-Malthusian);

According to Kahl (2006), the neo-Malthusians argue that rapid population growth, environmental degradation, resource depletion and unequal resource access combines to exacerbate poverty and income inequality in many of the world's least developed countries. These deprivations are easily translated into grievances hence increasing the risks of rebellion and societal conflict (Kahl, 2006). Kahl (2006) further explains that internal disputes can also arise from local environmental degradation, for instance when forest destruction, disrupts flow of water downstream or when factory emissions pollute a main fresh water source. Ethnic conflicts clashes also occur when rapid population growth increases demand for scarce resources such as water or timber (Kahl, 2006).

b) Theory of abundance

Other scholars, according to Gleditsch (2007), claim that it is resource abundance, rather than scarcity, that is likely to fan forest resource use conflict. Some countries with abundant natural resource have experienced what has been coined the "resource curse." This is characterized by corruption, economic stagnation, and violent conflict over access to revenues. The availability of easily lootable resources, such as timber, has increased corruption chains (Gleditsch, 2007). For example in Cambodia, the government and the rebel groups use timber as a source of revenue for their military activities. Competition over the control of oil production has helped fan the violence among Kurds, Sunni, and Shiites in Iraq (Gleditsch, 2007).

According to Gleditsch (2007), when resources are either scarce or abundant, political instability makes regions much more vulnerable to conflict. Instability impacts not only on the governance structure, but also on all other infrastructures that depend on government control and oversight. Gleditsch (2007) further explains that population growth, environmental degradation, and resource inequality can combine to weaken an already unstable government's capacity to address the needs of the populace. Abundance of natural

resource can provide the incentive for increased conflict over control of the income-generating sources (Gleditsch, 2007).

When natural resources are not at the heart of the conflict, their availability can compound the problems created by cultural conflict (United States Institute of Peace (USIP) (2007). Severe divides between ethnic and religious groups within a country can magnify wealth inequalities, and the competition for political and economic dominance between the groups can lead to conflict (United States Institute of Peace (USIP) (2007).

This study pursues the 'scarcity' theory as the genesis of forest resource use conflict. Forest resources in the study area have been depleted by human activities. It is this scarcity that triggers forest resources conflicts and influences community's attitude and perception towards conservations initiatives.

2.13 Conceptual Framework

This study was conceptualized as a model shown in Figure 2.1 that describe relationship between forest resources use conflict, which is a factor of household socio economic and demographic characteristics, forest dependency, conservation strategies, legal and institutional framework and attitude (Independent variables) and sustainable conservation efforts in Enderit forest (dependent).

Household's socioeconomic and demographic characteristics determine income, the extent of consumption, production and expenses. According to Gunatilake (1998); Hedges and Enters (2000), off-farm employment opportunities, agricultural income, household size, land holding, education and market access, ultimately influences the level of dependence on forest resources.

Exponential human population, for instance, creates high demand and competition for arable land and grazing land, medicinal plants, firewood, water resources, building materials and other resources. Efforts to meet these demands lead to competition and ultimately conflicts. Consequently, forest resource use conflict in turn disrupts the ecological processes that are essential in maintaining long-term biodiversity in the forests.

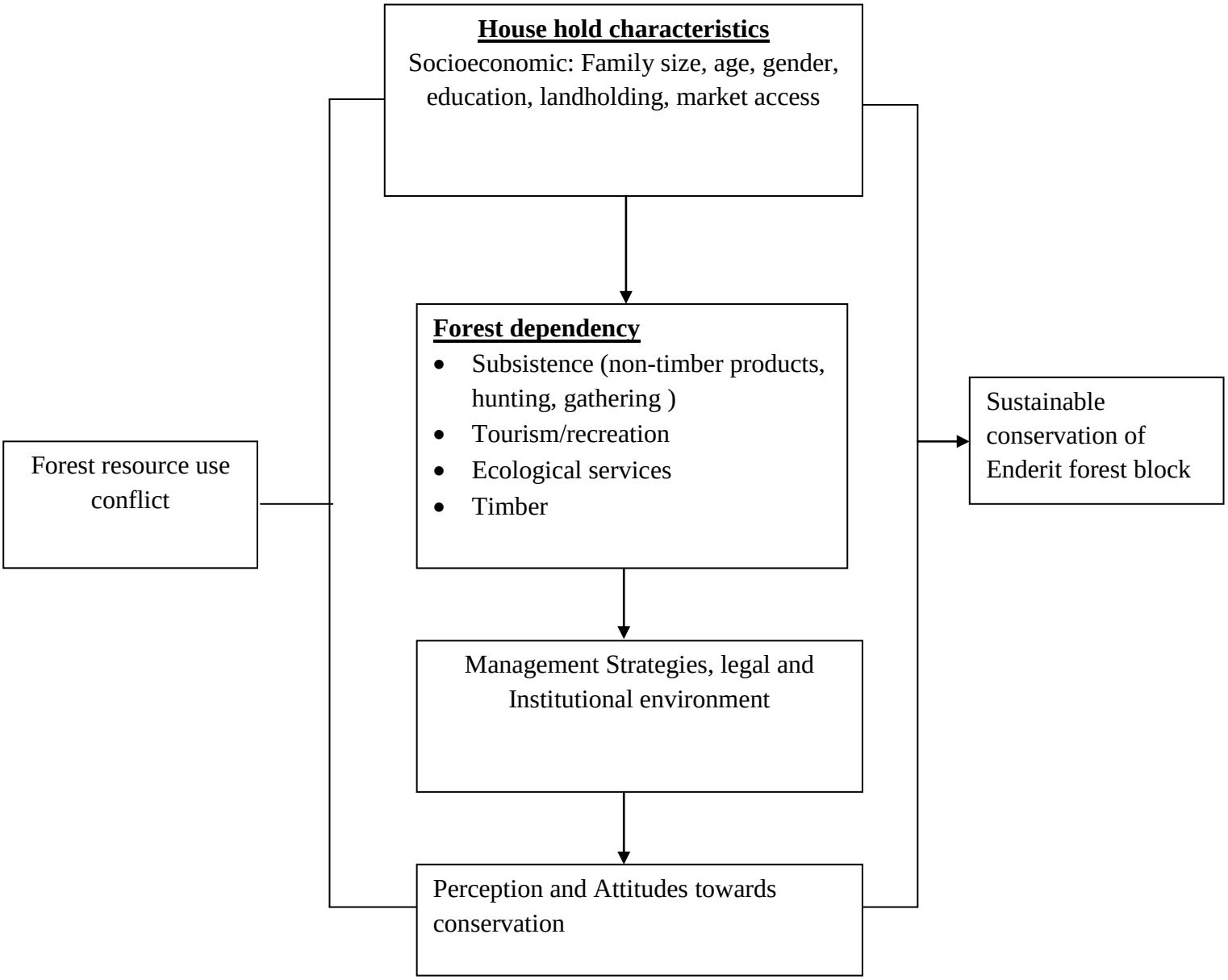


Figure 2.1: Conceptual framework
Source Researcher**,** 2014

Conservation strategies are initiated in response to the increased pressure on forest resources that poses imminent threat to degradation of the forest resources. These strategies are, in most cases, informed by the legal and regulatory framework and are enhanced given the ecological and economic value of the forest.

The success or failure of the conservation initiatives will be largely dictated by the perceptions and attitudes of the forest adjacent communities. Study by Nepal and Weber (1995) revealed that dependence on protected areas resources leads to negative attitudes towards its conservation. In addition, Heinen (1993) points out that literacy and rights to collect forest products lead to positive attitudes. However, crop damage and restrictions on grazing and collection of fuel wood were shown to have negative impact on the conservation of Kosi Tappu Wildlife Reserve, Nepal. These results have been supported with other findings from various countries (De Boer and Baquete 1998; Parry and Campbell 1992; Fiallo and Jacobson 1995). Nepal and Weber (1995) further found that landholding size has positive effect on attitude towards the park. Finally, the study of Mehta and Heinen (2001) in Nepal revealed that benefit from tourism; wildlife depredation issue, gender, and education level were significant predictors of local attitudes towards conservation.

The above variables were used in the study to collect relevant data and deduce results that informed the discussions, conclusions and recommendations.

2.14 Knowledge Gap

The above discussion notwithstanding, the literature available has not exhaustively identified the clear roles and responsibilities of the main stakeholders. This study shall therefore analyze and identified the roles and responsibilities of the stakeholders in conservation of Enderit forest and how forest resource use conflict affect their conservation activities.

Stakeholder interests and expectations in forest resource use and conservation remain a challenge in forest resource management. This can be attributed to the institutional arrangements that are not well developed under the existing laws and regulations. However, the literature review has not exhaustively analyzed this aspect. This study therefore identified this as a knowledge gap through which it sought to address.

CHAPTER THREE: RESEARCH METHODOLOGY

This chapter discusses the research methods used in the study. It also discusses the research design, sampling procedure, methods of data collection and analysis. It further gives a brief description of the study area.

3.1 Research design

The study applied both qualitative and quantitative research design. The qualitative methods were used to collect data that could not be subjected to statistical tests. These included legislations, policies, community's opinions, activities and ways through which these activities have been implemented. On the other hand, quantitative design was used in areas where the data collected were capable of being subjected to statistical analysis. This type of data is presented in form of graphs, tables, averages, maps and other statistical presentations modes.

3.2 Sampling Size and Sampling procedures

The sampling frame for this study comprised of the forest adjacent communities, pastoralists, Kenya Forest Service station managers and stakeholders involved in conservation programmes within the selected study area.

3.3 Sampling procedure

Purposive sampling method was used to select Enderit Forest block. This was judgmentally selected on the criteria of being adjacent to the forest block and has been affected by forest resource conflicts. Three villages; *Gatimu*, *Gwa Chati* and *Segutiet* were selected for the purpose of the study were randomly selected from amongst the villages that border the forest reserve. Since the ultimate sampling unit was the local people from the surrounding community, a sample of 150 households was randomly selected from the three villages. In addition, Chief Forest Officer based at Sururu Forest Station, officials of the Mau Sururu Likia Community Forest Association (MASULICOFA) representatives from provincial administration, staff of the Africa Wildlife Foundation (A.W.F) were also identified to be interviewed.

3.4 Data collection tools

These were the tools used to facilitate the collection of the information from the respondents. They were categorized into primary and secondary data collection tools.

3.4.1 Primary data collection methods

Primary data was collected mainly through a combination of several primary data collection techniques. These included use of interview schedule, self-administered questionnaires, Focus Group Discussions (FGDs) and observation.

(a) Household questionnaire

These are a set of pre-set questions, which had both closed and open-ended questions that were administered to the household respondents. The questionnaires were in English and were administered to the respondents by the enumerators, who had been trained. In cases where the respondent was not able to read and write the enumerator read out the questionnaires and ask the respondent to answer as he fills the answers given. In cases where the respondents did not understand English, the enumerators, who were familiar with the local dialects interpreted the answers given and recorded them.

Information on the socio-economic and demographic characteristics of the household members, land ownership information, forest resource value, types of resource use conflicts, conservation efforts as well as how the forest resource use conflicts affect conservation of the forest block.

(b) Key informant interviews

The basis for identifying key actors for interview was based on both literature review as well as findings of field data collection. Actors identified were either those extensively mentioned, poses a wealth of information and experience on the subject, are key partners as relates to conservation of Enderit or have special interest and a good grasp of Enderit and the interplay of socio-economic and environmental aspects. Representatives of the following institutions were interviewed; KFS, Sururu Forest Station, officials of the Mau Sururu Likia Community Forest Association (MASULICOFA) representatives from provincial administration, staff of the Africa Wildlife Foundation (A.W.F) were also identified to be interviewed.

(c) Observation

In order to undertake the observation, the researcher took transect walks and critically observed all the activities in the communities, livelihood assets such as roads, non-farm income activities and their social interactions as well as their interactions with the forest

resources. The transect walks also involved a walk through the forest to observe the various manifestation of forest resource conflicts. Photographs were also taken to supplement this method.

(d) Focus Group Discussion

A focus group discussion is an organized informal discussion between the researcher who usually serves as a facilitator and a group with a maximum of 12 participants. According to Twumasi (2001), FGDs allow for expression of views, opinion and counter opinion on attitude, beliefs and practices.

A total of 3 focus group discussions were conducted, each from three villages. Each of the focus group had 10 participants and comprised of people with similar socio-economic backgrounds. Focus group discussions were used to collect only qualitative data. The focus group discussions were used among others, to get information on the forest resource use conflicts and their effects on conservation efforts.

3.4.2 Secondary data

The study used secondary data from; reports from Kenya Forest Service, Participatory Forest Management Plan, Forest Management Agreement and reports from County Government, Central Bureau of Statistics (CBS) as well as other relevant reports from non-governmental organizations involved in development and conservation in the study area. In essence, the secondary data from some of the above sources provided information on the conservation initiatives, demographic, physiographic features of the study area, human, forest resources statistics, habitat types, tourist activities, infrastructure, land use and general environmental conditions, such as degradation.

3.5 Data management and quality control

This was done before during and after data collection to ensure that the data was free of bias and also ensure that no information that was lost. Quality control was done through coding, editing and asking probe questions.

Before the actual data collection, the researcher carried out pre-testing of 20 questionnaires. This was done so as to enhance accuracy of the responses. After the pre-testing, the questionnaires were edited so as to come up with more precise questions, which were then

used to collect data. Data were later coded according to respondent's residents. This was intended to help the researcher follow up for any clarifications.

The researcher also sought voluntary consent of the respondents to partake in the research without coercion, so as to avoid any cases of discomfort and misinterpretation of any given data. On top of this, the researcher explained the study benefits to the respondents, and assured them of confidentiality by concealing their identification, and also respected the views, concerns and cultures of the participants.

3.6 Data analysis

Data analysis was made with reference to the research problems and objectives. The first step in the analysis was a critical examination of the collected data and categorizing them into quantitative and qualitative.

Qualitative data was analyzed thematically using descriptive master sheet analysis where data was cleaned, edited and coded. Thematic areas to be coded included sources of livelihoods in terms of social, physical, financial and natural capital as well as how conflict directly or indirectly affected the conservation efforts. Quantitative data was first be cleaned, sorted, coded and entered in a computer software, SPSS or excel. The data was processed according to the research objectives. Analysis of these types of data entailed relating the processed data to the research objectives and deducing their inherent meanings.

The study hypothesis was tested using *chi* square, where the decision to reject or accept null hypothesis was arrived at.

3.7 Study Area

3.7.1 Location

Enderit forest block is one of the blocks that make up Sururu forest. Geographically, the forest lies within the following coordinate bounds: (161,237m, E, 9,937,639m, N); (161,237m E, 9,924,748m N), (177, 3018 m E, 9,937, 637m N), and (177,3018m E, 9,914,748m N) in addition, it is positioned within an altitude range of 2,400 to 2,900m above sea level.

With respect to KFS classification, Enderit forest falls within the Mau Conservancy and comprises Station beat, Gatimu beat, Lepolos beat and Kanorero beat. Upper beat is found in Sururu block as shown in Figure 3.1

The administrative location of the forest is shown in Figure 3.2.

3.7.2 Settlement Trends

Table 3.1: Population and settlement trends per village

Village	Year of Settlement	Duration
1. Metta	1969	40
2. Gatimu	1970	39
3. Miti Mingi	1971	38
4. Likia/Lare	1972	37
5. Githima	1973	36
6. Kianjoya	1974	35
7. Mahiga	1974	35
8. Kiambogo	1974	35
9. Njeru	1976	33
10. Gwachati	1976	33
11. Kapiyemit	1983	26
12. Sururu	1995	14
13. Narienda	2004	5

Source: Forest Management Plan (2010-2014)

Settlement within the various villages took place at different times with the earliest settlement taking place in 1969 and latest in 2004. Table 3.1 illustrates the relative period and duration of settlements within the Sururu forest adjacent communities.

3.7.3 Forest Reserve's Value

The Forest reserve is part of the larger Mau Forest Complex which has a regional ecological and economic significance. Mau Forest Complex is one of the five main water towers in Kenya supporting livelihoods, environment and economic services within its environs and the greater Eastern Africa and Nile Countries. As shown in Table 3.2, Enderit forest block furthermore, has great potential or generating revenue for forestry programmes. The main sources of revenue are sale of minor forest produce, firewood and grazing.

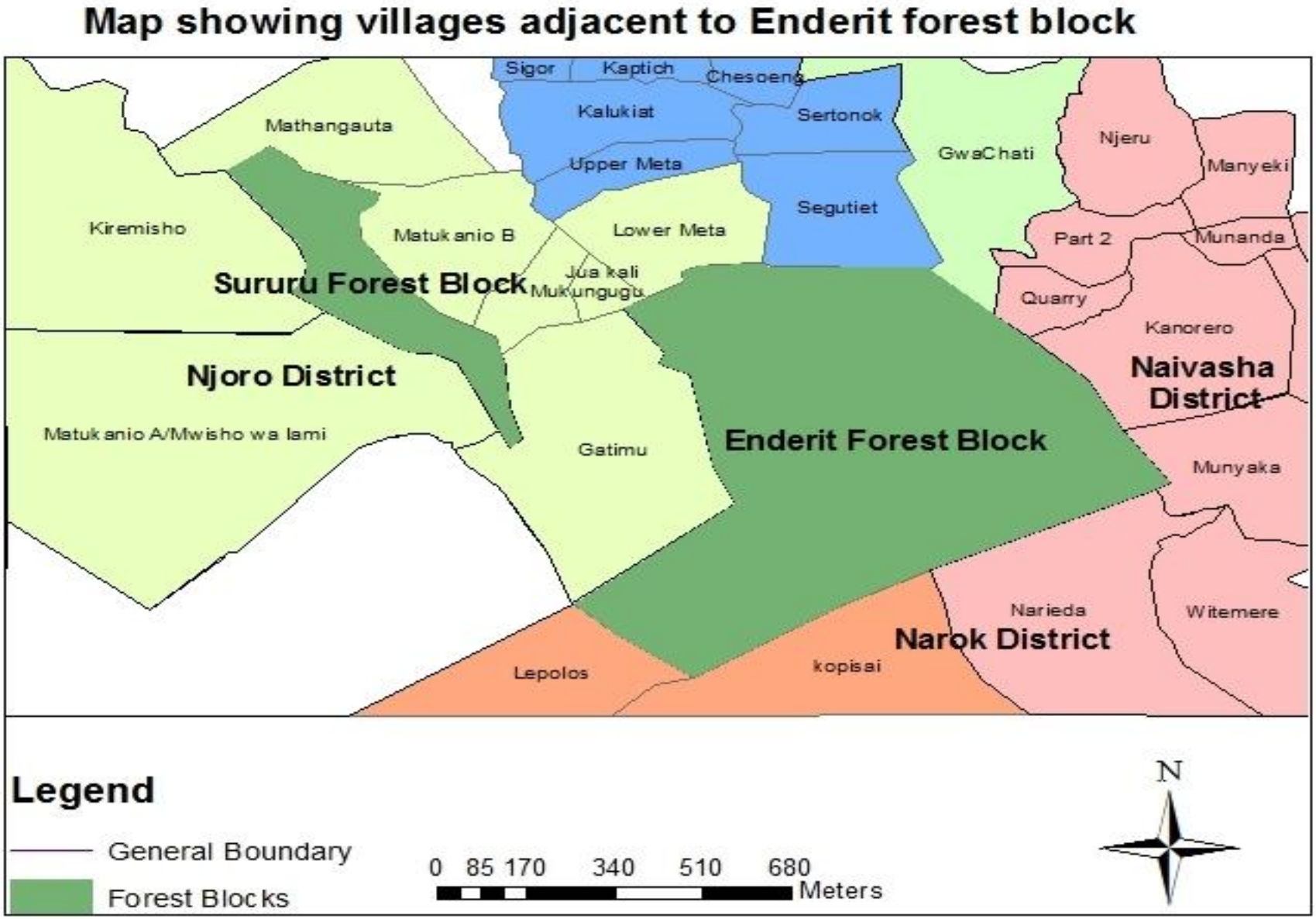


Figure 3.1: Map showing the villages adjacent to the forest
Source: Forest Management Plan (2010-2014)

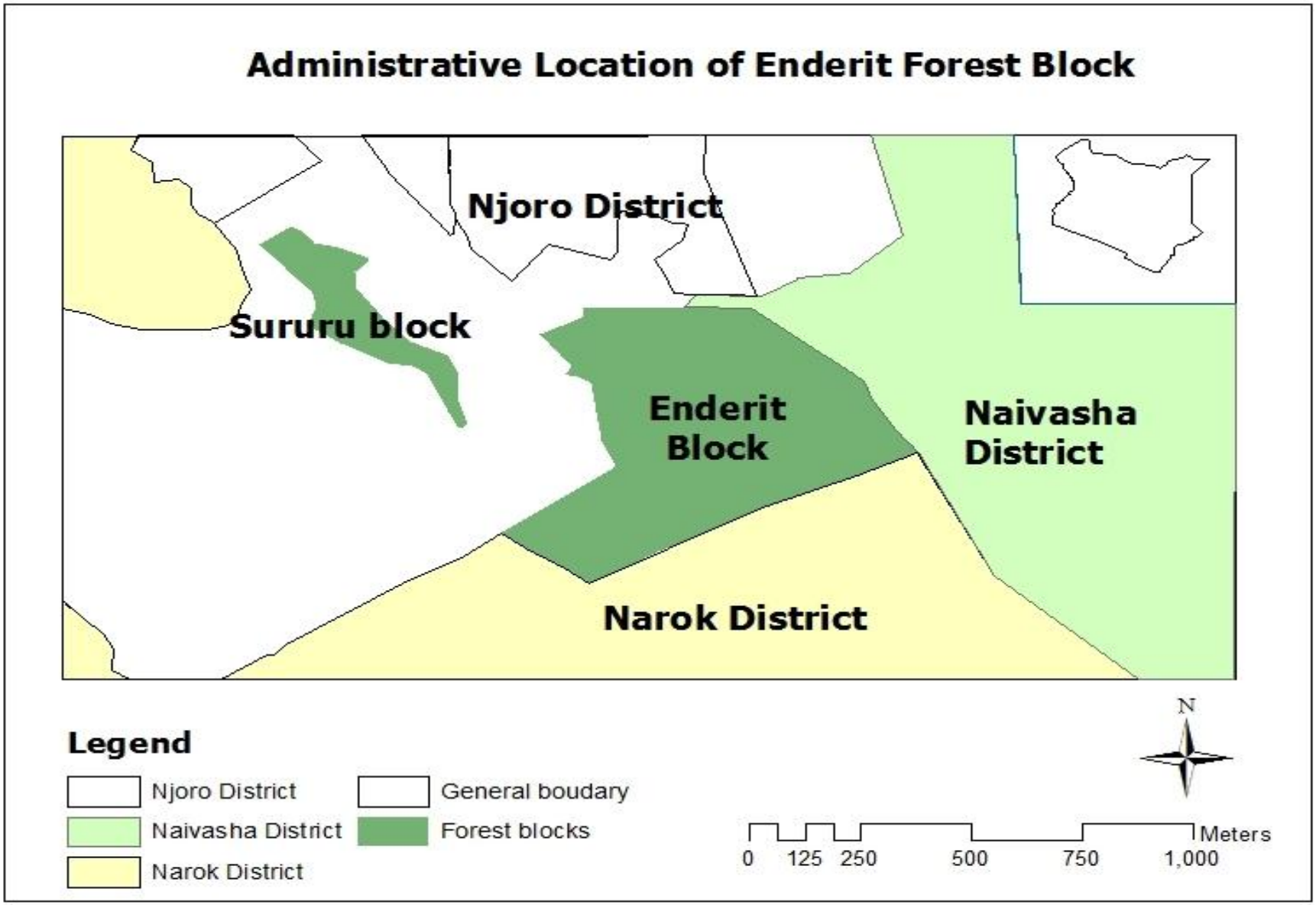


Figure 3.2: Administrative location of the forest block
Source: Forest Management Plan (2010-2014)

Table 3.2: Forest Revenue

Year	Amount (Kshs)	Source of Revenue
2005	76,007	Sale of minor forest produce, firewood, grazing and compounding of offences
2007	56,422	Sale of minor forest produce, firewood and grazing
2008	28,560	Sale of minor forest produce, firewood, grazing

Source: Forest Management Plan (2010-2014)

The observed trends depict a reduction in the value of the forest as well as change of forest management strategy with communities increasingly being involved in the management as a result of implementation of Forest Act 2005.

3.8 Socio – economic status of the Forest Adjacent Communities

The mainstream economic activities conducted by communities living around the forest include farming which is practiced by all communities except Maasai who are pastoralists and Ogiek who are ancient hunter-gather who is addition to farming are bee keepers. The main crops grown in the area include maize, bean, peas, cabbages, pyrethrum and potatoes. Fish farming trials are ongoing in the area. In the drier parts of Kianjoya and Kiambogo farmers are growing maize, beans and potatoes though with high crop failure.

3.9 Biodiversity

The Enderit forest block is a montane forest which is composed of glades, natural forest, bamboo zone, and bush-land. Each of these zones has different flora and fauna species. The natural forest is dominated by indigenous tree species and shrubs which include bamboo, podo, Africa Olive, Africa Snow Ball, Coroton, Wild Olive, Cedar, African Pencil Cedar, Yellow grana dilla, Elgon Olivewood, Acacia tree, Nandi flame, Flea plant and White Thom among many others.

3.10 Drainage

The forest block and the adjacent forest areas form the upper catchments of River Nderit which is one of the rivers that recharge Lake Nakuru. The gazetted forests and private forests around Empatipat/Topoti areas are sources of numerous springs and streams which join to form River

Nderit. The rivers are identified using different names by different communities along its course. On upper parts of Empatipat and Lepolos, there are several tributaries that drain into Kopisai river including, Olenkungu, Olempejeto, Olomoto Narok, Mpatipat. Around Mau Narok and Sururu area the river is called Siapei or sometimes Metta. Downstream in Kianjoya the river is called Kirimu 1 which is joined by Kirerua and Gathinginia. Further downwards, the river joins Narianda River which is made of Kirimo I and Kirimo II. Kirimo III is made of Mpatipat, Olepolos and Ntumot streams. Eventually the river becomes River Nderit which flows into Lake Nakuru.

3.11 Water Resource Management

The river has several tributaries as it meanders across the landscape providing water for ecological, livelihood and commercial purposes. In addition the river is of high livelihood importance (L_i) as small scale, subsistence oriented economic activities dominate over 80% of the river catchment.

CHAPTER FOUR: RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents the data gathered in the field from household respondents, Focused Group Discussions, Observation and Key informants. The chapter further discusses the findings from the data gathered and analyzed in line with the objectives of the study.

4.2 Household characteristics

(a) Gender

The majority of the respondents interviewed were male representing 76%, while female represented 24% of the total respondents interviewed in this study.

Table 4.1: Gender and forest resources

Benefits from the forest * Gender Crosstabulation				
		Gender		Total
		Male	Female	
Benefits from the forest	Herbal plants	56	18	74
	Bush meat	3	0	3
	Building materials	18	4	22
	Firewood	16	20	30
	Grazing	1	0	1
	Charcoal burning	1	0	1
	Water	0	4	2
Total		95	48	137

Source: Field data, 2014

In the study area, as shown in Table 4.1, majority of the forest related activities are carried out by male. This is mainly because some of the forest activities including charcoal burning, hunting and collection of building materials are labour intensive and prohibited in the forest, men are likely to take risk relative to women to enter the forest.

The different livelihood tasks and responsibilities performed by women and men result in different needs, priorities, and concerns. As noted above, women generally are responsible for providing their households with the basic necessities including firewood and water and in this

case, they rely on the forest block. Men, on the other hand are usually involved in more physically strenuous activities of collecting and processing materials for construction, for example timber and poles. These differentiated roles in the study area influence the attitude towards forest resources and conservation. Men, for instance, are interests in trees for more for commercial reasons whereas women are more interest in trees for food and fuel characteristics. Consequently, women are less likely to be involved in forest resource use conflict and support the conservation activities, as opposed to men.

(b) Age

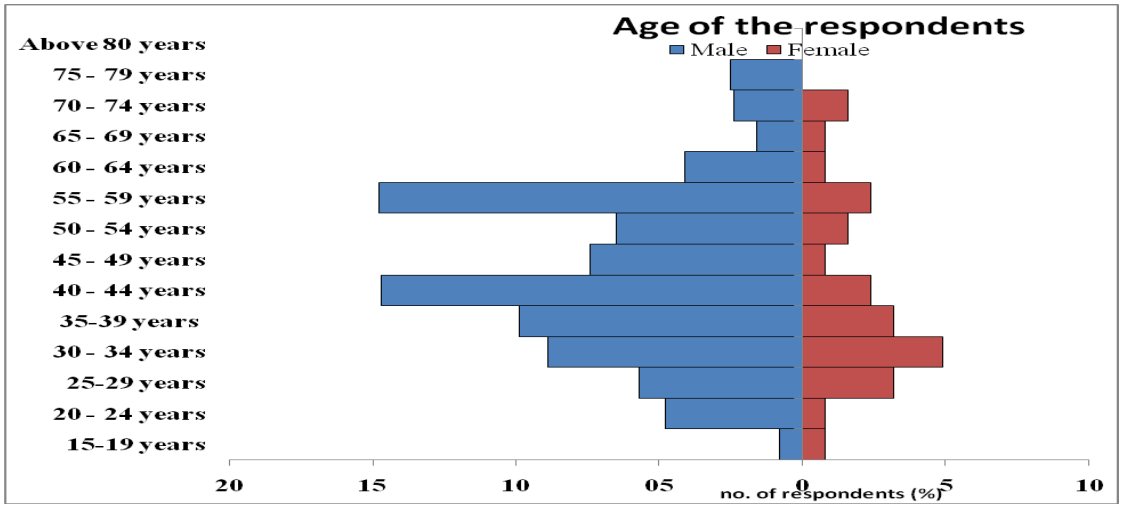


Figure 4.1: Age of the respondents
Source: Field data, 2014

Figure 4.1 shows that the majority of the respondents were between 40-44 years (14.7%) and 55-59 years (14.8%).

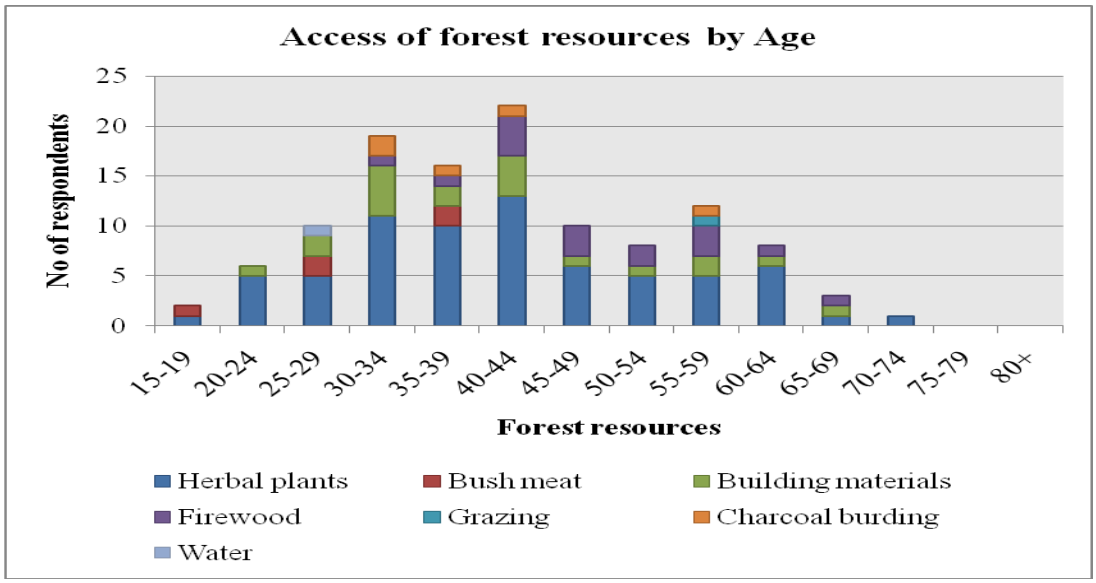


Figure 4.2: Access of forest resources by Age
Source: Field data, 2014

Age is an important variable in forest resource use conflicts and also conservation. Figure 5.2 shows the access of forest resources by age. From the figure, it can be observed that between 30-45 years population are active in obtaining forest resources. This is mainly because forest dependent activities in protected forests are labor intensive, people have to walk long distance to reach and search for forest resources. Also forest dependent activities are often prohibited in protected forests, therefore elderly people may not risk of going into the forest to do illegal activities. This notwithstanding, it can also be argued that elderly are likely to support conservation initiatives given the ecological value they have derived from the forest in the past.

Furthermore, according to Faham (2008), Age has been outlined in studies as a contributing factor to "who" and "when" someone engage in participatory management practices. In his research a research done in Iran, Faham, (2008), found that the level of community participation in reforestation and development of forest areas reduced with the increase in age of the forest dwellers. This means that the earlier the younger individuals are empowerment on forest conservation, the higher the impacts of participatory forest management.

(c) Household size

A household consists of a person or a group of persons, who live together in the same house or compound, share the same housekeeping arrangements and are catered for as one unit.

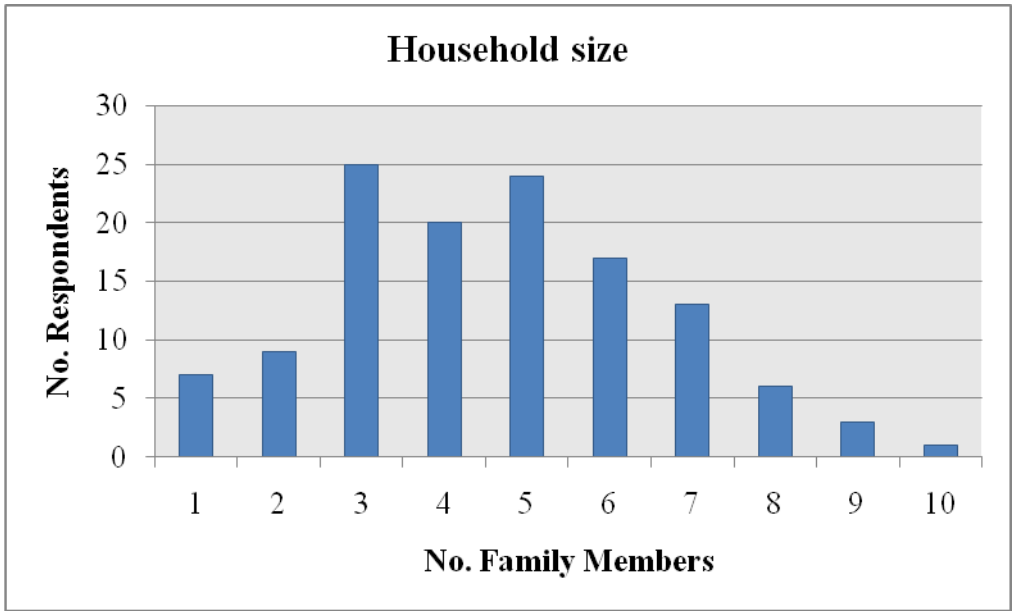


Figure 4.3: House hold size
Source: **Field data, 2014**

Figure 4.3, summarizes the household sizes of the families within the area. It can be observed from the figure that majority of the families have average of between 3 to 6 household members.

Families with more labor tend to extract more forest resources (Gutanilake, 1998; Hedge and Enters 2000). In general large families require more resources to meet their subsistence needs, therefore have a higher propensity to extract resources from the reserve. In addition, families with more labour can mobilize part of it for forest dependent activities while maintaining the labour supply for village-based activities.

d) Level of education

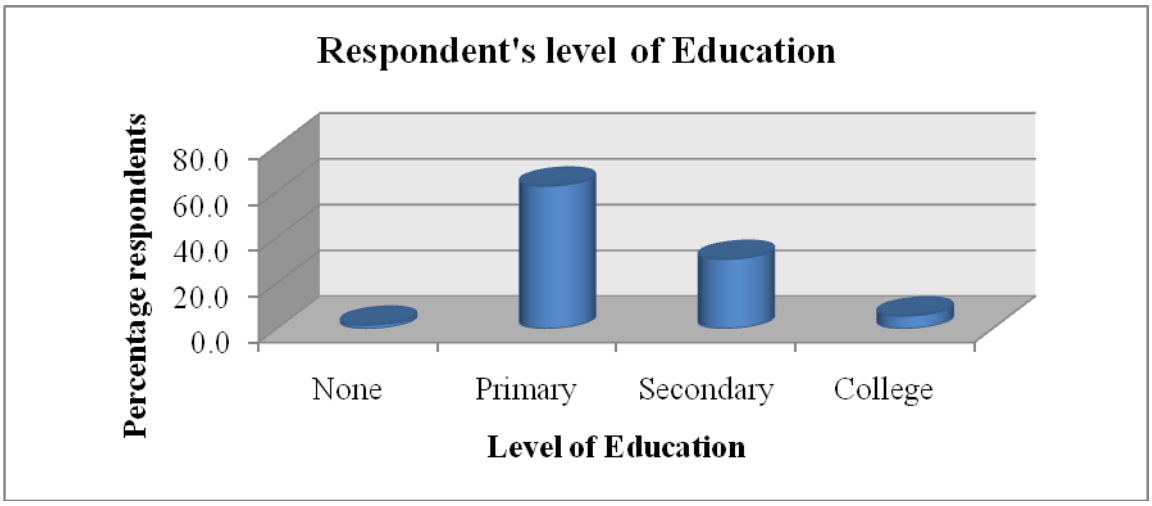


Figure 4.4: Respondent's level of Education
Source: Field data, 2014

Majority of the respondents can be said to have attained basic education. Figure 4.4 shows that 62.4% of the respondents in the study area have attained primary schools education followed by secondary education with 34.4% and those who had attained tertiary education represented 5.6%. 1.6% respondents have not attended school.

With such high level of low education, it is quite impossible to get a 'white collar job' and therefore people are more likely to depend on their forest resources as source of livelihood. Furthermore, according to Fiallo and Jacobson (1995); Heinen, (1993), the level of acceptance of the protected area increases with the education level of residents. Educated people are expected

to support conservation because they may be more aware of the short and long term benefits of conservation.

This therefore means that with adequate sensitization, the conservation initiatives in the study area likely to get support from the majority of forest adjacent communities.

e) Main occupation of household heads

As shown in Figure 4.5, majority of the respondents in the study area are peasant farmers who practice mixed farming. The dominant crops grown in the area are maize (46%), potatoes (32%), beans (16%) and wheat (6%). These are grown in small scale given their sizes of the land.

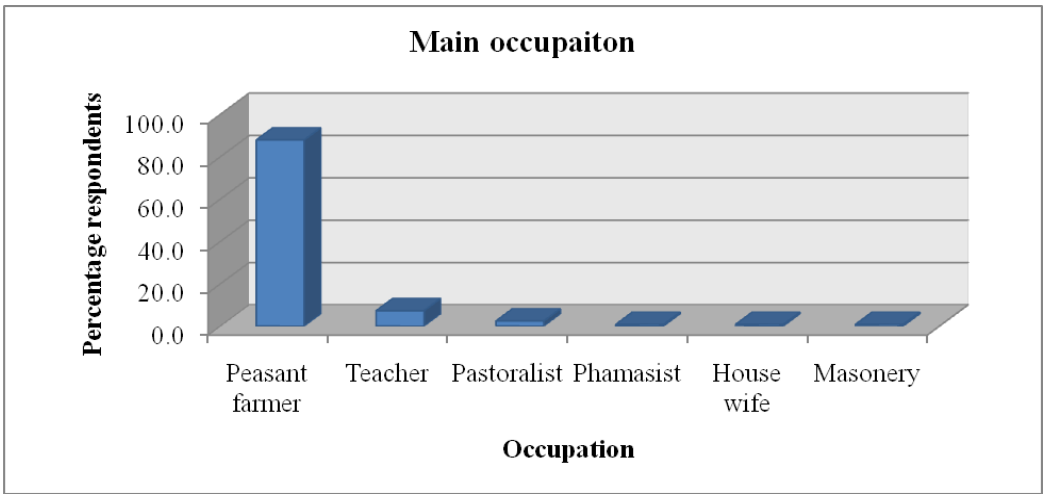


Figure 4.5: Main occupation of the household heads
Source: Field data, 2014

The greater percentage of the respondents is peasant farmers. Subsequently, for such communities, forest resources matter greatly since they would need more land for farming. The high dependence on farming as source of livelihood compounds the problem of land shortage. To enhance their livelihoods, the community needs to increase farm produce. In such situations, encroachment onto the forest reserve for more land becomes inevitable.

f) Income Level

Income is a crucial variable in the analysis of social welfare and as a key indicator of household wellbeing. Income level provided the means to acquire goods and services for household wellbeing.

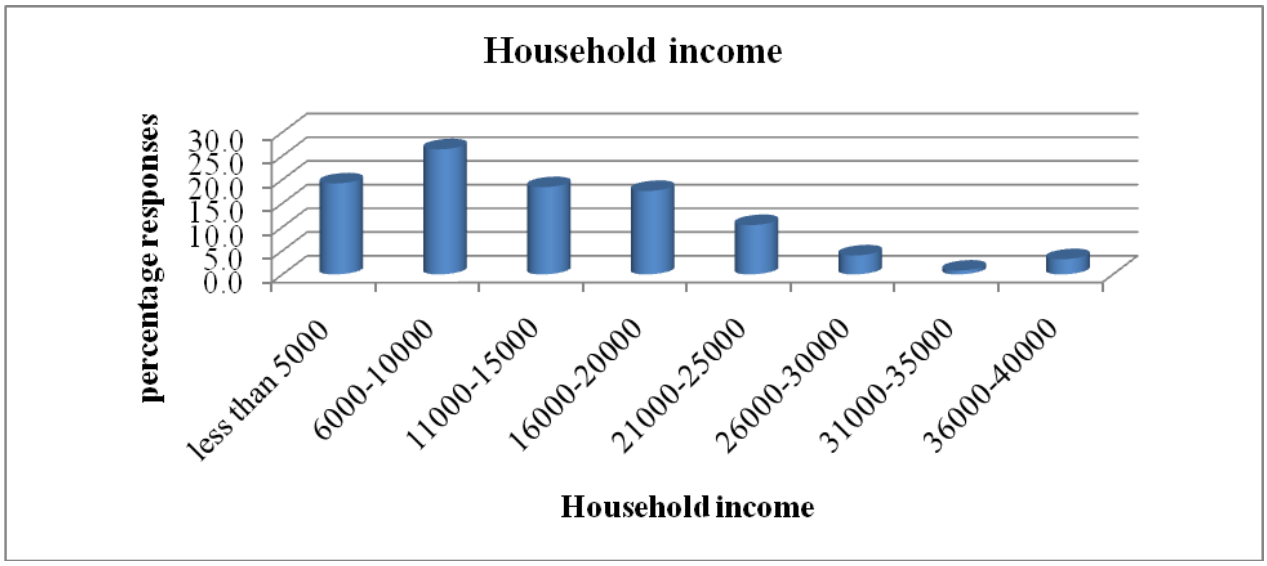


Figure 4.6: Total income of the households
Source: Field data, 2014

Figure 4.5 indicates that majority of the household heads are peasant farmers who are involved in cultivation of crops and livestock keeping. Their average income as depicted in Figure 4.6 is between Kshs. 6,000 – 10,000 per month. Income is mainly from farming activities.

g) Landownership information

Majority of the respondents (94.4%) indicated that they own land within the study area. The remaining 5.6% were either on short term assignments in the area, for example, teaching or those looking for casual labor in the study area.

The sizes of land in the study area varied from between 1-5 acres (91.8%), 6-10 acres (6.6%) and with a few (1.6%) with over 10 acres. As earlier discussed in section 5.2.5, majority of the community members in the study area are peasant farmers and therefore depend on farm produce to provide for their families.

The shortage of land drives the community to move into the forest reserve in search of land for grazing, cultivation among others since the community depends mainly on subsistence agriculture for their livelihoods. This breeds conflicts between them and the Kenya Forest Service. According to Njogu (2002), Even if the people with small landholdings do not directly encroach on the reserve for farming, they may engage in a lot extractive activities such as poaching and illegal cutting of trees for firewood, thereby exerting excessive pressure on the

forest reserve which may eventually be a precursor of conflicts between the local communities and the KFS.

4.3 Main types of forest resource use conflicts

Means K *et al.,* (2002) classifies forest resource use conflicts into; conflicts within and among communities; between communities and governments; and within other community-based organizations, NGOs, Commercial interests and other external players. Based on his classification, the study identified the following types of the forest resource conflicts in the study area.

4.3.1 Conflict between the forest adjacent communities and the Kenya Forest Service over illegal forest resource use

The study established that the forest adjacent communities, through Community Forest Association, signed a Forest Management Agreement with the Kenya Forest Service (K.F.S). The agreement allows the forest adjacent communities, with permission and upon payment of prescribed fees to; access the reserve to graze their livestock and harvest grass, practice bee keeping and honey harvesting, collect medicinal herbs, carry out eco tourism and recreational activities, collect firewood, establish plantation through PELIS, assist in carrying out specified slivicultural, seed production, carbon trading, Fish farming, collection of forest produce, Murram collection, water abstraction, butterfly farming, soil collection, seed collection, silkworm farming and mushroom farming.

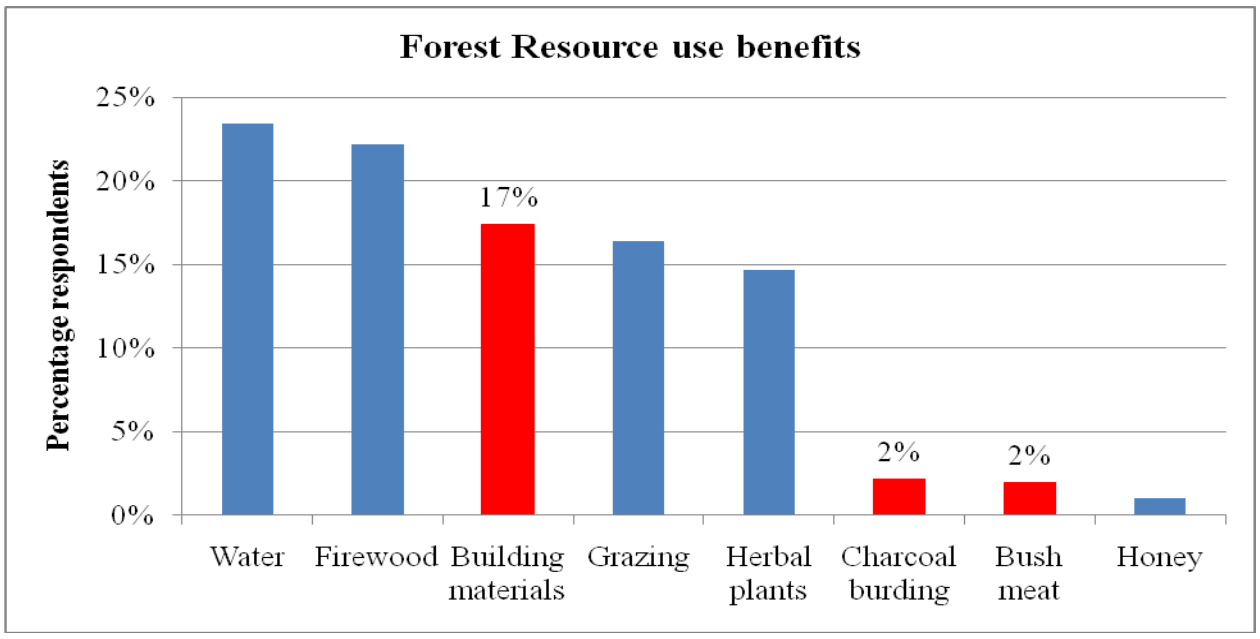


Figure 4.7: Benefits of the forest resources to the adjacent communities
Source: Field data, 2014

However, despite the agreement, some community members access the forest and carry out illegal harvesting of timber and poles, carry out charcoal burning and game hunting. As shown in Figure 4.7, 17.4% of the respondents indicated that they access the forest to obtain timber and poles, 2.2% indicated that they obtain Charcoal and 2% indicated that they obtain game meat from small herbivores. These represent category of user rights that does not form part of the forest management agreement are therefore illegal.

Table 4.2: Encroachment into the Forest Reserve

Village * Are you aware of people cultivating on forest land Cross tabulation				
		Are you aware of people cultivating on forest land		Total
		Yes	No	
Village	Gwa Chati	15	16	31
	Gatimu	21	18	39
	Segutiet	12	31	43
Total		**48**	**65**	**113**

Source: Field data, 2014

The study further established that forest adjacent communities have also encroached into the forest reserve to carry out farming activities. As shown in Table 4.2, the encroachment is common in *Gwa Chati*, Gatimu and *Segutiet* villages. The respondents attributed the

encroachment into the forest reserve for farming activities to land scarcity (58.8%), unclear boundaries (17.6%), ignorance (11.8%), poor fertility outside the reserve (9.8%) and greed (2%).

The aforementioned findings are consisted with Ongugo (2001) assertion that the community members rely on the forest reserve to get quick income, especially from the sale of the charcoal and firewood.

Table 4.3: Estimated volume of products in Kshs/year derived from the forest

Product/Services	Unit Cost per day	Average/day	Annual Est.	Value/HH/Kshs/Yr
Wood fuel	10 Kshs/Kg	5kg	1,825 Kg	18,250
Charcoal	15 Kshs/Kg	3 kg	1,095 Kg	16,425
Pastures	1 Kshs/Livestock	3 livestock	1,095 days	1,080
Honey	80 Kshs/Kg	0.1 Kg	36.5 kg	2,920

Source: Forest Management Plan (2010-2014)

Table 4.3 shows the estimated volume of products in Kshs/year derived from the forest.

Considering that the average population in the surrounding areas is estimated at 140,000, the pressure on the forest resources is immense. These would therefore require more than 255,500 tones of fuel wood annually at a cost of Kshs. 365 million with a corresponding 153,000 tons of charcoal annually at an estimated cost of 360 million (Forest Management Plan, 2014).

Despite the ban on harvesting of trees, burning charcoal, and poaching, these activities are still ongoing.

Plate 1: Illegal logger ferrying timber from the forest
Source: Field data, 2014

Plate 2: Recently felled cedar tree
Source: Field data, 2014

Plate 3: Charcoal kilns
Source: Field data, 2014

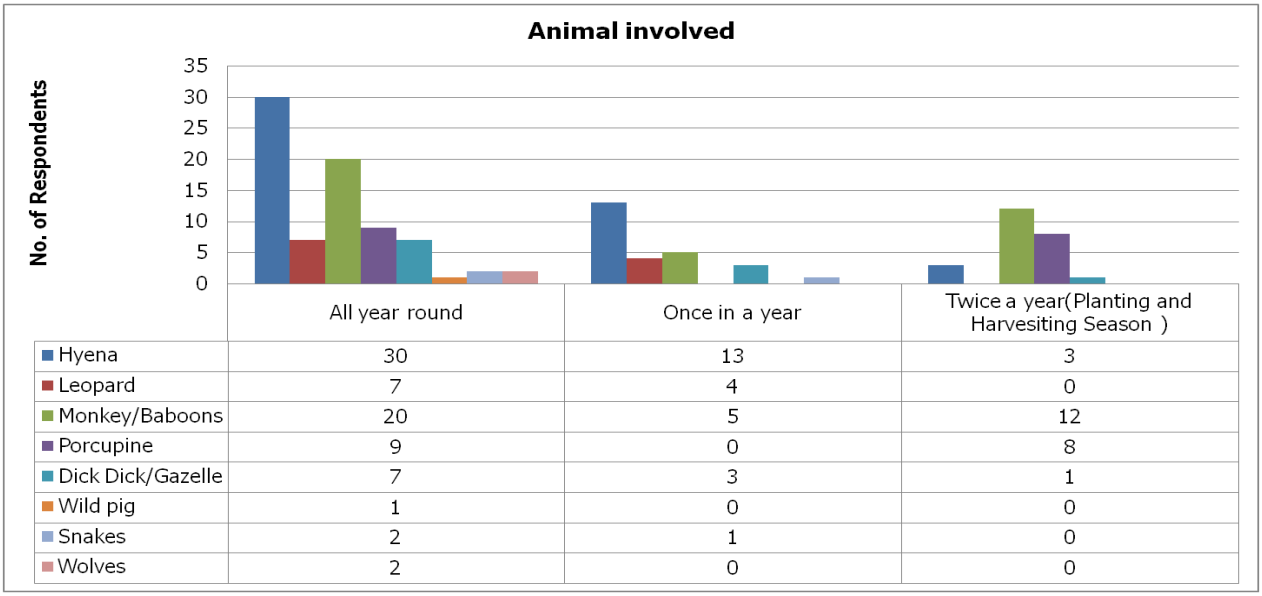
As shown in Plates 1, 2 and 3. There are a number of charcoal kilns that are found deep in the forest which proves that some members of the community are burning charcoal secretly.

4.3.2 Human wildlife conflicts

Human-wildlife conflict refers to interaction between wild animals and people and the resultant negative impact on people or their resources, or wild animals or their habitat (IUCN, 2005).

Enderit forest is a habitat for the vertebrates and invertebrates. They include; - mammals, birds, reptiles, insects, ambiphians and mollusks. Mammals include Buffalo, Antelopes, Giant forest hog, hare, Mongoose, Porcupine, Mrush rabbits, Warthogs, Wild pigs, Tree hyrax. Primates include black and white Columbus monkeys and blue monkey. Carnivores include; Leopard, Spotted Hyena, African wild dog, wildcat. Birds include Africa spotted eagle Owl, Africa Eagle hawk, Guinea fowl, Great honey guide and weaver bird among others. Insects include butterfly, wild bees, stingless bees, grasshoppers and locusts. Reptiles include common lizards, snakes and Chameleons.

The study established that there is conflict between human and wildlife in the study area. Wild animals occasionally stray into the settlement area destroying crops and attacking livestock and humans. This was confirmed by 45.4 % of the respondents. The respondents cited baboons and hyenas, leopards as being the most troublesome animals.



	All year round	Once in a year	Twice a year(Planting and Harvesiting Season)
Hyena	30	13	3
Leopard	7	4	0
Monkey/Baboons	20	5	12
Porcupine	9	0	8
Dick Dick/Gazelle	7	3	1
Wild pig	1	0	0
Snakes	2	1	0
Wolves	2	0	0

Figure 4.8: Animals involved in conflicts with humans
Source: Field data, 2014

The other wild animals reported as having been involved in conflict with forest adjacent communities, as shown in Figure 4.8, are dik-dik, wild pigs, snakes, porcupines and wolves.

Human- wildlife conflicts in the study area can be attributed to the degradation of the forest reserve over the years by the human activities. In the context of these changes, humans depress wildlife mainly through competition, either directly for space or indirectly for resources that are used by domestic stock and human populace. Consequently, wild animals react to the impact negatively on human mainly through human injury or death, damage to agricultural crops, depredation of domestic animals competition for space, competition with livestock for pasture and water, transmission of diseases to domestic animals and destruction. The impact is also in terms of loss of freedom and security.

These impacts have many other related social and economic impacts on the people affected. Loss due to injury and/or death of breadwinner is usually devastating to families, while materials

losses often cause unbearable financial suffering, particularly when agricultural loans are involved. In some areas, farmers have abandoned good cropland because of sheer futility of trying to raise crops to maturity in the presence of uncontrolled wild animals.

Relevant agencies, particularly Kenya Wildlife Service, are yet to fully address this conflict. This was confirmed by 55% of the respondents, who further indicated that the situation has forced them to hunt down the animals.

The findings from this research agree with the assertion by Njogu (2004) who noted that the nature and extent of human-wildlife conflicts, within a forest reserve are related to socio-economic and ecological factors, all of which are very dynamic and sometimes unpredictable, such as droughts.

Competition for land is the main unrelenting problem, since human beings have occupied and settled permanently in new areas initially inhabited by wildlife. In the same vein, human needs increase with rising population numbers, since the local people depend on agriculture, more land is needed for farming and livestock keeping. This makes competition for land and natural resources intense among people themselves and between the wildlife leading to human-wildlife conflicts.

4.3.3 Conflicts between pastoralist and peasant farmers

The majority of the forest adjacent communities within the study area practice farming mainly for subsistence purpose with limited surplus sold. Pastoralists on the other hand, are community members who are involved with raising and herding livestock as their main economic activity.

In the study area, the Maasai communities are well known to practice pastoralists. They have travelled from as far as Narok and Transmara Counties. They graze their livestock inside the forest reserves.

The cases of conflicts involving pastoralists and farmers, in the study area occur mostly due to competition for grazing land and farming. The livestock while grazing in the forest edges adjacent to the farmlands occasionally stray into the farmland and destroy the crops, situation which puts the two communities into conflict. This form of conflict is prevalent in *Gwa Chati*

and *Segutiet* villages. 40% of the respondents noted that this aspect has resulted into conflicts between the communities.

The complexity of pastoral resource management in the study area hinges on the unstable claims and counter claims on pasture, water and other resources. Since the pastoral Maasai wander ceaselessly with a herd of cattle and constantly explore new grazing areas in the reserve, they naturally surrender to nature with primary objective of security of their animals. The security of pastoral livelihood depends on the condition of their herd and grazing ecosystem which symbiotically relies on the availability of grazing pasture, which at times is outside the forest reserve, water holes and other ecological, socio-economic and safety conditions.

The relevant government agencies have not adequately regulated the mutual co-existence of the pastoral and peasant farmers, in harmonious sharing of competed resources. The communities therefore have been forced to co-exist in conflict.

4.3.4 Conflict between communities upstream and downstream over scarcity and quality of water

Enderit forest block is a source of several tributaries of River Nderit. The River is a source of water for domestic use for majority of forest adjacent communities in the study area.

Table 4.4: Source of Water for domestic use

Water source	No of respondents	Percent respondents
Enderit river	97	62.6%
Borehole	26	16.8%
Rainwater	31	20.0%
Dams	1	0.6%
Total	**155**	**100.0%**

Source: Forest Management Plan (2010-2014)

As shown in Table 4.4, 62.6% of the respondents cumulatively noted that River Nderit supplies their water for domestic use. It is also a source of water for irrigation and for watering livestock.

River Nderit has a permanent catchment area of 520 km^2 and an estimated annual discharge of $605X10^3m^3$ /s, which is variable depending on the season of the year. This volume is variable

depending of the season though observed decreased over the years (Forest Management Plan, 2010-2014) has been noted.

The study established that there exists conflict over water between communities living downstream (*Gwa Chati* area) and those living upstream (*Gatimu* area). Disputes over water in the study area arise due to increasing farming activities upstream and livestock keeping within the reserve. These two activities mainly pollute water therefore affecting quality and over abstraction, which cause temporary shortage during the dry seasons. During the group discussion held at *Njeru* Primary in *Gwa Chati*, it was noted that during dry seasons, the communities downstream are forced to compete for few water points. The disputes according to the area chief have occasionally resulted to physical confrontation amongst the affected community members.

Table 4.5: Common source of pollution

$Q31 Frequencies			
		Responses	
		N	Percent
Common source of pollution[a]	Dead animals	2	6.2%
	Soil arising from cultivation along river banks	13	40.6%
	People who bathe in the river	6	18.8%
	Chemicals being used to spray the crops	9	28.1%
	Maasai cattle using the water sources	2	6.2%
Total		**32**	**100.0%**

Source: Field data, 2014

These assertions were corroborated by 93.7% of the respondents who noted that to soil erosion, people bathing in the river; chemicals used spray farms and livestock who have unrestricted access to water channel have polluted the river (Table 4.5).

Plate 4: Polluted parts of River Nderit at Gwa Chati
Figure 4.12 shows the polluted water channel.

Water has potential to fuel conflicts. The current situation between the communities living upstream and downstream has caused tensions in the area, which has a potential to escalate into physical confrontation. 7.4% of the respondent from downstream reported that they have attempted to confront people upstream as a measure to curb pollution from human activities. 37.4% reported that they have reported the challenges to the relevant authorities for action.

Competition for water between communities downstream and upstream is mainly associated with water conveyance and distribution systems where water flows from the upstream to the downstream end. This type of competition for clean and adequate water in the study area is usually assisted by the fact that it is technically very difficult to prevent the upstream users from over-using water and also the large tracts of agricultural land upstream that require more agricultural inputs. The resultant inequality is borne by women and poor downstream who cannot afford to drill their own boreholes.

4.3.5 Conflict between stakeholders involved in Conservation of the forest

There are various stakeholders who are involved in the conservation of the Enderit Forest block. As discussed in **section 4.4.1** these stakeholders run independent conservation programmes with

different objectives as well as expectation. These divergent interests in conservation cause conflicts amongst them.

The conflicts amongst conservation actors are discussed in details in **section 4.4.2**

4.4 Stakeholders in Enderit forest block

There are several actors who have direct or indirect contribution to conservation of Enderit Forest block.

4.4.1. Stakeholder Identification and Analysis

Stakeholder, in this context, and has been defined in the literature, refer to all those people and organizations that have a stake in the conservation of Enderit Forest. The stakeholders are directly involved in the conservation activities, or influence the dynamics of conservation. Stakeholder analysis therefore helps identify the power they have and relationship among them. It also stipulate the extent of conflict or harmony among them as they carry our conservation activities.

The study identified the following stakeholders who are actively involved in the conservation of the forest reserve;

a) State Corporation; These include;

- Kenya Forest Service
- Kenya Wildlife Service
- Water Resource Management Authority (WARMA)
- Office of the president

b) Non-Governmental Organizations: these include

- Africa Wildlife Foundation
- Green belt organization
- Kenya Forest Working Group
- World Vision

c) Academic Institutions: These include

- Yokohama University

- University of Nairobi
- Egerton University
- Mt. Kenya University

d) Private Companies
    - CMC Motors Group
    - Local banks and credit Institutions
    - ERMIS Africa

e) CSO's
    - Mau Sururu Likia Community Forest Association (MASULICOFA)
    - Water Resource Users Association (WRUA)
    - Consortium of CBO's: Conservation and Management of Eastern Mau Group

Table 4.6: Analysis of the rights and responsibilities of the various stakeholders

Stakeholder	Category	Rights	Roles and Responsibilities
Kenya Forest Service	Primary	Protecting forest Controlling other stakeholders Implement government legislations, policies and directives Follow up on forest management plans and strategies Communicate forest management programs Implement provisions of forest management agreement	Facilitate cooperation between stakeholders; Monitoring and evaluation Discussion with the community on the forest issues; Co-ordinate activities Awareness creation Follow up on the protection
Kenya Wildlife Service	Primary	Wildlife conservation and management	Control of game damage to plantation
Water Resource Management Authority (WARMA)	primary	Provision and regulations of water services	Regulation of water projects in the forest
Office of the President	Primary	Law enforcement and public administration	Provide security and community mobilization and administration
Africa Wildlife organization	Secondary	conservation of wild life species in their habitats	partnering with CFA in tree planting and facilitating the income generating activities and recruitment of scouts among others
Green belt organization	Secondary	tree planting	Partnering with CFA
Kenya Forest Working Group	Secondary	Enhancing technical capacity of CFA as well as advocating for sound conservation policies at National level	Partnering with CFA

World Visions	Secondary	building of schools, planting trees, sponsoring orphans and physical challenged children, water projects	partnering with CFA
Yokohama university	Secondary	research activities on the tree species	partnering with CFA and K.F.S
University of Nairobi		tree planting and research	partnering with CFA and K.F.S
Egerton University Mt. Kenya University	Secondary	tree planting	Partnering with CFA and K.F.S
CMC motors group Local banks and credit Institutions	Secondary	corporate social responsibility	Partnering with CFA and K.F.S
ERMIS Africa	Secondary	developing forest management plan	Partnering with CFA and K.F.S
Mau Sururu Likia Community Forest Association (MASULICOFA)	Secondary	Access to various forest resources; beneficiaries	jointly protect and conserve the forest with KFS and other Stakeholders Capacity building Benefit sharing
Water Resource Users Association (WRUA)	Secondary	Contribute towards, sustainable water resource management	jointly protect and conserve water sources with WARMA and other Stakeholders
Consortium of CBO's: Conservation and Management of Eastern Mau Group	Secondary	undertaking grassroots environmental conservation activities, Supporting Setting up tree nurseries, Tree planting	Coordinating CBO's activities with Eastern Mau Conservation

Source: Field data, 2014

Table 4.6, shows the rights and responsibilities of the various stakeholders in the Forest. According to Engel and Korf (2005), rights are legally defined access and control over resources while responsibilities are the role and the power of stakeholders in conservation of the forest. The examination of rights and responsibilities of different stakeholders in relation to the resources enables understanding of the direction of conservation activities. As shown in Table 4.6, Kenya Forest Service has greater rights and responsibilities over conservation of the forest block. This is mainly because the Forest Act 2005 gives it an overall responsibility for formulation policies regarding the management, conservation and sustainable management of

forests. However, the existing arrangement envisages complimentary working relationships in implementation of conservation objectives in the forest. Forest Act 2005, for instance allows Community Forest Association (CFAs) to manage forests through a management agreement between them and KFS.

4.4.2 Interactions amongst key actors and resultant conflicts

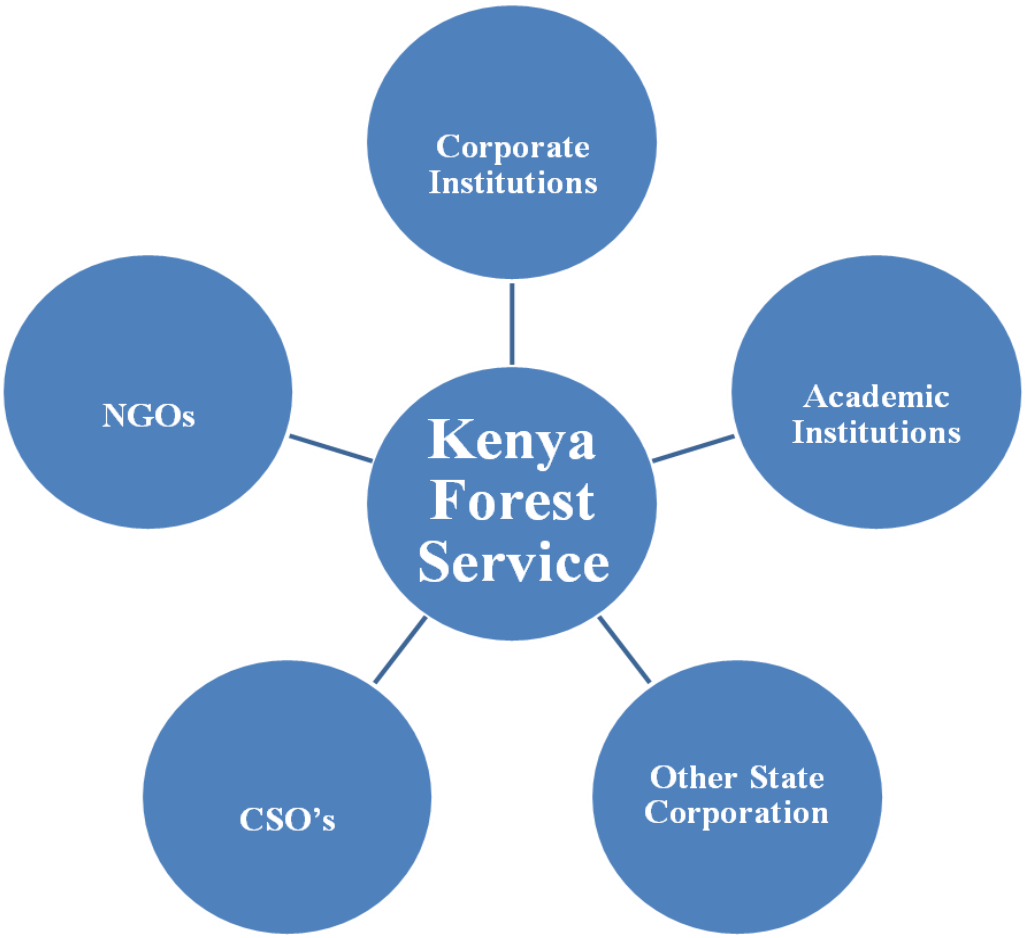


Figure 4.9: Level of stakeholder interaction
Source: Field data, 2014

The main institutions involved in forest conservation management include the Kenya Forest Service, County Governments. However, the overall institution with a jurisdiction mandate over forest reserves is the Kenya Forest Service (K.F.S). Other important stakeholders involved in the management include the Kenya Forestry Research Institute and relevant learning institutions such as universities and colleges.

Figure 4.9 illustrates the various levels of interactions. Kenya Forest Service besides their role in conservation supervises the activities of all the other stakeholders involved in conservation of the forest. It gives permission to the various stakeholders wishing to carry out conservation activities within the forest. The stakeholders who in most cases, are the Non Governmental Organizations, mobilizes the community members through Community Forest Association towards this cause.

The study established that the various stakeholders involved in conservation, especially rehabilitation of the forest, have different conservation objectives. In most cases, the various activities carried out in the forest should meet the standards prescribed by the Kenya Forest Service, including the specific trees to be planted at certain seasons.

Table 4.7 Relationship between CFA and KFS

	Frequency	Valid Percent
Excellent	6	20.7
Good	3	10.3
Fair	13	44.8
Poor	7	24.1
Total	29	100.0

Source: Field data, 2014.

Conflicts between stakeholders therefore arise when the conservation interests of the other stakeholders are not in line with those of the Kenya Forest Service. As shown in Table 4.7, 44.8% of the respondents, for instance, rated the relationship between Community Forest Association (CFA) and KFS as fair. Community Based Organization, for instance sees conservation activities being carried out in the forest as source of income because they are able to sell their seedlings as well as supply labour. Kenya Forest Service on the other hand is driven by among others need to long term sustainability of the efforts and is not obliged to buy species of the seedlings being provided by the CFAs.

Sustainable conservation of the forest block ultimately requires collaboration between different stakeholders. Consequently, at the onset of any conservation project, the overlapping and

differing stakeholder interests will have to be negotiated to arrive at an arrangement beneficial to all stakeholders.

4.5 Impacts of the various conservation efforts on the sustainability of Enderit forest block

According to UNEP (2005), between 1973 and 2003, Eastern Mau forest lost 49% of its vegetation due to human activities. The shrinkage of vegetation covers has reduced the diversity of trees and shrubs as illegal loggers, charcoal makers and grazers select suitable trees and shrubs to suit their needs. Consequently, the reserve has received considerable attention from local and international organizations due to its ecological significance. The various stakeholders, identified in the preceding section, have put in concerted effort to protect as well as conserve the forest through various initiatives including; Restoration/replanting of degraded sites, enforcement forest regulations, awareness creation activities, participatory forestry and river riparian pegging.

The preceding Section 4.5.1 discusses the impacts of these activities towards sustainable conservation of the forest block.

4.5.1 Restoration/replanting of degraded sites

Restoration, in the natural resources, is the process of rehabilitating an ecosystem as close as possible to pre-disturbance conditions and functions (Mbinga and Okeyo, 2013). The process of restoration, according to Mbinga and Okeyo, (2013), is multistage involving planning, evaluating the options to be used for restoration and the actual restoration.

The study established that the main restoration activities are carried out by Africa Wildlife Foundation (A.W.F), in partnership with K.F.S and C.F.A. The CFA, supply indigenous seedlings and labour whereas Kenya Forest Service play overall supervisory role. Yokohama University are also involved in tree planting, but for research purposes.

Plate 5: Tree planting exercise ongoing
Source: Field data, 2014

Plate 5 shows community members carrying out tree planting in degraded forest in *Gatimu.*

Tree planting has achieved notable results in the study area. Some of the degraded sections in the block have been successfully rehabilitated. Various forest sites in the past have been successfully restored mainly through the support of Green Zones Support and Development Project (GZSDP) However, unreliable weather patterns, pests and diseases, livestock grazing inside the reserve has undermined the survival of the tree seedlings and subsequently the successful rehabilitation of other section of the block. Furthermore, inadequate resource allocation to the exercise has only left the NGOs to make with the existing resources.

4.5.2 Enforcing forest regulations

The research established that Kenya Forest Service, Community Forest Association and Africa Wildlife Foundation (A.W.F), collaborate to enforce the existing forest regulations. The forest wardens work alongside the scouts recruited by A.W.F from the community. The overall role of the wardens and the scouts is to conduct regular patrols within the forest and enforce law and order. This involves impounding illegally acquired forest products and prosecuting the offenders.

The study further found out that there are ten (10) forest wardens and five (5) scouts charged with enforcing forest regulations in approximately 8,600 ha of the entire Enderit block.

This number of the forest wardens and the scouts is low given the increased threat to the forest resources posed by the illegal loggers. The study further established through group discussions that there is laxity in enforcing regulations. This was supported by 26% of the respondents who indicated the forest wardens extort money from them, even when they have paid the requisite fees and have relevant permits. The discussants during the group discussion at *Njeru* primary school, noted that the wardens neglect their duties and some collude with the poachers.

Therefore, the effectiveness of enforcement officers in carrying out their mandates has been affected by corruptions allegations that characterized by irregular issuance of permits, bribery to forego arrests/prosecution and use of bribery to gain harvesting rights. This, if not checked pose a great threat to forest law enforcement and governance and sustainability of the conservation efforts within the forest block.

4.5.3 Awareness creation on conservation activities

Awareness creation amongst the forest adjacent communities on the importance of conserving the forest resources is a significant effort in boosting the forest conservation efforts. When the communities appreciate the importance of the forest, they change their perception and ultimately support the conservation activities.

The study found out that awareness creation has not been carried out comprehensively. 17.4 % of the respondents attributed illegal forest resource use in the study area to low level of awareness on the importance of conservation. Furthermore, 14.6% of the respondents reported that there are community members who still lay claim to the Enderit forest block, on the premise that it was left to them by fore fathers. Accordingly, they believe that forest resources should be used without restriction. They believe that forest resources can never get finished no matter to what extent they are extracted, considering the fact that it existed before they were born and they still met it, therefore it will always be there in future.

Awareness creation is the primary responsibility of the Kenya Forest Service in conjunction with Community Forest Association. The study established that the Kenya Forest Service, mainly use forums organized to carry out conservation activities, especially tree planting, to sensitize communities on forest conservation. This medium has not been very effective in reaching intended recipients.

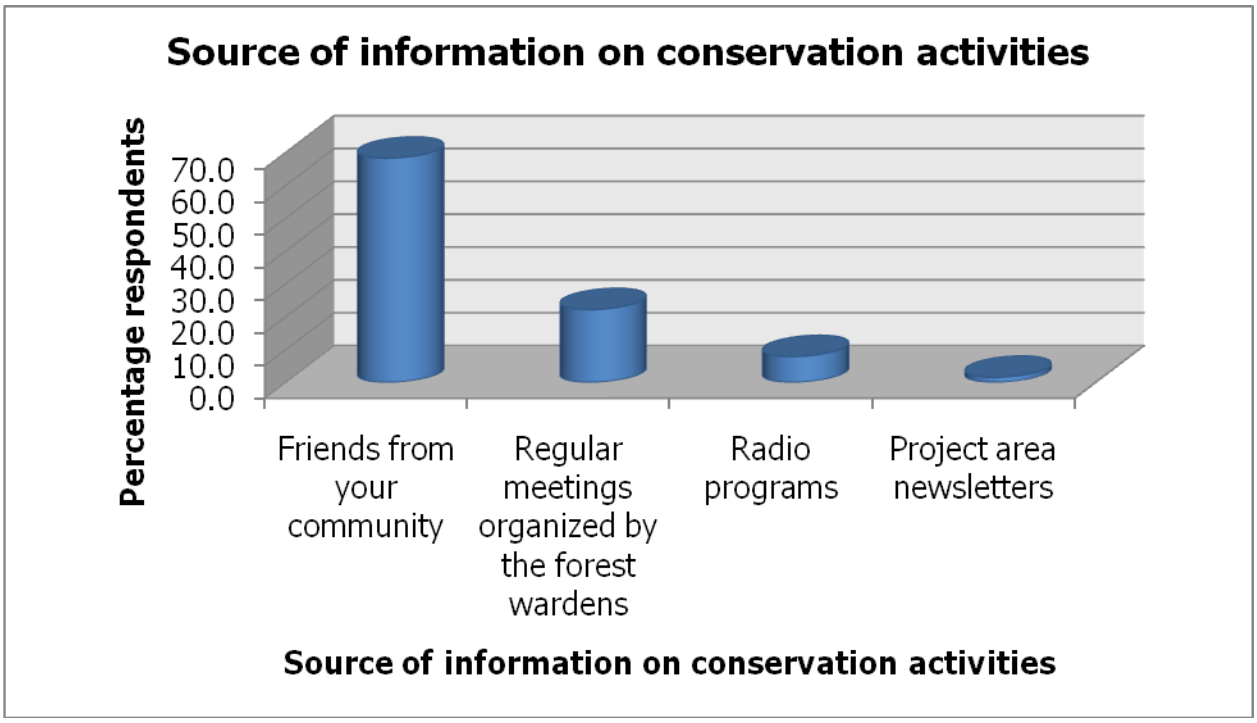


Figure 4.10: Source of information on conservation activities
Source: Field data, 2014

As shown in Figure 4.10, 70% of the respondents noted that they get information on conservation activities from their friends as opposed to 25% who get such information from meetings organized by KFS. Under these circumstances, the information is likely to be distorted and in some instance might not be taken seriously. Consequently, there is limited knowledge among the forest adjacent communities on the legal and institutional framework governing forest resource conservation.

Evidently, comprehensive awareness creation is yet to be carried out in the study area. Therefore there is need to maintain enhanced public awareness on the importance of the forest block. This

would also address the needs of local communities living around the forest, including sustainable livelihood options in the forest, with particular emphasis on employment opportunities and natural resource based income generating activities.

4.5.4 Participatory Forest Management

Participatory Forest Management, according to Tarus *et al.*, (2013) is an approach used to achieve sustainable conservation of the forests through inclusion of local communities, equity and democratization of control of forest resources. Community involvement in forest resource management and environmental conservation is crucial. This will contribute to cohesiveness of the community members and ensure sustainability of conservation initiatives.

Kenya Forest Service and the forest adjacent communities, through Community Forest Association (CFA), implement participatory forest management, through a Participatory Forest Management Plan and Forest Management Agreement signed by both parties. Participatory Forest Management, in the study area allows forest adjacent communities to access the forest resources products after obtaining permits.

A Participatory Forest Management Plan (PMFP) is a document meant to guide and assist core stakeholders – Community Forest Association (CFA) and the Kenya Forest Service (KFS) – to co-manage the forest resources sustainably as per the Forest Act, 2005. The PFMP are instrumental in ensuring the conservation of natural and planted forests as well as facilitating the utilization of forest resource in a controlled manner that would allow for effective monitoring and timely interventions where there are threats.

Table 4.8: Appropriateness of forest management agreement is an appropriate tool for aiding utilization of forest resources

		Do you think the forest management agreement is an appropriate tool for aiding utilization of forest resources	
		Yes	No
Whether you are aware of Forest Management Agreement	Yes	65.2%	75%
	No	34.8%	25%
Total		**100%**	**100%**

Source: Field data, 2014

The study established that the participatory forest management framework has achieved significant conservation of the forest. As shown in Table 4.8, 65.2% of the respondents confirmed forest management agreement as an appropriate tool for proper utilization of forest resources. Tarus *et al.*, (2013), corroborates these findings in his study, which concluded that participatory forest management has been largely beneficial in restoration of degraded parts.

The above findings notwithstanding, the potential of the Participatory Forest Management has not been fully tapped into. Majority (75%) of the forest adjacent communities are not aware of existence of a Forest Management Agreement. This is mainly because FMA in the study area is implemented through C.F.A, which has earlier noted, has is effective. Community Forest Association is grappling with internal conflicts, inadequate resources and technical capacity amongst its leaders. Furthermore, it is also facing perception that it is not representative of ethnic composition of forest adjacent communities.

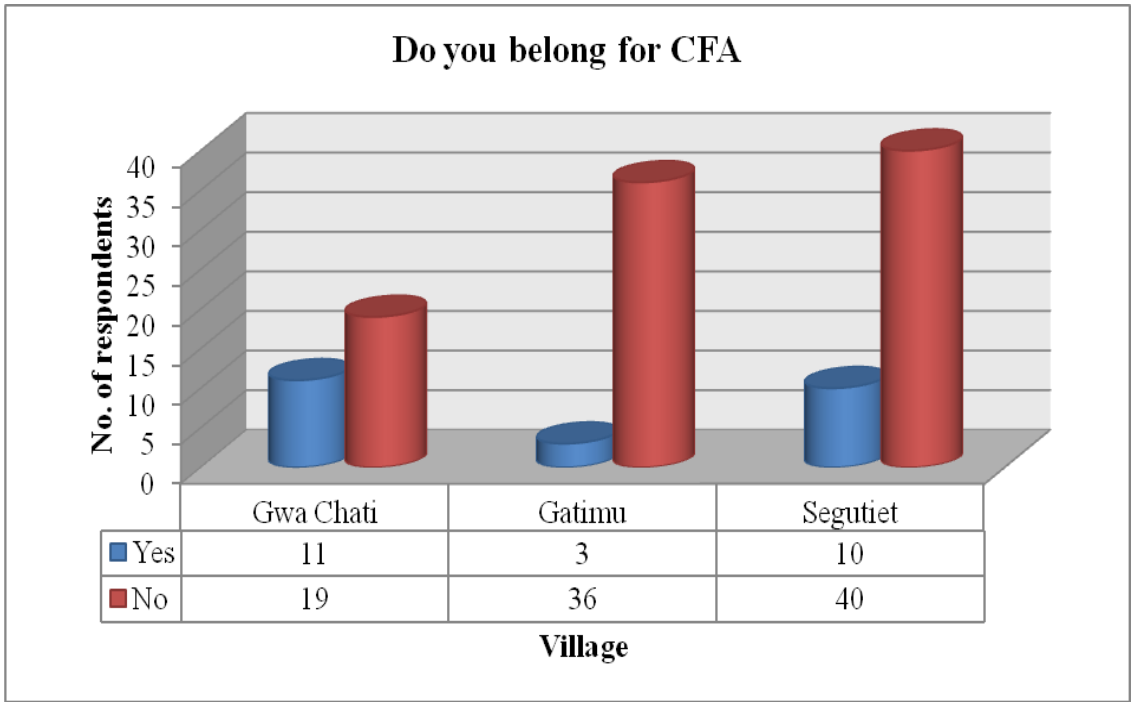


Figure 4.11: Membership to CFA
Source: Field data, 2014

As shown in Figure 4.11, majority of the respondents from the three villages indicated that they are not members of the CFA and 45% reported that they are now aware of existence of any CFA within the study area. Implementation of participatory forest management under the present circumstance will not be very effective. Furthermore challenges within CFA means it cannot fully commit to their obligations of the provision of the participatory forest management. Consequently, illegal forest resource use continues whereas conservation initiatives are threatened.

Nonetheless, Participatory Forest Management mainly through the existing arrangement between KFS and Community Forest Association has great potential to contribute to sustainable forest conservation. The Community Forest Association, for instance, have people who have worked in forestry sector and have wealth of knowledge and experience in tree planting and management. Furthermore, the members of the CFA often know the tree species in the forest for a long time, their use, abundance and diversity. Such knowledge is important in education, research and ecotourism which can be quite useful in the conservation efforts of the forest.

4.5.5 River riparian reserve pegging

River riparian reserve pegging is an effort by the Water Resource Management Authority (WARMA), Water Resource Users Association (WRUA) and other stakeholders to mark a distance of 60 meters from the riverbank. This exercise is meant to protect the river channel from siltation caused by farming activities.

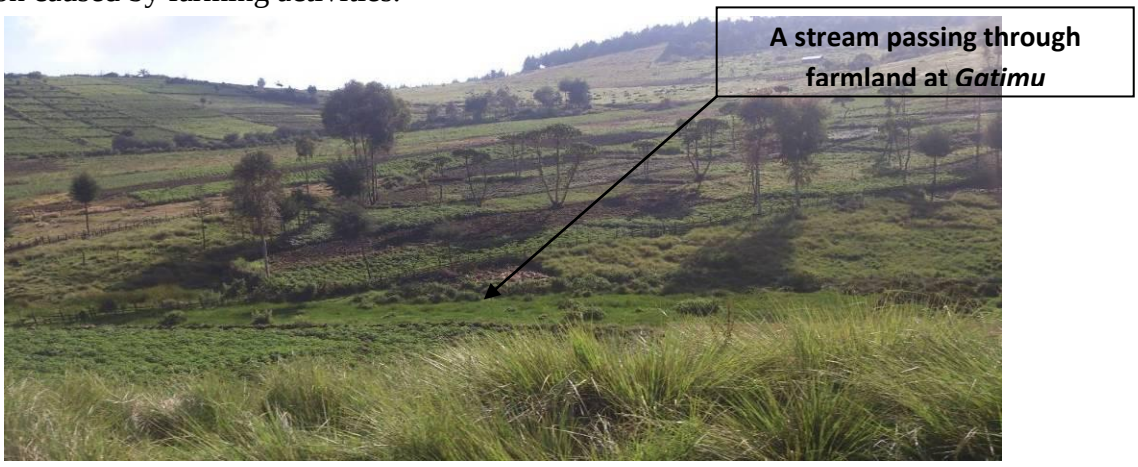


Plate 6: A photo showing cultivation into the riverbank

Source: Field data, 2014

This exercise in the study area has been largely unsuccessful. Majority of the community members whose land parcels, the tributaries of River Nderit pass through, have cultivated up to the edge of the streams, as shown in Plate 6

River riparian reserve is largely viewed as an extension of the farming land and therefore efforts to conserve has been ignored. As a result of farming activities up to the river banks, the tributaries have experienced siltation due to soil erosion. Furthermore, 51.7% of the respondents attributed pollution of the river channel to siltation arising from cultivation along the river channel. Disregard of river riparian in the study area does not only affect quality of water, but also the sustainability of River Nderit and ultimately enhance forest resource use conflicts.

River riparian pegging in the study area does not have full support from the relevant stakeholders. WARMA and WRUA do not have adequate resources to carry out the exercise.

4.6 Hypothesis testing

Ho: Forest resource conflicts do not affect the conservation activities in the Enderit forest block

In order to test the null hypothesis, the study sampled one hundred and twenty forest adjacent communities. The responses were evaluated on whether forest resource use conflicts affect conservation activities in the Enderit Forest Block. The data was analyzed using a *chi* square goodness of fit test. Appendix 4 shows *Chi* square computations.

The calculated X^2 statistic, for degree of freedom, is 94.620. Additionally, it indicates that the significance value (0.000) is less than the threshold value of 0.05, summarized as follows X^2 (1) = 94.620, $p \leq .05$

The critical value at degree of freedom of 1 at significance level (α) of 0.05 is 3.84. In this case, the calculated statistic (X^2) of 94.620 is greater than chi-square critical value (3.84). The null hypothesis is rejected in favour of alternate hypothesis. This therefore means that forest resource use conflicts affect conservation activities in the Enderit forest block.

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter presents a summary of the research findings, conclusions and recommendations.

5.1 Summary of findings

The study focused on the effects of the forest resource use conflicts to the conservation efforts in Enderit forest block. In addressing the overall goal, the study adopted three main objectives outlined below;

a) Establish the types of natural resource conflicts in Enderit forest

b) Identify the stakeholders involved in forest conservation and their focus in the Enderit forest

c) Examine the various forest conservation programmes by the different stakeholders and their impact on sustainable forest conservation

The study identified various conflicts in the study area. The first form of forest resource use conflicts is between forest adjacent communities and Kenya Forest Service, a government agency charged with the mandate of protecting gazetted forests in Kenya. This form of conflict, the study found out, arose from the need by the Government to protect and conserve the forest and also the communities need to use forest resources, unrestricted to satisfy their needs. The forest adjacent communities encroach into forest reserve and carry our illegal forest activities including charcoal burning, cutting down trees for building materials, farming inside the forest reserve and hunting herbivores in the forest.

The study further identified human-wildlife conflicts in the study area. This is common mainly because the forest is a habitat for wild animals including hyenas, leopards, baboons, monkeys and herbivores, and also because continued human encroachment into the forest has led to the destruction of these habitat. Consequently, the wild animals regularly stray into the human settlement and destroy crops, attacking livestock and also humans.

There also exist conflicts amongst the farmers and the pastoralists. The pastoralists graze the livestock inside the forest reserve after paying of the requisite fees to Kenya Forest Service. However, due to scarcity of pasture in the forest reserve at specific seasons, the livestock stray into the farmlands at the edge to the forest reserve. Related to this, the study further identified conflict amongst communities living downstream and the communities upstream including the pastoralists. These conflicts are occasioned by the scarcity and quality of water especially during the dry season. The communities living downstream use the water from the streams emanating from the forest reserve. The water are however polluted by livestock and the farming activities upstream.

The study further identified conflict between the stakeholders involved in conservation activities within the forest reserve. The conflict arises from deferring objectives and expectation from conservation programmes. These affected the implementation of conservation activities, since they require full support and commitment from all the stakeholders.

The research further identified the various stakeholders actively involved in the conservation of Enderit forest. They broadly include State Corporations (Kenya Forest Service, Kenya Wildlife Service, Water Resource Management Authority and the Office of the president), Non-Governmental Organization (Africa Wildlife Foundation, Green belt, Kenya Forest Working Group, Nature Kenya and World vision), Academic institutions (Yokohama University, University of Nairobi, Egerton University and Mt. Kenya University), Companies (CMC motors group), Financial Institutions and local community organizations (MASULICOFA and WARUA). These stakeholders are implementing out numerous conservation programmes including tree planting, enforcement of forest regulations, awareness creation initiatives and river channel pegging.

The various conservation efforts being carried out in the forest have achieved significant conservation of the forest. However, forest resource use conflicts affect sustainability of these efforts. Illegal logging destroys indigenous tree species, forest fires and livestock grazing areas under regeneration affect survival of the seedlings.

The study further established that the enforcement of the forest regulations is inadequate, mainly because of few wardens against the big track of the forest. Laxity, furthermore, allows illegal forest users to access the forest undeterred. Awareness creation programmes has largely been inadequate and ineffective. The Community Forest Association, which signed FMA with the KFS, is grappling with internal conflict, inadequate resources and technical capacity among its leaders challenges, hence they cannot effectively carry out their mandate. River riparian pegging has also been largely unsuccessful. This is mainly because the programme has not received support from the community and also inadequate resources and capacity to carry out the exercise.

5.2 Conclusion

The study concludes that, though Enderit forest block is an important resource not only to the government and the forest adjacent communities, it is facing constant threat from forest resource use conflicts. The conflicts further threaten success of the conservation programmes in the forest. Forest resource conservation in Kenya took a paradigm shift, with the enactment of Forest Act, 2005. It gave the communities ability to manage the forest resources, through Community Forest Association (CFA). This presents a great opportunity for conflict resolution and sustainable conservation of the forest block. Sustainable forest resource conservation is both socio-economic, environmental as well as an institutional issue. There is therefore need for all the stakeholders to work together to resolve the existing conflicts, and work towards ensuring that sustainable conservation is achieved.

5.3 Recommendation

This study recommends the following measures that would enhance sustainable conservation of the forest resources within Enderit forest block;

A. To the Government

1. Work together with all the stakeholders to put in place policy measures that aim at increasing income and generating off-farm employment activities for the forest adjacent communities to reduce forest dependency and consequently enhance biodiversity conservation. Such policies could include training forest adjacent communities to make arts and crafts that can be sold.

2. Address human wildlife conflicts as soon as it occurs in the study area to deter individuals from taking law into their hands. Relevant measures need to be put in place measures that deter wildlife from straying into settlement areas and also compensating the victims of wildlife attack.

3. Formulate a policy to guide on resource sharing under Participatory Forest Management Framework. This system has not been established in the study area. The scheme needs to be established and implemented to plough back to the forest adjacent communities. The mode of revenue sharing could include construction of schools, offering scholarships, carrying out and starting income generating activities for the forest adjacent communities through common income groups.
4. Enhance on the enforcement of the existing laws that safeguard the forest as well as strengthen surveillance on the illegal activities.
5. Recruit more forest wardens and address their integrity issues to restore public confidence.
6. Demarcate and fence the forest boundary.

B. Non-Governmental Organizations

1. Recruit and train more scouts who shall work together with the Forest Wardens.

2. Build capacity of the Community forest Association, so that they can effectively carry out their mandate and resolve the internal conflicts

C. Community Forest Associations

1. Awareness about the importance of forest resource conservation should be increased among the local communities. Community Forest Association should therefore take lead in sensitizing its members about the benefits of conservations.

2. Kenya Forest Service, working with the CFA, and other relevant stakeholders should strengthen forest management through intelligence gathering and sharing on the illegal activities in the forest. This process shall also profile the illegal forest resources users.

5.4 Areas of further research

This study focused on the forest resource use conflict in the study area and how it affects conservation efforts. However, it should be stressed that this study did not comprehensively cover all aspects of forest resource use conflicts presented in the study area. Therefore, there is need for an extensive research to establish pattern of the various forest resource use conflicts. This is will inform interventions that will enhance sustainable conservation of the forest.

Further, this study did not get adequate responses on how the various conservation activities affect the livelihoods of forest adjacent communities. Knowledge on the implication of conservation programmes on livelihood of the forest adjacent communities is important in enhancing the sustainability of these programmes. It is therefore recommended that further research be carried out on the how conservation activities affect the livelihood of the to the forest adjacent communities in the study area.

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APPENDIX 1: HOUSEHOLD QUESTIONNAIRE

I am carrying our Masters Research project on "effects of forest resource use conflicts on conservations efforts in Enderit forest block." I therefore request that you kindly spare a few minutes to complete the questionnaire below.

Declaration: This information is confidential and it will be used purely for academic research purposes only.

Date of Interview…….. Questionnaire Number…….

Name of Interviewer …… Village…….

1) Respondent's Information

a) Name of Respondent (Optional) ……..

b) Age ……

c) Gender (1) Male (2) Female

d) Marital Status

(1) Married (2) Single (3) Divorced/ separated (4) Widowed/ Widower (5) Other

e) How many members live in your household? _____

2) Demographic Characteristics of household members

No.	Sex	Age	Highest level of education	Place of birth	Year settled in this place	Previous place of residence	Main occupation

3) Socio economic characteristic

6.What is your total income?

Item	**Income (Kshs/P.M)**
Salary	
Crops Sale	
Livestock Products Sale	
Remittances from Relatives	
Other (specify)	
Total Income	

Salary Code: 1 =less than 5000, 2=6000-10000, 3=11000-15000, 4=16000-20000, 5=21000-25000, 6=26000-30000, 7=31000-35000, 8=36000-40000, 9=41000-45000, 10=46000-50000, 11=over 50000

7. What is your approximate monthly expenditure?

Item	**Cost per Month**
Food	
Clothing	
Health	
Education	
Energy	
Other (specify)	

4) Land ownership information

8. Do you own land in which your household lives? 1. Yes ☐ 2. No ☐
9. If the answer to 8 above is yes, what is the total size of the land?
   a) 1-5 acres ☐
   b) 6-10 acres ☐
   c) Over 10 acres ☐

10. What are the main economic uses that you have put on your land?

a) Crop farming (specify which type of crops)

b) Livestock farming (specify which type of livestock)

c) Other specify_____

11. a) Does your plot border the forest reserve? 1. Yes ☐ 2. No ☐

b) If the answer in 11 a) above is yes, is the boundary clearly marked? 1. Yes ☐ 2. No ☐

12. Are you aware of instances where people have encroached into the forest?

1. Yes ☐ 2. No ☐

13. If the answer in 12 is yes, what do you think could be reason?

a) Boundaries not known ☐

b) Poor fertility outside the forest reserve ☐

c) Land scarcity ☐

d) Others specify ☐

13. What happens to the persons who are found by authorities to have encroached into the forest land?

a) Arrested ☐

b) Nothing ☐

c) Others specify ☐

14. Who, in your opinion owns the forest land in Enderit forest block (please explain)?

a) The Government_____

b) The Community _____

c) Others specify _____

15. a) Have you witnessed instances where the ownership of the forest land is being contested?

1. Yes ☐ 2. No ☐

b) If yes, please explain the parties involved land being contested in this area?

_____

_____

_____

5) Forest resource utilization and challenges

16. What can you say are the benefits that you derive from the forest (tick appropriately and Please explain)

a) Herbal plants ☐ _____

b) Bush meat ☐ _____

c) Building materials ☐ _____

d) Firewood ☐ _____

e) Grazing ☐ _____

f) Worship ☐ _____

g) Charcoal burning ☐ _____

h) Water ☐ _____

i) Others specify ☐ _____

17. How do you get access to the forest reserve?

a) Free ☐ _____

b) Permission ☐ _____

18. What challenges are you faced with regard to accessing the forest resources mentioned in qn 16 above?

a) Arrested by authorities for illegal use of resources

b) Denied access

c) High fee

d) Others specify

19. What measures have you taken to address the challenges mentioned in qn 18 above

_____

_____

_____

20. a) Do you belong to any community forest association? 1. Yes ☐ 2. No. ☐

b) If the answer to 19 a) above is yes, which one group (specify the user group)? _____

c) If the answer to 19 b) above is no, why? _____

d) How does the association assist you address some of the challenges in 18 above?

e) How do you rate the relationship between your associations and the Kenya Forest Service on a scale of 1-5? (1=Excellent 2=Very good 3=Good; 4=Fair; 5=Poor) _____

Please explain your answer

_____

_____

_____

_____

21. a) Are you aware of the existence of forest management agreement? 1. Yes ☐ 2. No ☐

b) If yes, in what ways has it enabled you utilize the forest resources sustainably?

c) Are you satisfied with how the Forest Management Agreement is being enforced? 1. Yes ☐ 2. No. ☐

Please explain your answer

_____

_____

_____

d) Do you think the forest management agreement is an appropriate tool for aiding utilization of the forest resources sustainably? 1. Yes ☐ 2. No ☐

Please explain your answer

_____

_____

_____

6) Human wildlife conflicts

22. (a)Do you have any major problem with the wild animals from the forest? 1.Yes ☐ No ☐

(b)If yes, please provide information specified in the table below

Animal involved	Damage caused	Specific season

23. What measures have you put to address the issue?

a) Reporting to authorities ☐

b) Hunting them down ☐

c) Nothing ☐

d) Others specify ☐

24. Whenever damage is caused by the wild animals in qn. 22 b), are you compensated? 1. Yes ☐

2. No ☐

25. If yes, what kind of compensation are you awarded?

_____

_____

_____

a) In your opinion, do you feel that enough efforts have been put by relevant authorities to address the issues of wildlife conflict in this area? 1. Yes ☐ 2. No ☐

b) Please explain your answer?

_____

_____

7) Water resources;

26. What is your source of water for domestic use?

a) Enderit river ☐
b) Borehole ☐
c) Rain water ☐
d) Other specify ☐

27. a) If your answer to qn 26 a) is yes, do you get reliable and constant supply of water? 1. Yes 2. No. ☐ ☐

b) If the answer is no, in your opinion, what could be the cause of this?

a) over abstraction upstream ☐
b) effects of climate change ☐
c) others specify ☐

28. What do you do to ensure that you always have reliable constant supply of water?

_____

_____

29. Is the water clean and fit for domestic consumption? 1. Yes ☐ 2. No ☐

30. If the answer is qn. 29 is no, what are the common source of pollution?

a) Pollution upstream ☐
b) Others specify ☐

31. What then do you do ensure that you water for domestic use are clean?

a) Confront the people involved? ☐

b) Report the matter to authorities ☐

c) Others specify ☐

8) Conservation efforts

32. (a) Are you aware of the existence of any conservation initiatives being undertaken to rehabilitate/protect the forest? 1. Yes ☐ No ☐

(b) If the answer to qn. 21 above is yes, please fill the table below.

Name of the actor involved in the conservation		Specific conservation activities undertaken
Local	External	

33. a) How would you rate the level of conservation of this forest? (1=Excellent 2=Very good 3=Good; 4=Fair;5=Poor)____

b) Please explain you answer in 33 a) above.

_____

_____

_____

_____

33. a) Are you involved in the various activities? 1. Yes ☐ 2.No ☐

b) If yes, what is your main source of information?

a. Radio programs
b. Project area news letters
c. Friends from your community
d. Regular meetings organized by the forest wardens
e. Others specify

c) If no, what do you think could be the reason why?

_____

_____

_____

34. a) Do you support the various conservation programmes? 1. Yes ☐ 2. No. ☐

b) If the answer to qn 34 a) is no, please explain

_____

_____

_____

_____

c) Do the various conservation efforts negatively affect your livelihood activities? 1. Yes ☐

2. No ☐

If yes, please mention which and explain your answer

_____

_____

a) Please choose the most appropriate response according to your opinion

		Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
1.	Enderit forest reserve is more of a liability	1	2	3	4	5
2.	This reserve is just for outsiders to benefit	1	2	3	4	5
3.	This reserve should be abolished	1	2	3	4	5
4.	To restrict access to resources in this reserve to community members is a good idea	1	2	3	4	5

What are the reasons for your choice in question a) above

1. _____

2. _____

3. _____

4. _____

9) Effects of forest resource conflicts on the conservation

35. a) Do you think the forest resource conflict affect the conservation efforts in the Enderit forest block? 1. Yes ☐ 2. No ☐

    b) If the answer is yes, please explain how?

    _____

    _____

36. In your opinion, what do you think needs to be done to enhance forest conservation in this area

    _____

    _____

    _____

Thank you very much for your time

APPENDIX 2: INTERVIEW SCHEDULE - CFA

I am carrying our Masters Research project on "effects of forest resource use conflicts on conservations efforts in Enderit forest block." I therefore request that you kindly spare a few minutes to complete the questionnaire below.

Declaration: This information is confidential and it will be used purely for academic research purposes only.

Name of the organization…….
Name of respondent……
Title of Respondent…….
Date……....

1. Briefly describe you organization? (when was it started; how many registered members; user groups; geographical scope; legal and institutional framework)
2. What is your mandate as far as forest resource use in Enderit forest is concerned?
3. How do you relate to the state sponsored conservation agencies?
4. What are the benefits accrued from this forest? How are they shared with the other stakeholders?
5. Are you aware of the existence of forest resource use conflict in the forest block? If yes, briefly explain which ones? What do you think causes this?
6. What role does you organization play in resolving the conflicts? What challenges do you encounter in the process?
7. Are you governed by a forest management agreement? When did you sign? Is it being enforced as required? Do you think it is an effective tool in resolving some of the forest conflicts
8. Are you involved in conservation activities in this forest? If yes, which ones? What challenges are you faced in undertaking your mandate
9. Are there conflicts between different communities and you organization context of forest access and use? If yes, please explain. How do they affect your conservation activities?
10. How to the existence of forest resource use conflicts inhibit the various conservation initiatives?
11. Do you think the conservation activities are a hindrance to the livelihood of the communities? If yes, please mentions which and how?
12. In your opinion, what measures do you think need to be taken into account to ensure sustainable conservation of Enderit forest block?

The end

Thank you for your time

APPENDIX 3: INTERVIEW SCHEDULE

I am carrying our Masters Research project on "effects of forest resource use conflicts on conservations efforts in Enderit forest block." I therefore request that you kindly spare a few minutes to complete the interview schedule below.

Declaration: This information is confidential and it will be used purely for academic research purposes only.

Name of respondent……

Date……..

Title of Respondent…….

1. How long have you been in charge of this forest station?
2. What would you say are the benefits of this forest to the local people?
3. What benefits do you derive from the forest block? Do you share with the community? If yes how?
4. What is the legal and institutional framework governing forest resource use in this forest block
5. Which are the common types of forest resource conflicts in this area, please explain? How do they manifest themselves (e.g. various infractions)? What are the causes of the mentioned forest resource conflicts?
6. What is your mandate as far as forest conservation is concerned? (Conservation programmes in place). Explain the various challenges you encountered while carrying out with your mandate.
7. Do you involve the local community in the various programmes? If yes, how?
8. Does the conservation programmes enjoy the support of the community members support the conservation activities? please explain
9. Who are the other actors involved in forest conservation activities and what do they do?
10. Are there conflicts that you know of both in the past and presently between the various actors both local and external while carrying their mandate? Please explain
11. Are there local institutions which used to exist in the past and which now are none existent? If yes what are they and what role did they play in Enderit Forest Reserve

What made/caused the institutions above to vanish?

12. How would you rate the level of success of various conservation efforts in achieving sustainable conservation of Enderit forest block, in a scale of 1-5 (1=Excellent 2=Very good 3=Good; 4=Fair; 5=Poor). Please explain your answer.
13. How do the forest resource use conflicts affect the conservation initiatives in this forest block? Please explain your answer.
14. In your opinion, what are the measures that shall enhance conservation of the Enderit forest block?

Thank you for your time

APPENDIX 4: CHI SQUARE COMPUTATIONS

Table 4.1: *Chi* square test

Do you think illegal use of forest resources affect conservation of Enderit forest block

	Observed N	Expected N	Residual
Yes	114	60.5	53.5
No	7	60.5	-53.5
Total	121		

Table 4.2: Inferential statistics.

	Do you think illegal use of forest resources affect conservation of Enderit forest block
Chi-Square	94.620[a]
df	1
Asymp. Sig.	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 60.5.

Significance level (α) = 0.05
p-value = 0.000
Calculated *Chi* square statistic (X^2) = 94.620
Degree of freedom (df) = 1

X^2 (1) = 94.620, P< 0.05
Source: Field data, 2014

Table 4.3: Critical Values of the Chi-Square Distribution

Accept Hypothesis ← **Reject Hypothesis** →

Percentage Points of the Chi-Square Distribution

Degrees of Freedom	Probability of a larger value of x^2								
	0.99	0.95	0.90	0.75	0.50	0.25	0.10	0.05	0.01
1	0.000	0.004	0.016	0.102	0.455	1.32	2.71	3.84	6.63
2	0.020	0.103	0.211	0.575	1.386	2.77	4.61	5.99	9.21
3	0.115	0.352	0.584	1.212	2.366	4.11	6.25	7.81	11.34
4	0.297	0.711	1.064	1.923	3.357	5.39	7.78	9.49	13.28
5	0.554	1.145	1.610	2.675	4.351	6.63	9.24	11.07	15.09
6	0.872	1.635	2.204	3.455	5.348	7.84	10.64	12.59	16.81
7	1.239	2.167	2.833	4.255	6.346	9.04	12.02	14.07	18.48
8	1.647	2.733	3.490	5.071	7.344	10.22	13.36	15.51	20.09
9	2.088	3.325	4.168	5.899	8.343	11.39	14.68	16.92	21.67
10	2.558	3.940	4.865	6.737	9.342	12.55	15.99	18.31	23.21