

**A STRUGGLE BETWEEN LIVELIHOODS AND FOREST CONSERVATION:
A CASE OF MAU FOREST IN KENYA**

BY

**BORE NELLY CHEPNGENO
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DEDICATION

To the loving memory of my late Sister Beatrice, RIP

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I am greatly indebted to my supervisor, Dr. Onjala for his unfailing guidance, sound critique, support and patience during this study. Your comments and insights enabled me conceptualize and compile this project paper. I sincerely appreciate. I am also grateful for my supervisor Prof. Jama for his constructive contributions and guidance.

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Finally I cannot forget the moral, financial support and encouragement of my sister Marcel and my friend Vincent without you this would not have been possible. Thank you for your endless support all along. God Bless you.

All errors of omission and commission are entirely mine.

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Signature_____

Date _____

Nelly Chepngeno Bore

Institute for Development Studies, University of Nairobi

This project paper has been developed with our supervision and submitted for examination with our approval as university supervisors.

Signature_____

Date_____

Dr. Joseph Onjala

Signature_____

Date _____

Prof. Mohamud Jama

Institute for Development Studies

University of Nairobi

ABSTRACT

There is an increasing understanding that forests have played a crucial role in sustaining livelihoods among the rural communities and has been key element in poverty reduction strategies. Contrary to this major contribution, the dilemma encountered by the forest dependent communities is to ensure that the source of their livelihoods is sustained while the government and other conservation stakeholders interest is to protect and conserve forest. Therefore, this paper presents an analysis of household surveyed to determine their access and utilization of resources and to determine the struggle and synergies that have emerged on forest utilization for livelihoods and forest conservation. The findings showed that access to forest products is associated with household's characteristics. This include Age, position of household, level of education and distance to the forest all indicated significant relationship with forest access and utilization of forest resources. Households' dependence on forests and activities they engage in have had a significant impact on forest, and thus hindering the effort to conserve and sustain forest resources. Furthermore, the efforts to protect and conserve forest resources through conventional approaches used by the government like formal forest laws and regulations are shown to be serious constraints that hinder forest access and thus their livelihoods. Overall, the study contends that there is a struggle between accessing forest for livelihoods by the local users and efforts to enhance forest conservations. These study findings have implications in determining ways to which to create a balance between forest livelihoods and forest conservation. It will call for actions that enhance equity and thus form the basis for developing and enforcing policies that will aim at recognising the different roles that forest resources play in the livelihoods of local forest users and how it can be integrated in the sustainable systems that will also support the protection and conservation of forest.

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LIST OF ACRONYMS

CBO	Community Based Organisations
CBNRM	Community-Based Natural Resource Management
CC	Community Conservation
CFA	Community Forest Associations
CF	Community Forestry
CFUG	Community Forest User Group
CPR	Common Property Resources
CPR	Common pool resources
DFID	Department for International Development.
FAO	Food Agriculture Organisation
FUGs	Forest User Groups
FLEGT	Forest Law, Enforcement, Governance and Trade.
GOK	Government of Kenya
ICDP	Integrated Conservation and Development Projects
ICRAF	International Centre for Research in Agroforestry
JFM	Joint Forest Management
KFS	Kenya Forestry service
KFAN	Kenya Forest Action Network
KIFCON	Kenya Indigenous Forest Project
KIPPRA	Kenya Institute for Public Policy Research and Analysis.
KFWG	Kenya Forests Working Group
LEKAFAKA	Lesot Kabianga Farmers and Kamwangi.
NTFP	Non timber forest products
PFM	Participatory Forest Management
REDD	Reducing Emissions for deforestation and forest degradation
UNEP	United Nations Environment Programme
WCFSD	World Commission on Forests and Sustainable Development
WCED	World Commission on Environment and Development
WHO	World Health Organisation

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Forests currently comprise approximately 4 billion hectares, or 30 percent, of the global land base and provide food, shelter, fuel, and other goods and services to a large portion of the world's population. According to a report of the World Bank (2006), approximately 1 billion extremely poor people depend on the forests for part of their livelihood, with 350 million heavily dependent on forests.

In rural areas of Sub-Saharan Africa, forest resources are amongst the most vital components of livelihoods and development opportunity (Arnold and Townson, 1998; Cavendish, 2003). Forest resource utilization therefore is a precondition for livelihood of forested communities who do not have alternative sources of income (Chilalo and Wiersum, 2011). Africa is said to have the highest percentage of people in the world that live on less than a dollar a day (Anderson et al., 2006), and almost 60% of rural Africans live below the poverty line and in Sub-Saharan Africa, more than 90% of the poor reside in rural areas where poverty is particularly acute. Timko et al., (2010) noted that in Africa, over two-thirds of the continent's 600 million people are estimated to rely on forest products, either in the form of subsistence uses or as cash income derived from a wide range of timber and non-timber forest products (NTFPs).

During the colonial period, population densities and pressure on forests at the time was low, and this gave greater latitude for tolerance and compromise. However this scenario has changed over time with regards to forest livelihood-systems in Kenya. As the human population increased in Kenya, forest departments used the colonial forest statutes as a means to impose permit-based access systems, thereby significantly limiting local peoples' customary management systems and rights. With land and forest pressures increasing, permit-based access rights were compromised, as land was encroached, degraded, and cultivated, with the forest department reacting by blaming 'encroachers' and evicting them; including those who may have had legitimate secure customary rights (Barrow et al., 2002).

The necessity of ensuring clear incentives for communities to limit local resource use to sustainable levels, and provision of non-forest alternative sources of income and subsistence

and of legitimate participation in forest management are cited as important components of sustainable natural resource management strategies across East Africa (Barrow, 1988; Emerton, 1995a, b, 1996c, Emerton and Mogaka, 1996). Various laws and policies have been passed by governments for instance in Kenya to allow collaborative natural resources conservation with respect to forests. These include: Kenya Forest Act, 2005; which emphasizes on the involvement of adjacent forest communities and other stakeholders in forest conservation and management and access rights and benefit sharing arrangements which provide a role for communities in the utilisation of forest resources and protection of forests.

According to Kenya Forest Service (2013), Kenya's forest cover stood at approximately 7 percent. Deforestation has reduced Kenya's forest cover with the country losing approximately 12,000 hectares of forest yearly despite the government's attempts to alleviate the problem. Approximately 2.9 million people live adjacent to forests in Kenya and have depended on forest resources for their livelihoods. This is over a tenth of the total population (Wass, 1995). Population growth in Kenya as in most parts of Africa has been claimed to be a major driving force behind environmental degradation. This claim has been supported by the fact that the livelihoods of the majority of the population in such countries are linked to agricultural production at subsistence or local level. Therefore, with the growing population, expansion of agriculture has been achieved at the expense of the natural resource base (Kamugisha et al., 1997).

Mau Forest is one of Kenya's important water towers. Wanton encroachment, degradation has been the hall mark of this important resource. In the Mau ecosystem, people living adjacent to the forest depend on it for their livelihoods. The forest provides most of the goods and services, which form the basis of their subsistence. The forest adjacent communities view the forest as a reservoir of goods and services, and as a source of livelihoods to thousands of people living within kilometres of forest boundaries and benefit from a whole range of goods and services from the forest (Kamugisha et al., 1997).

Mau Forest has been confronted with excisions, widespread encroachment and irregular land allocations, in addition to illegal logging and charcoal production, which have contributed immensely to the degradation in the encroached areas. Over the last fifteen years, conversions to settlement and farmland have affected about 107,707 hectares of forest land, representing

around 25 per cent of the Mau Forest Complex area (KFWG, 2005). According to a study done by UNEP on changes in forest cover in the five water towers of Kenya, including Mau Forest by which data was collected using satellite images of 2005 and referenced against corresponding images of 2003. The study registered a total loss of about 9.813 hectares within Mau Forest of which 9.295 hectares of indigenous forest cover was cleared. This meant that deforestation was not only more extensive in 2005 than in 2003, it was also spreading to the new recovering sites (KFWG, 2005).

Institutional and management responses to forest conservation led to the government's formulation of policies and regulations that were intended to encourage sustainable management and use of forest resources so they improve local livelihoods and contribute to regional, national, and global economies. The history of control of forests by the government for conservation purposes in Kenya dates as far back as the colonial period. By 1908, the colonial government had put all the major forest areas in the country under the control of the government. The colonial government emphasized that "the public good was best served through the protection of forests and water resources, even if this meant the displacement of the local communities"(Kamugisha et al, 1997).

Recently, for instance, the Kenyan government following the recommendations by Task Force to assess the forest situation established the Mau Forest Rehabilitation Programme in 2009. The mission of the programme is: to rehabilitate the Mau Forest ecosystem so that the region can once again play its essential role as a national and international watershed, providing ecosystem services that conserve biodiversity, support livelihoods locally, regionally and internationally, sustain economic development, and contribute to mitigating and adapting to global climate change (GOK, 2010).

Empirical evidence in forest conservation in African countries and elsewhere show that the promotion of land use practices that conserve ecosystems services in most cases have been backed by strong policy and legislative frameworks with strong punitive measures that tend to hinder conservation practices. Legal sections usually present a series of consultations and penalties that will be meted out to landowners who do not conform to specified practices. Such regulations tend to antagonize local people who might otherwise cooperate with conservation efforts. In addition, most regulations impose high costs on local people without compensating benefits for their participation in forest conservation (Sang, 2004). This has led

to competition for natural resources which has been a major cause of conflicts between different groups including the objectives of forest dwellers who utilizes forest resources and forest management programmes (Ghai, 1994; Salasfky and Wollenberg, 2000).

The sense of traditional ownership, responsibility and control of forests and their benefits by local communities have largely been ignored. Most communities therefore view government control and management negatively thus making them indifferent to conservation initiatives led by the government. The government lacks financial and personnel resources to sustainably manage and conserve forests. As population increases, pressures on the forests increase and this has exacerbated the conflict between the local communities and the government (Scott, 1998). Hence despite various governments' effort to conserve forest, the dilemma is how to ensure there is a sustainable forest livelihood for the local communities.

The necessity of ensuring clear incentives for communities to limit local resource use to sustainable levels, including the provision of non-forest alternative sources of income and subsistence and of legitimate participation in forest management are cited as important components of sustainable natural resource management strategies across East Africa (Barrow, 1988; Emerton, 1995a, b, 1996c, Emerton and Mogaka, 1996).

If properly managed, these forest products can serve as incentive for forest communities to protect existing forest and restore degraded areas, to sustain their source of income (Timko et al., 2010). Forest represents a point where ecological, economic and social systems intersect. Everywhere in the world people have devised ways of utilizing their surrounding natural resources (Ihenyen et al., 2009). Worriedly, however, forestry initiatives and plans to conserve have failed to recognize the important role played by forest resources in rural livelihood. This oversight has been primarily associated with lack of quantitative information to justify the role of forest resources in forestry sector development.

1.2 Problem Statement

People in rural areas depend on the resources available in the area for their livelihood. With regard to rural livelihoods, forests present an opportunity for development and a challenge in achieving conservation goals (Timko et al., 2010). Consequently, different types of settlement have evolved and alternative livelihood activities are being explored. The potential for sustainable livelihood development is assessed by analysing the forest dwellers' livelihood

assets, perceptions of the forest livelihood as well as the conservation initiatives (Timko et al., 2010).

Forests are an important natural capital. Past development efforts to conserve forest have primarily focused on building natural capital, with minimal or no equal attention to how these natural resources such as forests, combine with other assets will help sustain or improve livelihoods, especially among the poor. This oversight has resulted in gaps in understanding the contribution of forest products to sustainable livelihoods (DFID, 1999). However, there is limited awareness on the real contribution that forests make towards achieving sustainable livelihoods and poverty alleviation as well as the impact of forest conservation on this contribution. This is primarily due to poor forest statistics and valuation, but also as a result of lack of effective advocacy. There is therefore an urgent need to recognize the contribution and potential of the forestry sector with regards to sustainable livelihoods.

Concerns about the fate of forests and increasing rural poverty have converged towards the issue of sustainable livelihoods in the forest fringe. While the decision on forest management is to ensure protection and conservation of forest resources, for the poor forest users and households, for poverty mitigation and to ensure sustainable forest livelihoods, there is need to have their access to resources protected. In practical terms, that means recognizing the many and varied stakeholders in any forest management case, and finding ways to avoid loss of access to resources or to compensate people who will lose access to resources as a result of forest management decisions.

Although there has been increasing interest in trying to link the livelihoods of people living near natural resources to the conservation of those resources, there has been little attempt to systematically assess or measure this linkage. Therefore, the dilemma has been to create a balance to ensure that the forest livelihoods are secure while ensuring forest conservation is achieved. The aim of the study therefore was to explore the struggle that exists by examining the impact of household livelihoods activities on the conservation of Mau forests; how the conservation efforts by household impact on the livelihoods activities; what synergies exist between conservation and livelihoods activities and the struggles that exist in an effort to converge the forest conservation and household livelihoods.

1.3 Research Questions

The overall research question that the study sought to answer is the link between forest livelihoods and forest conservation within the Mau Forest.

1.3.1 Specific Research Questions

1. How do the household livelihoods activities affect conservation efforts within Mau?
2. How do the conservation efforts by households infringe on the livelihoods activities?
3. What synergies exist between conservation and livelihoods activities?
4. What struggles exist in an effort to converge forest conservation and household livelihoods to achieve sustainability?

1.4 Objectives of the study

The overall objective of the study was to investigate the link between forest livelihoods and forest conservation within the Mau Forest.

1.4.1 Specific Objectives

1. Examine household livelihoods activities and their links with the conservation efforts in Mau Forest.
2. Examine how the conservation efforts by households infringe on the livelihoods activities.
3. Analyse the synergies that exist between conservation and livelihood activities.
4. Analyse the struggles that exist in an effort to converge forest conservation and household livelihoods to achieve sustainability.

1.5 Justification of the study

Whereas in Kenya, there has been increasing interest in linking the livelihoods of people living near forests to the conservation, the dilemma has been how to create a balance to ensure forest livelihoods are secure while at the same time guaranteeing forest conservation is achieved. This study is important because it seeks to bring on board a new dimension to the forest conservation discourse by analysing the struggles to converge forest conservation and livelihood sustainability. Lack of information on forest utilization and management in the context of local communities presents a major problem to forestry policy makers and supportive development agencies that are mandated to adopt a pro-poor approach. Without a clear data about how poor people make a living from forests, how they manage and conserve

and what their situation is, it becomes all too easy to overlook their interests when designing and enforcing policies and laws aimed at improving forest management. This study, therefore seeks to contribute to a body of knowledge and insights on integrated sustainable forest livelihoods to policy frameworks which would be the inter-phase between sustainable forest livelihoods and conservation.

Since the main drivers of degradation in these forests are the local people, incentives that guarantee their livelihoods and motivate them to participate in their conservation and management are the best option. There is need to equitably apportion the cost of forest conservation among the stakeholders, and to provide them with incentives to conserve forests, to limit their consumption of forest resources to sustainable levels, to halt forest clearance for other economic activities and to exploit forest resource sustainably. Therefore, this study will seek to document the need to create a balance between forest conservation and ensure that there are sustainable livelihoods among the forest communities in Kenya.

1.6 Limitations of the Research

A few problems were encountered while conducting the research and this were mainly associated with the kind of information sought and the kind of respondents interviewed.

First, the interview was carried out in rural areas where most respondents were illiterate and this means they could only communicate in their vernacular. This language barrier was major challenge as the researcher could not speak the language. However to address this challenge, the researcher, had to hire a research assistant who would also help in translation.

Since there was no funding sourced for the research, financial constraint made the research work very difficult as the study required substantial funds to print questionnaires, observations, transportation and other logistics in the field.

Confidentiality of the information was also an issue. Most respondents were not willing to participate in answering some of the questions asked, and they felt that it touched on the sensitive matters that surround Mau forest. To address this challenge, the researcher had to explain well that the intention of the research was for scholarly study and reassured them of the confidentiality of the information collected.

Some of the respondents interviewed would also digress from the questions asked and give unnecessary information which also affected time taken collecting data. Other respondents at the same time would ask for payments to be interviewed. To address these limitations, the researcher would steer the respondents back to the questions while explaining to them the overall purpose of the research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section presents reviews on the existing relevant theoretical and empirical literature to the study. The goal is to identify existing gaps of knowledge that the current study seeks to fill. This chapter is divided into parts. The first part reviews theoretical literature on forests and livelihoods, empirical literature on forests and livelihoods and Kenyan studies on forests and livelihoods. The second part examines theory that is applicable to forest conservation and analysis on empirical literature on conservation. Further, the chapter reviews various approaches towards Sustainability in Forest Livelihoods and Conservation. Lastly, conceptual framework from the reviewed literature that guides the present study is presented

2.2 Forests and Livelihoods

2.2.1 Theoretical literature on forests and livelihoods

A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets, both now and in the future, while not undermining the natural resource base. It comprises of capabilities, assets (material and social resources) and activities required for a means of living (Chambers and Conway, 1992).

According to the livelihoods framework, there are five types of capital that support livelihoods: Natural capital (such as lands, water, forests and fisheries); Human capital (such as knowledge and skills); Financial capital (such as income opportunities); Physical capital (such as infrastructure); Social capital (such as social network). These types of capital operate in the context of vulnerability, which is the context outside people's control. Though these can be transformed into livelihood strategies and finally into livelihood outcomes.

To be poor is to have few assets or resources from which to create a secure livelihood. The resources that most people expect to use to build some kind of security for their family are absent (land holdings, education, health, political connections, mobility, knowledge of rights, savings etc.). In this context, any forest or tree resources that the poor can freely access will inevitably form a critical part of their lives. The primary role of forests and trees in the lives of the poor is thus as a "safety net" one of many strategies to avoid falling into destitution (Shimizu, 2006)

The external factors such as vulnerability context and the transformation of structures and processes have influence on the livelihoods. The vulnerability context is the degree of exposure to risk, shocks and stress. These include political and institutional trends, macroeconomic changes, climate, agro-ecology and environmental factors, in particular the state of forests. These factors shape part of the context and conditions which affect people's livelihood to which they have limited control. They differ in the degree of influence, due to the household's level of sensitivity and resilience. The goal of the household would be to have a low degree of sensitivity and high degree of resilience (Ellis, 2000). Events over which people have limited control such as forest degradation, economic and political changes will have a critical impact on forest-livelihood linkages. The poorest are often unable to benefit from trends even when they do move in the right direction (such as a good market for NTFPs) because they lack assets and strong institutions working in their favour.

People use a range of livelihood assets – also called capital assets – in order to pursue various livelihood objectives. These include natural resources assets and environmental services, financial capital, human capital, social capital and physical infrastructure. People require a range of assets to achieve livelihood outcomes and a defining feature of the poor is usually that they have limited access to any given category of assets. Whatever the particular benefit that is being derived from forests will depend partly on the other assets available to the household. For instance, artisanal use of forests will need human capital resources of skill; deriving fodder benefits entails having livestock and forest management may require social capital assets. Different assets are linked which have an influence on different livelihoods strategies adopted by the local communities. These factors will affect the stake that people have in forests as well as their capacity and willingness to take part in sustainable forest management (Shimizu, 2006)

Communities have successfully organized and maintained a reasonable level of control over decision-making in forest utilization. There has been a correlation between dependence on forests for local livelihoods and successful organization (Sarin, 2001). This dependence on forests includes both direct uses and income generation through the sale of forest products and services. Such commercial activities include the sale of non timber forest products (NTFPs) and other such small-scale forest enterprises. Forests serve as subsistence safety nets for the rural poor, essentially mitigating poverty for its users (Mayers, 2007). Forests can

function “as a source of permanent increases in income, assets, services, political rights and the rule of law” (ibid.), particularly in well-functioning community-managed forests.

Policies, institutions and processes play a critical role in shaping the conditions on which people access and utilize forest resources. This influence is exerted through various ways. For instance, institutions and policies shape contextual factors and conditions. They are important in determining access to capital assets and they affect livelihoods through structuring opportunities and constraints to accessing. The Livelihood Framework gives central importance to institutions, processes and policies and therefore draws attention to how they shape access to resources across a range of scales from the micro to the macro level. In livelihoods understanding of institutions encompasses both formal and informal institutions as well as the processes through which they operate (Shimizu, 2006)

An analysis of institutions therefore involves paying attention to the politics of power and control that influence access to forest resources. For instance; Capacity of the public sector to make and enforce legislation; Private and commercial which influences the existence and type of market for forest products; the active involvement of Civil Society, NGO and community based networks to manage forests and defend access and rights, policies which helps shape and define development agendas including National forest policies, national development policies, international conventions and forums; Formal forest legislation and distribution of property rights and actual effectiveness of legislation and also access of forest dependent groups to legal jurisprudence; Informal Access Rules Local conventions on forest access, informal rules of use and collective action. Finally, Formal and informal relations of power in forest access and management, intra-household customs and division of labour (Shimizu, 2006)

The challenge of reconciling forest livelihood and forest conservation in developing countries is daunting and largely unmet. Many forest-related activities that forest-dependent communities undertake as part of their survival strategies are illegal under current forest regulations (Colchester, 2006). The World Bank finds that forest laws are often “not correct” from the perspective of poor and marginalised social groups whose voices are unable to shape the legal reform process (World Bank, 2006). Under these circumstances enhanced enforcement could deny the livelihoods of forest-dependent communities. Globally, the largest use of wood is for fuel, yet much fuelwood collection occurs outside of formal forest

management and in many cases violates the law. Foresters and forest police often overlook the collection of fuelwood and other illegal practices because they are central to the livelihoods of forest-dependent communities.

In Kenya, for instance in Mau Forest efforts to incorporate local communities in forest resource management policies have not adequately recognised the variable nature of the forest adjacent communities. This has resulted in conflicts over the use and management of these forest resources (Odhiambo, 1998).

Laws to secure forest rights for communities may exist, but they sometimes contradict other laws (especially wildlife, conservation and forestry laws) and tend to be disregarded in decisions over forest access and use. In some countries like Kenya the legal system does provide room for indigenous communities to have their native customary rights regularised, but they lack the knowledge and resources to take advantage of this. Often, forests are managed under overlapping formal and informal frameworks. The former are derived from the sovereign right of the state to regulate the management of state forests and the latter are locally-based management systems that may have developed over many generations. The outcome is contesting claims over forest tenure that can result in conflict and depletion of the forest resource. Many areas are affected by serious conflict in their forested areas, finding that this is often a product of limited human, civil and property rights (Andy, 2006). Under these conditions, strict enforcement of forest law is likely to exacerbate conflict.

Forest-dependent people who live in or near forests tend to be politically weak or powerless. There is a history of competition with more powerful outsiders for access to the forest resources they depend on. The competitors include the national governments seeking to nationalize natural forests, often in contravention of customary or traditional law; forest concessionaires, agro industrialists or other commercial farmers seeking land for expansion; and entrepreneurs seeking to appropriate high-value NTFPs. The political weakness of forest-dependent people is reinforced by their geographic distance from urban centers where political alliances favouring forest conversion tend to be formed and maintained (Rudel, 1993).

Many issues are of particular concern as forest-dependent communities are often on the lowest rung of the socio-economic ladder, yet the importance of forest-based activities to

rural livelihoods is not always fully appreciated. Forests contribute to poor peoples' livelihoods by: providing resources that can be used for income generation; providing resources that serve as the basis of subsistence livelihoods; providing a safety net to minimise vulnerability; providing an energy source (fuelwood), and contributing to stable landscapes and hydrological regimes that allow for sedentary agriculture.

Despite these roles, much illegal forest resource exploitation is actually carried out by, or with the connivance of, politicians and government agents. Measures such as law enforcement programmes that empower these officials and give them more resources could make it easier for them to act with impunity and further marginalise poor people” (Kaimowitz, 2003). Enforcement tends to target poor people. Enforcement drives in Indonesia, for example, have not been successful in prosecuting players high in the patronage networks because their contacts forewarn them of the upcoming security operations (FLEGT, 2006). The same problems have been observed in Mau Forest where the political elite have had to control the forest with their interest.

The issue of community dynamics in relation to individual influence or status in the community has had a big influence. For instance, the issues related to the local elite capture of forest resources resulting from newly created community-based forestry laws (Ribot, 2002) has had an influence on the struggle for forest livelihoods and conservation among the local communities. In some cases, local elites have fronted fictitious community forests or used other such administrative strategies to divert resources from their intended recipients (ibid.). These actions imply better knowledge of legal and administrative systems, as well as a greater capacity to utilize them than most other local actors have.

On the contrary, rural forest communities are ethnically, socially and economically diverse (Banerjee and Duflo 2007), comprising of residents “divided by factors such as caste, ethnicity, length of residence, gender, income, age and power” (McDougall, Prabhu and Fisher, 2007). Oftentimes, groups who are economically and socially marginalized such as women, the very poor, ethnic minorities and those within lower socioeconomic classes or castes are left out of the development and forest management dialogue entirely, though they are generally the groups most dependent on forestlands and resources, if not necessarily for direct income generation (McDougall, Ojha, *et al.*, 2007).

Therefore, the knowledge on appropriation of natural resources, why and how the diversification is developed and for what it is used (substantial, production or cash income) the national and local authorities are more capable of setting policies and strategies to maintain biodiversity and sustain what the forest can offer for future generations (Vedeld *et al.*, 2004). To be able to understand livelihood adaptations, both external and internal factors need to be understood. The sustainable livelihood approach shows the complexity and interaction of factors that is needed to understand how and why decisions are made. Amongst these is the level on dependence on forest resources, as they can provide firewood, construction materials, foods, medicine and cultural values.

2.2.2. Empirical literature on forests and livelihoods

Forest resources in particular often contribute to a substantial share of livelihoods of rural and tribal communities. Income from forest resources is common strategy of the poor to complement agricultural income from small and marginal land holdings (Dasgupta and Maler, 1993). It is coping strategy by the poor to mitigate the risk inherent in the subsistence agriculture. According to WCFSD (1999) noted that estimated 350 million “depend almost entirely for their subsistence and survival needs on forests” and that another 1 billion depend on forests and trees for fuelwood, food and fodder. World Bank (2001) estimated that 1.6 billion depend to varying degrees on forests for their livelihoods, with 350 million living in or near dense forests depending on them “to a high degree”.

The forestry sector in Africa performs poorly in relation to other regions by providing only 2% of global value added products and exports due to a variety of political, economic and structural problems which must be of concern to policy makers (FAO, 2004 as cited by Anderson *et.al.*, 2006). Despite these setbacks, NTFPs have been a main focus in discussions of livelihoods and rural development for several reasons (Neumann and Hirsch, 2000). This is because there is a high level of actual use of NTFPs by the rural poor. Many studies record that rural household use a wide range of forest products, and some have attempted to measure the quantities in absolute and relative terms.

In an overview of case studies, Vedeld *et al.*, (2004) found that forest products contribute between 20% and 40% of total income of households in forest areas, and that poor households tend to be disproportionately dependent on forest resources (especially fuelwood and fodder). These high use levels are often cited as a rationale for investing in NTFPs as a

way to achieve poverty reduction. At a minimum, the widespread use of forest products by the poor reflects that they are both useful and accessible in the prevailing circumstances. Many forest products are treated as open-access resources, meaning that they are freely available even to resource poor people and many can be processed simply and at low cost using traditional technologies.

For instance, wood remains the main source of energy for the vast majority of rural Africans and for many urban Africans as well. Between 70 and 90 percent of the population of Malawi, Namibia, Tanzania and Kenya rely on fuelwood and charcoal (Mogaka et al., 2001). There are no empirical statistics on how many rural Africans receive cash income from fuelwood and charcoal activities but Kinyanjui (1978) notes that at least 40,000 part-time charcoal makers sold charcoal in Nairobi in the mid-1980s. According to the study carried out in Ethiopia, it shows that 90% of the energy used in Ethiopia originates from biomass, and nearly 80% of human and 90% of livestock while majority of the populations depend on traditional herbal medicine for primary health care (WHO, 2002 and Yinger *et al.*, 2007). FAO (2002) estimated that Ethiopia's fuel wood consumption amounts to 84 million per year

Millions of poor rural households depend on the forest for the livelihoods but the problem is that many existing forests management systems that have been enforced and implemented to conserve the forest have had unacceptable negative impacts on poor people, ethnic minorities, and women; and in many places they are enforced in a fashion that is discriminatory and abusive (Kaimowitz, 2003). Poor rural people, including people with traditional claims on the forest, have not benefited much from forestry, and have very often been made much worse off by having their resources depleted to the point of destroying traditional livelihoods, or by being displaced from their traditional lands (Belcher, 2005). Further analysis reveals that most countries benefiting from these forest livelihoods have relatively large forest cover as compared to Kenya. For instance, Kenya has a forest cover of approximately 2.9%, while Tanzania represents 7% and Zambia represents 6% of Africa's total forest cover and is among the top 10 most forest-rich countries that account for 70% of the total forest area in Africa (Kelatwang and Garzuglia, 2006).

The history of forest conservation in Kenya is as old as the communities who have depended upon it. The Kenyan economy being mainly agrarian, the forestry sector plays a major role in supporting the country's natural resource-based economic production and consumption

activities. Prior to the introduction of the protected area system of conservation, local and traditional institutions in place then regulated and controlled forest resources ownership, access and exploitation patterns (Kamugisha *et al.*, 1994). Studies from the Pokot and Turkana regions of Kenya (Barrow, 1998) indicate that local people embrace traditional management regimes which they have applied for several years to use local trees sustainably. Nevertheless, since the introduction of formal management systems, traditional and local based mechanisms of forest management have been eroded.

From this empirical literature, the challenges identified is how to ensure that the needs of the poor rural households who are highly depended on Mau forest for their livelihoods are met while at the same time the forest area which has suffered from encroachment and loss of forest cover is conserved and managed well to ensure its sustainability? Do the conditions underlying successful conservation of forest whilst establishing a link with forest livelihood in other countries exist in Kenya?

2.2.3. Kenyan studies on forest and livelihoods

In Kenya, almost 3 million people live adjacent to forests and the majority of these depend on agriculture or agricultural-related activities as a livelihood (KIPPRA, 2002). As agriculture and forest resources have a strong contribution to the natural resource based economic production and consumption activities; it is estimated respectively 1% contributes to the monetary (cash) economy and 13% to non monetary. The local forest value can be difficult to identify in quantitative terms as it is also a source of non-monetary activities (subsistence use). Cultural and traditional values and knowledge exchange through history, experimentation, innovation and local forest management by the communities themselves. This has also made it difficult to incorporate well defined policies into the national development (Mogaka *et al*, 2001).

Livelihood' refers to the access that individuals or households have to different types of capital which include natural, physical, human, financial and social, opportunities and services (Ellis, 2000). The rules and social norms determine the ability of people to own, control or claim these resources which further control access to them. Different aspects can influence the extent to which households depends on a forest resource. These include distance, wealth, infrastructure, household size, and level of education of members of household. Household's distance from the forest will mainly dictate whether a household

depend almost fully on the forest or not for its needs. Some research findings had shown that poorer households depend totally on forest products due to limited access to alternative sources of income, while the more wealthy households mainly use the forest for larger commercial activities (Wass, 1995).

For instance, in Kenya, Mt. Elgon ecosystem is unique because forest reserve and a national park extend and border with the local communities. Local communities living adjacent to the forest rely on forest to sustain their livelihoods. The forest provides most of the goods and services, which form the basis of their subsistence. Though the forest adjacent communities view the forest as a reservoir of goods and services, some parts of the forest have been opened up for cultivation under the Taungya system. There are conflicts, which have arisen from the use of forestland for cultivation both within the forest and along the forest boundaries. The forest department who manages the forest looks upon the cultivators to contribute to development of the forest, while the cultivators would like the forests to continue being the source of the forests products for their livelihoods (Ongugo and Mwangi, 1996).

Mau ecosystem has been a source of livelihoods to surrounding community and they have relied heavily on the utilization of surrounding natural resources. The Mau Complex is a particularly degraded catchment area in Kenya. Despite its critical role in sustaining current economic development and sustaining the local livelihoods, Mau has been affected by widespread unplanned settlements, encroachments and illegal extraction of forest resources. Degazettement of forest reserves (excisions) and continuous widespread encroachments have led to the destruction of over 107,000 ha over the last two decades, representing over 25 percent of the Mau (GOK, 2009).

Forest resources are crucial for rural livelihoods as well as for industrial income as a contributor to the national economic growth. Such industry is estimated to generate \$40 million annually and employs 80 000 people (Nield *et al*, 1999). Despite this contribution of forest, population growth in Kenya as in most parts of Africa has been claimed to be a major driving force behind environmental degradation. This claim has been supported by the fact that the livelihoods of the majority of the population in such countries are linked to agricultural production at subsistence and local level. Therefore, as population increases,

expansion of agriculture has been achieved at the expense of the natural resource base (Kamugisha et al, 1997).

2.3 Forest Conservation

2.3.1 Theoretical Literature on Forest Conservation.

Common-pool resources are systems that generate finite quantities of resource units so that one person's use subtracts from the quantity of resource units available to others (Ostrom, Gardner and Walker, 1994). Forests are among the most important types of common-pool resources (Ostrom, 1992a). Most common-pool resources are sufficiently large that multiple actors can simultaneously use the resource system and efforts to exclude potential beneficiaries are costly. When resource units like water are highly valued and many actors benefit from appropriating (harvesting) them for consumption, exchange, or as a factor in a production process, the appropriations made by one individual are likely to create negative externalities for others. The "tragedy of the commons" will occur in highly valued, open-access commons where those involved and/or external authorities do not establish an effective governance regime (Hardin, 1968). Governance regimes regulate how appropriation and obligation activities are to be monitored and enforced and how over appropriation and obligation conflicts activities are to be resolved; they also assess how the rules affecting the above will be changed over time with changes in the performance of the resource system and the strategies of participants (Hardin, 1968).

Circumstances in which decisions are made with regard to management of common pool resources is based on nature of resources that are used jointly, how technological or institutional aspects of use can influence resource characteristics, and how the structure of the situations in which resources are utilized affects use and management decisions and use patterns (Oakerson, 1992, Ostrom, 1990, Runge, 1984). Hence, there is involvement of local communities and lower-level decision-making units in protecting and managing the environment (FAO, 1999). These new policy trends are based on the recognition that the fiscal capacity of the state to undertake coercive conservation is limited and that communities can often manage their resources better than either private actors negotiating through market-based exchanges or state actors regulating through command and control policies. In many cases, communities are seen also to be characterized by high levels of social capital, which permit them to undertake collective tasks far more efficiently in comparison to state bureaucracies, and to do so far more equitably than market-based solutions (Putnam, 1993)

Common pool resources (CPRs) are non-excludable and rival and share properties of both public and private goods. CPRs are often characterized by externalities and incomplete or costly contracting, and hence are prone to both market and state failures. The management of such resources therefore is likely to succeed when they are embedded in social networks. These social networks can be used to negotiate, bargain, and acquire dispersed information to monitor, retaliate and impose penalties (Bowles and Gintis, 2002).

Ostrom (1990) on common property regimes of small- scale institutions developed eight principles that seem conducive to secure long enduring CPR's. This is to create a sustainable use of resource systems and for the sustainability of livelihoods. History of access, use and management shows a trend of overexploitation and arising conflicts between the managers and the dependants. Reasons for this have been widely discussed and there is no definite answer; if the previous management have forced the local population to act individually to secure their livelihood, climate changes that forces to extract the resources with negative consequences or if it managers that have not considered the local peoples lack of choices.

This framework is based on the premise of collective action in the management of resource. And in the case of common-pool resources like forests that have multiple uses there may still be conflicting interests between users of the resource regarding the quality or composition of the resource system and in the management of the forest resources. Communities are capable of avoiding the 'tragedy of the commons' by creating and sustaining institutions to prevent degradation of natural resources (Berkes, 1985; Chhetri and Pandey, 1992; Ostrom, 1990). In addition, collective action is believed to further progressive social change that brings about meaningful participation, decentralisation and conservation (Chambers and McBeth, 1992).

Collective action by local communities has increasingly been recognised as crucial for effective management of natural resources, particularly the management of forests in the rural settings. This is based on the assumption that the involvement of local communities in the management of forests can improve the forest condition and utilisation. Why and how people act together to sustain the forest and improve livelihoods are important questions in the study of human-environment relationship concerning the management of community forests. However it has been argued that cooperation among self-interest driven individuals is often impossible because it may actually harm individual interests (Olson, 1965; Hardin, 1968). Olson (1965) argued that “unless the number of individuals is quite small, unless there is coercion or some other special device to make individuals act in their common interest,

rational self-interested individuals will not act to achieve their common or group interest”. Similarly, Hardin (1968) argued that the individual’s rational action results in collectively irrational outcomes.

Common Property approach would be to reinforce the motivation of institutional arrangements that can support conservation and people through their collective action would cooperate to manage and use forest resources in a sustainable way. The communal ownership and the ineffectiveness of market and administrative structures in managing large natural resources has led to an interest in the role of local communities in the management of natural resources. Devolution of rights and responsibilities to local user groups is now being advocated in many countries including Mau Forest in Kenya but the success of participatory management depends on the ability of the group to work collectively and overcome the free rider problem (Sathya, 2005).

The problem of collective action is to overcome the prisoners’ dilemma type situation where individual action choices, in the aggregate, lead to an outcome that is not preferred by anyone in the group (Ostrom, 1990). This is because communal management of forest resources like in Mau forest may undermine conservation efforts since when people own resource communally; the motivation to conserve is under threat due to personal interest eg political interest. The powerful actors both within and beyond the local communities control the forest use to ensure conservation, thereby the poor users who are mostly dependent on forest resources are disadvantaged (Shrestha, 1999)

Collective action and resource management are better understood by analysing them as embedded in social, economic and political situations (Mearns, 1996). Therefore, communities have responded to these new institutions governing management of common pool resources and adopted their innovative ways to manage forests. The effectiveness of an institution varies with the degree of co-operation found in collective actions. The mechanisms of the institution are interrelated with the formation of collective action, making use of mutual functions (Varughese, 2000; Agrawal and Gibson, 2001; Varughese and Ostrom, 2001). If people formulate collective action through a local institutions, they can effectively organise and govern themselves voluntarily as a group (Ostrom, 1990), and can allow the development of their own internal governance mechanisms and formulas so that they are able to allocate costs and benefits to members.

The existence of organized, well defined forest management systems amongst indigenous communities have been used to conserve forest in Mau Forest. These systems included sacred groves protected by religious sanction from which human interference was excluded. These were protected by utilization zones, and their access and utilization of forest resources was determined and regulated by specific rules and a clearly well defined structure of authority. For instance, the indigenous community in Mau-Ogiek have had a unique way of life well adapted to the forest. Their adaptation and their traditions have made them successful foresters and greater environmentalists than any other community in Kenya. Their indigenous knowledge has played a key role in forest conservation in Mau, this is through their rich array of traditional experiences, expertise and practices which has significantly contributed to forest conservation and sustainable forest livelihoods (Sang, 2001).

Rapid population growth in the Mau Catchment has led to expansion of cultivation, deforestation, encroachments, charcoal burning and firewood collection and overgrazing (Kenya Forest Working Group, 2006). Consequently, the agricultural landscapes become increasingly important frontiers for biodiversity conservation and livelihood provisioning. The strategies developed to address the need for conservation and livelihoods were necessary. Agro forestry was introduced and had a high potential becoming a vital tool for achieving the goal of conservation and improving sustainable livelihoods (ICRAF, 2009). Agroforestry entails growing and using useful trees and shrubs on farms in combination with crops and livestock is being used to fight illegal logging and land grabbing by poor farmers around the Mau Forest – one of Kenya’s most important forest resources.

Through sensitization of communities adjacent to the major forests in the country by the Kenya Forest Action Network (FAN) and the Kenya Forests Working Group (KFWG) (Ongugo et al., 2007), Mau Forest Community has been able to engage in community forest conservation through formation of association who works in collaboration with the government. A number of Community Forest Associations (CFAs) rely only on membership fee and subscription by members as their main sources of funds (Kinyanjui, 2007). Most of the forest associations, eleven (11) are located within the Mau forest ecosystem, which is the most important catchment for Lake Victoria (Forest Act, 2005). Through this association, the community members around Mau have been able to participate in conservation practices around Mau.

2.3.2 Empirical Literature on Forest Conservation

In recent decades, Community Forestry (CF) systems have been institutionalized in response to the growing concern related to the pluralistic nature of forest use and conservation in many countries. This shift from government-driven to community-based forest management systems aims at increasing the efficiency of forest use and conservation and strengthening social equity and justice through active involvement of different stakeholders in the decision making and implementation processes of forest management (Ramirez, 1998). Actors claiming a stake in community forestry are not only local people and government administration, but very often include also a large number of non-governmental organizations as well as bilateral donor agencies. The challenge with community forestry arrangements is consequently to provide ample space to integrate not only different interests, but also different, sometimes conflicting, values, perceptions, objectives and even knowledge systems (Anderson et al., 1997).

Community Forestry (CF) as an approach based on collective action has been increasingly accepted as suitable for the sustainable management and utilisation of forest resources, particularly in developing countries (FAO, 1978; Victor et al., 1998; Brown et al., 2002). Accordingly, forest areas owned or managed by communities have doubled in the last fifteen years, occupying more than 25 percent of the forest estate in developing countries. The area is expected to double again by 2015 (Bull and White, 2002). Brown (1999) argues that the implementation of Community Forestry aims at ensuring adequate resource flows to rural population so as to alleviate poverty and for socially justifiable income distribution.

CF generally aims at linking conservation of forest resources with the development needs of rural populations dependent on the resources (Gilmour, 1995). However, collective action in CF does not necessarily lead to sustainable outcomes that balance conservation and livelihood needs. Empirical evidence indicates that integrating conservation and development objectives on an equal basis is proving to be especially difficult, but often one objective, usually conservation, predominates among foresters (Warner, 1997; Arnold, 2001). There are examples where local people's development needs are not effectively reconciled with biodiversity conservation (Arnold, 2001).

Empirical study on forest conservation and utilisation under Nepalese community forestry (CF), emphasizes that there is numerous anecdotal evidence that forests have been better

protected by communities than by the state, but a few studies have reported that the forest condition has improved (Maharjan, 1998; Dev et al., 2003). The improvement has been attributed to the Forest User Groups (FUGs) focussed on forest conservation, not on utilisation. It is suggested that how CF will be implemented and whether it will improve forest resources are inextricably linked to historical and geographical specificities (Nightingale, 2003). An understanding of issues related to forest conservation and utilisation is related to how and why people collectively act and how socio-economic, political and ecological factors interact to each other and condition collective action processes and outcomes. Some reports show that CF has increased product flows and is contributing to improving livelihoods (Dev et al., 2003).

Conservation and natural resource management approaches have been shifting from costly state control systems to ones in which local people are actively involved in the process. The new system includes the participation of resource users in management decisions and the sharing of benefits through restructuring power relations between the state and communities by transferring management authority to the local level (Chambers 1995, 1997; Shackleton *et al.* 2002).

Most developing countries have initiated decentralisation reforms over the past two decades. In decentralisation, central governments transfer some of their fiscal, political and administrative responsibilities to lower-level government units, local institutions, corporate agencies, community groups and the private sectors (World Bank, 1997, Ribot, 2004). In the forestry sector, many countries in Asia and Africa have recently developed legislation and policies to address the core value of decentralisation and devolution. Devolution is commonly understood as the transfer of the role of the central state in managing forest under specified terms and conditions to local government units or communities. Devolution policy in forest management has been gaining popularity in most developing countries since 1990 as a strategy to achieve the goal of sustainable forest management and biodiversity conservation (Toha and Barros, 1997).

The motivation for devolution in forestry is driven by a series of factors such as: the need to overcome increasing forest degradation due to a history of government failure in protection and promotion of the forest, the need to reduce the cost of central bureaucracies, the desire to comply with the concept of economic liberalisation and market orientation, the desire to

increase access and control of local community and to ensure equity (Shepherd,1992, Hobley 1996, Fisher 2000, Edmunds and Wollenberg, 2001, Colfer and Capistrano, 2005).

Despite the aforementioned rationales of decentralisation and devolution in forestry, there is a quantity of literature that views the success of forest devolution as limited in practice (Anderson, 2000, Enters et al., 2000, Fisher, 2000, Edmunds and Wollenberg, 2002). This indicates that there is still lack of meaningful devolution in practice. Edmunds and Wollenberg (2001) stated that ‘regarding devolution in forestry from the perspective of the poorest farmers, who solely depend on nearby forest for their livelihood through collection of fodder, fuel wood, woodcarving, charcoal making, livestock grazing the results are almost disappointing’. In most cases, the livelihood of the poor forest dependents is challenged due to the influence of elites in decision-making about forest management (Shepherd, 1992). For instance the case of community based forest management (CBFM) in the Philippines is taken as a manifestation of devolution policy in forestry which was affected by weaknesses linked with the policy practice gap.

In India forest management has been faced with various issues. The Common Property Resources (CPRs) such as village forests and pastures which were owned by the village communities and acted as buffers between communities and government forests, suffered heavily due mainly to their overuse and lack of management. With dwindling CPRs, the reserved and protected government forests came under heavy pressure. Forest-management practices, which were initially meant to supply forest, produce for the use of local inhabitants, gradually shifted away from the communities. The rural communities were either bypassed by forest management or received meagre attention in the form of a limited supply of forest produce. This gave rise to dualism between local people and management with respect to customary rights and concessions and to modern forest laws and forest-management planning. Although communities had rights and concessions, they had no influence or say in the management of forests (Sharma, 2005)

It was, therefore, realized that these forests cannot be managed in isolation from the communities whose livelihoods are linked to their natural resources. Participatory Forest Management (PFM) envisages people involved in halting forest degradation. The vital objectives of rejuvenating degraded forest and alleviating poverty may be achieved by actively involving local people in planning and management of their forest resources. The

government of India issued guidelines to all the States, to promote involvement of village communities in the regeneration of degraded forests. Consequently, in many States, forests have been assigned to the village communities for their protection (Sharma, 2005).

2.3.3 Literature on Forest Conservation in Kenya

Communities have engaged in forest conservation through various ways. For instance in the traditional forest management, both community forestry and indigenous forest management systems are implemented in line with the concept of community-based forest management in dealing with common property and adopting an institutional system. Groups of individuals can jointly use the same common pool resources, sharing property rights with others by organising themselves in such a way that the group effectively co-operates in practising sustainable use and equally distributes the benefits and costs from the resources on which they depend (Varughese and Ostrom, 2001).

Community forestry has also been used to promote involvement of local communities. This refers to the management of forestlands and natural resources by local people, for commercial and non-commercial purposes (RECOFTC, 2004). It is characterized by the use of forest resources by local people, on an individual or household basis, for consumption and sale; and the community management of forests, which refers to a collaborative enterprise conducted by a group of local people who manage forest either independently or with outside support for the production of resources for consumption and sale. Community forests focused on individual on-farm tree-planting and the communal management of existing forests and woodlands which have both been successful (Shepherd, 1990; Arnold, 2001).

Thus, the sustainable development of the state owned forests involves management of the forests through collaboration with local communities to enhance forest conservation. Joint Forest Management (JFM) is a collaborative forest management programme with the involvement of rural communities living close to forests in protection and management of forest resources. In the pre-independence period the conversion of common property resources such as forests into the state management regime resulted in exacerbating the rates of deforestation. In India for example Post-Independence forest policies contributed to an expansion in agriculture production, met industrial demand for raw materials, and tightened control of forest lands through restricted access to forest and forest products (Haeuber, 1993). After various cases reported from different parts of the country in relation to self initiative

forest protection since the 1960s, and the efforts for creating partnership with people by the forest department in protection and management, the Joint Forest Management was introduced and it was giving an importance of people's involvement in protection, management and development of forest (Poffenberger, 1995; Banerjee, 1996).

Conservation and natural resource management approaches have been shifting from costly state control systems to ones in which local people are actively involved in the process. The new system includes the participation of resource users in management decisions and the sharing of benefits through restructuring power relations between the state and communities by transferring management authority to the local level (Chambers, 1995, 1997; Shackleton et al., 2002).

Communities have been able to engage in forest conservation through participation in forest conservation activities. Participation is often associated with community forestry, which refers to forest management or co-management by people living close to the forest. Legal, political and cultural settings for community forestry vary widely, and it entails a wide range of experiences and practices (Wily, 1997). Although local participation is important in forest conservation, there are circumstances in which it is absolutely necessary, for example high population pressures and resource use conflicts, communal ownership and in smaller and more vulnerable protected areas (Roche and Dourojeanni, 1984). In such cases, conservation without local participation is doomed to failure.

The widespread creation of local forest management institutions has targeted forest users who often come from groups in society that are usually marginalised and excluded from other decision-making forums. In addition, the formation of local organizations has significantly changed the relationship with the forest department and the ability of members to speak out and represent their forest and livelihood-related needs (Debnath and Dasgupta, 2006). A first step in social and economic development of isolated settlements is the formation of community associations (Grootaert and Narayan, 2001).

Active and effective community associations provide otherwise scattered Individuals and families with a means for organizing themselves and having improved representation in local government. For example Migration to the Amazon frontier in Brazil led to formation of community association which has led to collective action in Forest conservation. These

community forest associations is also being implemented in Kenya in various forest areas including Mau which will enhance community members including people who encroach on forest to participate in forest conservation.(Forest Act, 2005)

2.4. Impact of Forest Conservation Systems

Enforcement of forestry and conservation laws and regulations has the potential to negatively affect rural livelihoods. The magnitude of these risks varies greatly from country to country and the effects on forest dependent communities differ. For instance, some countries have little interest or capacity to enforce their forest conservation laws and regulations and even with increased international attention on forest law enforcement and implementation will not change that. Others focus their laws and regulatory efforts almost exclusively on curtailing abuses and wanton destruction of forest by large logging companies, which is less likely to have major negative effects on rural livelihoods. But there are many countries where existing efforts to enforce forest and conservation laws already have significant negative impacts on rural livelihoods (Kaimowitz, 2003).

Illegal forestry activities can be bad for rural livelihoods but enforcing and implementing existing forestry laws and regulations and doing it more effectively may make the problem even worse. This applies particularly to situations where legislation and/ or law enforcement practices discriminate against poor rural households. According to Kaimowitz (2003), most small-scale commercial forestry activities in developing countries are illegal or have unclear status under existing laws. Those involved generally do not have permits or formal management plans and do not pay taxes, and they often work without permission in forests claimed by governments or large landholders.

Every year developing country governments lose billions of dollars in revenues due to illegal tax evasion in the forestry sector and unauthorised timber harvesting in publicly owned forests (Contreras-Hermosilla, 2002). This leaves governments less money to spend on services such as health, education, roads, electricity, and agricultural extension. Lack of transparency in government budgets in countries with widespread corruption makes it less likely that whatever funds governments do receive will go to services for the poor. Weak rule of law and corruption also limit long-term economic growth, which further reduces tax revenues (Thomas *et al.*, 2000).

Widespread corruption and disrespect for the rule of law typically favour groups that have sufficient resources to pay bribes, develop informal links with government officials, and hire armed guards (World Bank, 1997). Corruption and lack of respect for the rule of law subverts the democratic process. Elected public officials lose influence or fail to represent the interests of those that elected them, while small elite groups can use bribery and private business associations with government officials to influence policies in their favour (Contreras-Hermosilla, 2002). Individuals or interest groups within community who engage in illegal forestry activities or support others involved in such activities undermine pre-existing mechanisms for regulating the use of forest resources. Formal community forestry initiatives have difficulty competing with groups that operate illegally, since the latter can sell their products cheaper because they don't pay taxes, prepare management plans or devote resources to paper work.

Many governments essentially tolerate poor families living in forestlands and protected areas claimed by the government, but there are also many cases where families have been evicted from such areas, often forcibly. If governments were to strictly apply existing forestry and conservation laws restricting poor rural households' access to forest resources that could have dramatically negative impacts on them (Sharma, 2003). By considering the livelihood activities of large numbers of rural people as illegal that essentially 'criminalises' those people and makes it easier to deny them their political and legal rights and the opportunity to participate in decisions related to natural resource management (Kaimowitz, 2003).

Enforcing laws that fail to recognise and build upon pre-existing 'informal' mechanisms to collectively regulate the use of forest resources may also undercut those mechanisms and make it more likely that forest resources will become essentially open access. Many forestry and conservation laws fail to recognise indigenous and nomadic peoples' rights over the territories they have historically occupied and to take into account their traditional farming, hunting, fishing, grazing, and gathering practices. That makes it harder for many local people to maintain their traditional diets, health practices, and ways of life. For example in Asia, there are laws that prohibit swidden cultivation (also known as shifting cultivation or slash and burn cultivation). Swidden cultivation forms an integral part of the traditional practices of many peoples, and in many cases is the main livelihood option that people have available to them (Kaimowitz, 2003).

Formal conservation interventions disregarded (and largely continue to do so) the need to involve local communities in decision making. Prior to gazettelement, the local community's consent is hardly sought for by the government. The conventional practice for example in the Republic of Kenya, 1982 of giving a notice through the Kenya Gazette is ineffective. This is because a fair proportion of local community members are illiterate and therefore not equipped to read and the Kenya gazette do not reach the rural areas where most forest areas are located. Local communities' perceptions and values regarding forest components are therefore inadequately reflected upon in the management tools to enable the formulation of appropriate incentive measures to enhance communities' involvement in forest management (GOK, 2010).

Forestry also has an important role in 'poverty alleviation' in the broader definition, pertaining to capabilities, empowerment and rights. Increased attention to both conservation and livelihoods issues at international and national levels has translated into substantial changes in governance worldwide, with increased subsidiarity (the principle that decisions should be taken at the most appropriate level) and participation by relevant stakeholders in natural resources management (Brown et al, 1999). In practice, this has meant more emphasis on, and considerable actual achievement in devolving decision making about forest management to the people living in and around forests (White and Martin, 2002).

While the actual outcomes of devolution policies have been disappointing to local forest users in many cases, with a need for more emphasis on pluralism and democratic accountability (Edmunds and Wollenberg, 2003), the trend is promising and seems to offer good potential for improved livelihoods. Moreover, at local levels, efforts to protect and manage forests have resulted in increased coordination among and exercise of power by local communities. Some of these have been locally initiated, while others have had external support through a variety of means. Improved local organization and capacity can represent both an improvement in livelihood in and of itself and provide a means to improve the income and welfare aspects of livelihoods (Angelsen and Wunder, 2003).

2.5 Towards Sustainability in Forest Livelihoods and Conservation.

The response to the perceived threat to the world's natural resources, particularly forests and wildlife, was conservation. This involves the scientific planning and wise use of the resources to ensure that they are not depleted. Conservation therefore arose out of concern that the

world would run out of its vital resources if wanton exploitation was not arrested. It became popular particularly in the first decade of the twentieth century (Samuel, 1959).

Coupled with a deepening biodiversity crisis in the last two decades, it stimulated a search for alternative conservation approaches. Consequently, management approaches based on local participation have sprung up, particularly in the developing countries (UNEP, 1988; Western and Wright, 1994). These approaches have an interest in local-level solutions to resource problems and in changing local institutional arrangements. They do so by conferring specific rights as incentives in order to stimulate local participation in the conservation efforts.

In the protected areas and their surroundings, these initiatives attempt to link conservation with social and economic development. These initiatives are known by a variety of labels, including community-based natural resource management (CBNRM), integrated conservation and development projects (ICDP) and community conservation (CC). Generally, these approaches have been developed more or less independently, based on the common premise that the management of conservation areas needs to reach beyond traditional conservation activities inside protected areas in order to address the needs of local communities outside in the perspective of the ecosystem management approach (WCED, 1987).

Different countries have adopted various approaches to conserve forests. For instance Nepal has different strategies to conserve and utilise its natural resources, and Community Forestry is one of the successful strategies through the active and meaningful involvement of rural communities in forests management. The government has made provision to hand over the state owned forests to the local communities in the form of Community Forest Users' Group (CFUG). The institutional development of Community Forestry through CFUGs has widened its impacts on livelihoods. Evidences shows that the Community Forestry has been contributing to rural livelihoods is mainly in two ways: (1) better flow of forest products through the improvements of forest resources and (2) through the development of livelihoods assets in the grassroots level, which are the basis for sustainable livelihoods (Uprety, 2006).

Public participation in forest management has increased in many countries and broader approaches to forest management, such as ecosystem and landscape management are becoming more widely accepted and applied. Integrated strategies for forest conservation in which conservation of forest resources and biological diversity entails management both

inside and outside protected areas are increasingly being developed (FAO, 2001b). By including local interests, people will have a sense of belonging and a greater conscience for preserving nature. For instance, the importance of participation has started to be recognised by the Kenyan government and it is expected that the Forest Act will lead to a greater involvement in all sectors. Local organisations have been developed and private stakeholders are invited to contribute monetarily. Stakeholders might suggest new strategies, but the state will still be the main decision-maker (Sang, 2001).

In the REDD+ era, the issue of forest tenure has shot to the top of international forest policy agendas. Clarity of tenure is considered a requirement for a compensation system that would pay forest “owners” for forest conservation because in many parts of the world this ownership is fragmented between different stakeholders and different authority claimants, in practice if not on paper. Indeed, complex tenure arrangements are more the rule than the exception (Unruh, 2008). However, beyond the issue of REDD readiness and its implications in forest conservation; there is much debate on the role of tenure in other outcomes of sustainable forest management, in particular livelihoods and forest conservation.

2.6 Conceptual Framework of the Study

This framework shows the relationship between the forest livelihoods and forest conservation.

Figure 2.1: Households, Conservation systems and implications

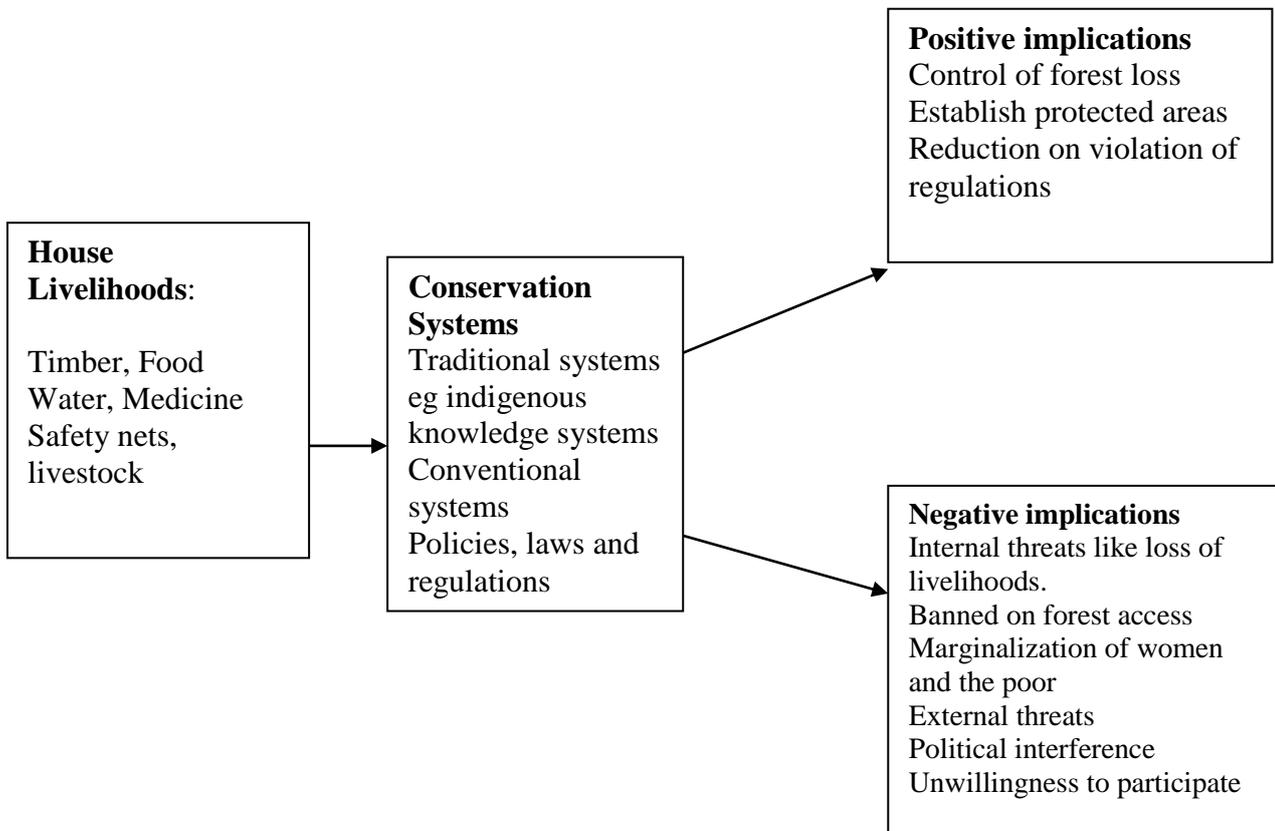


Figure 2.2 Households, Livelihoods Systems and Implications.

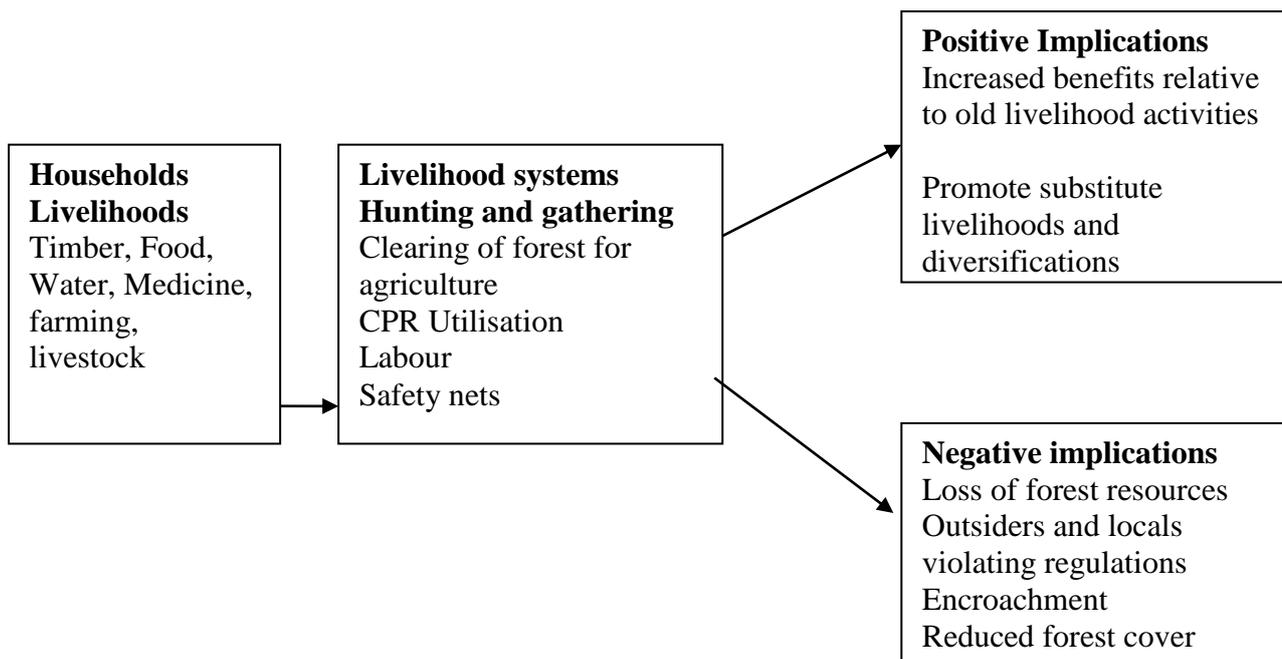
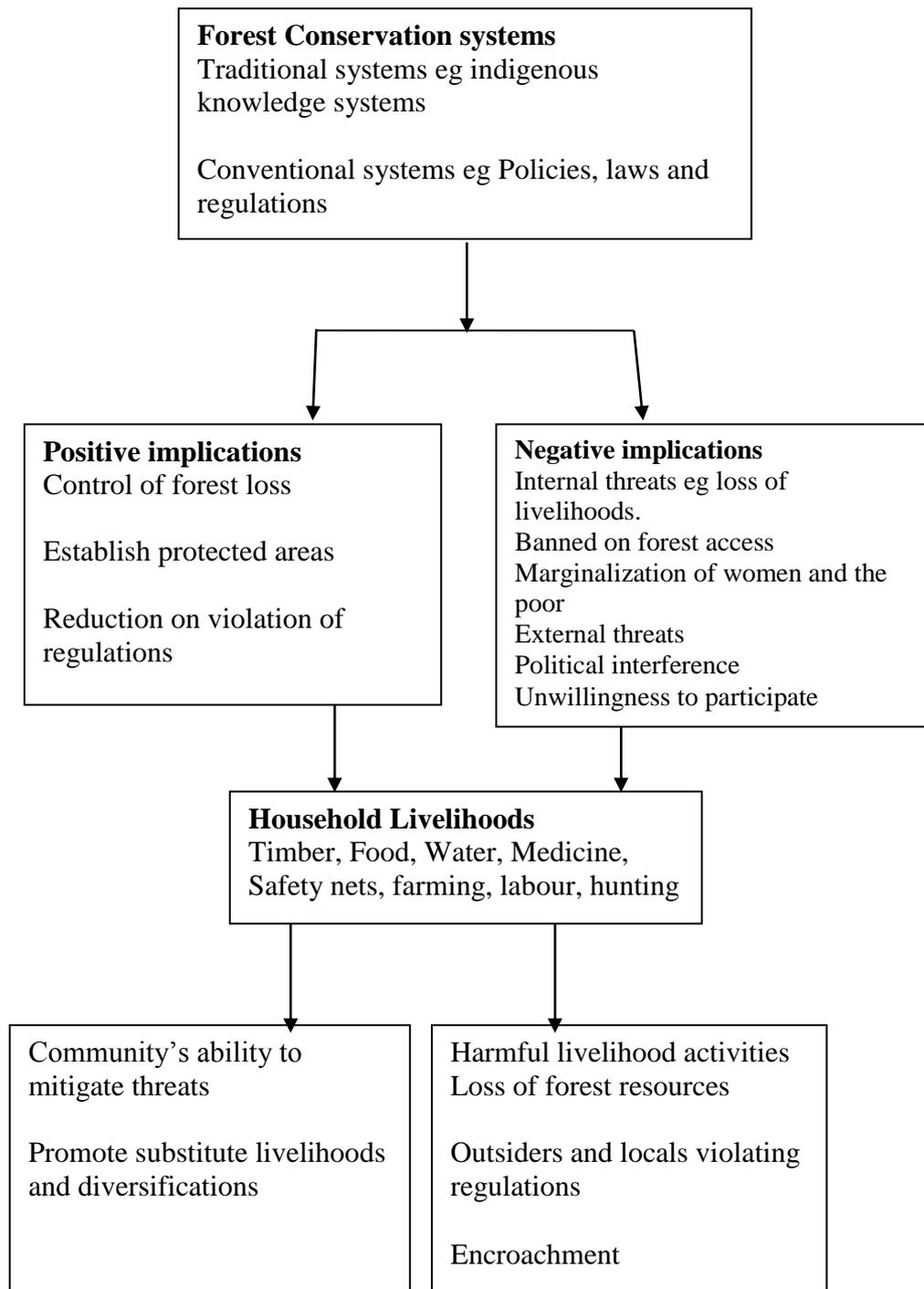


Figure 3: Towards Sustainability: Household synergies and struggle on livelihoods and forest Conservation.



Source: Author's own conceptualization

In the conservation system model, the (Figure 1), there are system that are implemented both traditional and conventional systems in order to protect on forest system but his is seen to hinder the local community from deriving their livelihood benefits from the forest. These systems have positive implication on the forest since it controls encroachments, misuse of forest resources and violation of regulations implemented.

In the Livelihood systems model (Figure 2), livelihood activities such as farming and common property utilization appear as one of the internal threats to Forest conservation. This is because of its negative implications which lead to forest loss and violation of regulations both by the locals and people who are encroaching on forest. Other diversification strategies increase the benefits that the local people receive from alternative conservation-oriented activities so that they no longer have the incentive to practice the damaging livelihood activities.

Finally, in the linked model (Figure 3), there is a link between conservation and the livelihood intervention. This link is the driving force behind the sequence of activities leading to conservation. It ``closes the loop" which creates a balance between livelihoods and conservation. The linked activities counter internal threats by providing more attractive livelihood options so that the stakeholders no longer practice their damaging livelihood activities. In addition, the linked activities should enhance the value of the biodiversity to the local people, thus prompting them to take actions to mitigate both the internal and external threats to the biodiversity. These are linked livelihood activities that are by definition directly dependent on natural resources.

Each of the relationships in the linked incentives model is necessary to ensure the success of the intervention. If any one link in the chain fails, the activity does not lead to conservation. There are a number of assumptions underlying each relationship. The livelihood activity must produce sufficient value to the stakeholders to create incentives for them to engage in threat mitigation activities. Stakeholders must have not only the incentive to take conservation actions, but also the capacity and resources to do so effectively. The key assumption in this model, however, is that it is possible to establish one or more livelihood activities that are linked to the biodiversity. Linkage is the fundamental relationship that shapes the presence and strength of the other steps in the chain. (Salasfky, 2000)

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This section presents the research methods used in the study. Specifically, it presents the details of the study sites, sampling methods, and data collection methods and data analysis procedures.

3.1 Research design

The study was conducted using a descriptive survey design. This is because the study sought to collect quantitative and qualitative data and thus research questions which guided the study captured both qualitative and quantitative information.

A descriptive survey design is defined by Kombo and Tromp (2006) as an attempt to collect data from a sample of a population in order to answer questions concerning the current status of the population with respect to one or more variables. Hence the descriptive survey design was appropriate since the aim of the study was to assess how household livelihoods activities impact the conservation efforts in Mau, how the conservation efforts by households infringe on the livelihoods activities and analyse the synergies and struggles that exist between conservation and livelihood activities to achieve sustainability.

3.2 Study Site.

The study was carried out at Mau Forest. It is a forest complex in the Rift Valley of Kenya. Mau Forest complex has an area of 273,300 hectares (675,000 acres). It provides domestic water to 10 million residents of Nairobi and other urban centres in the country and more than 12 million people (Kenya's population is about 40 million as per the census of 2009) depend on its 12 major rivers. It also acts as a wildlife reserves - including the Maasai Mara, the Serengeti and Lake Nakuru.

Mau Complex is situated about 170 km north-west of Nairobi and stretches west bordering Kericho County, Narok County on the southern side, Nakuru to the north and in south west side it borders Bomet county. The forest was segmented from the larger Mau forest complex into seven blocs which includes; East Mau, Ol'donyo Purro, South-West Mau (Tinet), Transmara, Maasai Mau, Southern Mau and Western Mau. Different categories of people have settled in Mau Forest ranging from bona fide settlers to illegal squatters. Their

difference is mainly derived from the process through which they found their way in the Mau Forests Complex. There is an estimated population of about 34,031 households in the Mau forest.

The forest has an annual rainfall of about 2,000 mm throughout the year and is 1,200 – 2,600 m above sea level. Mau Forest act as a water catchment area and it has helped to regulate the stream flow, thus controlling flooding and maintain water catchment areas which drains into main lakes in Kenya. Eg. Lakes Nakuru, Bogoria, Baringo and Victoria.

The study was conducted specifically in Tinet in Kericho district area near South west Mau forest where 2,300 households were recorded to have lived and encroached illegally up to 10 kilometres inside the forest reserve. Some of the families with no documentation to support their occupation of the forest were evicted in 2006. In addition the Government has never excised that forest area or even expressed any intention to set aside that forest for settlement. However, lack of enforcement made it possible for the squatters to return to the forest.

Deforestation has been rampant in Mau forest and already a quarter of its 400,000 hectares have been destroyed due to farming activities, encroachments and logging. Deforestation has grown significantly over the years despite pleas to conserve and protect to ensure sustainable forest management. Moreover, degradation of Mau forest has been associated with mismanagement, irresponsible and corrupt behaviour of politicians and government officials. This destruction has manifested itself in the form of deforestation, the shamba system, human settlements, cultivation, charcoal production and grazing as well as powerful interests allocating the land for large-scale tea plantations and resettlement schemes for government-favoured agricultural communities.

There is growing frustration among conservation and social development practitioners with the struggle in managing the forest that have not lived up to their claims of being able to deliver both forest protection and conservation while ensuring that the livelihoods of the users are secured. Hence the justification of conducting research at the Mau forest is to determine the relationship between forest livelihoods and conservation initiatives and to assess whether it is possible to achieve both without compromising livelihoods or management of the forest.

3.3 Population and Sampling Procedure

The unit of analysis for this study was the household and this is where I derived the respondents for the study. The household heads was target respondents.

3.3.1 Sampling of Location

The study was carried out in Kericho County the area bordering south west of Mau forest. This area was purposively selected due to the proximity to the forest and because this is the area that was highly impacted by encroachment and forest degradation. This is also the area where the highest number of rural households depends on forest for their livelihoods.

The locations bordering Mau forest were picked randomly due to their very close proximity to the forest. Only three locations were picked for this study which included; Masaita, Kamwangi and Kabianga Locations. This was mainly because of the limited resources (time and money) available for data collection and hence could not allow the researcher to obtain data from all Locations within Mau forest.

3.3.2 Sampling of Households

The Target population for this study was not known and thus the researcher was required to conceptualize the phenomenon under study and set the most reasonable sample size to ensure that all sources of variations are captured. According to Kombo and Tromp, (2006), minimum acceptable sample size depends on the type of the research, and ordinarily a researcher would require a minimum of thirty respondents in a survey research; a sample size less than this would provide too little data to be practical.

From this study, a sample of 120 households was considered appropriate. The respondents identified and selected within a five kilometre radius. Meffe and Carrol, (1994) as cited by Kiragu, (2002) assert that the impact and interaction of the community with the forest decreases with the distance from the forest. KIFCON studies (1994) also indicated that the greatest interaction of the community with the forest is by living within the radius of 5km from the forest. To get this sample size of 120 respondents, a random sampling technique was used to identify and pick households living adjacent to the forest location and within a 5km radius. Simple random sampling is a form of probability sample and each unit of the population has an equal probability of inclusion in the sample (Bryman, 2008). Simple random sampling technique was appropriate for this study because it was to provide a

representative sample that was used to generalize from that specific sample to the population. It was also a convenient technique to use since there was minimal chance for human bias to manifest itself.

3.3.3 Key Informants

The key informants in this study comprised of the Head of Conservancy Mau, Secretary of Community Forest Association, Village Elder who also heads the local organisation and the Chief of the village. These key informants were purposively selected on the basis of their expertise on issues the study sought to address. The chief of the village had been involved in forest conservation and in resolving conflicts among the forest users hence he was able to provide information on struggles affecting forest conservation and livelihoods.

3.4 Data Collection

3.4.1 Questionnaire

Quantitative and Qualitative data was obtained using both primary and secondary sources. A survey questionnaire was administered for the quantitative data. Open ended and closed questions were used to allow for qualitative discussions with the household concern and hence provide enough qualitative and quantitative data. The questionnaire consisted of questions on how household livelihoods activities impact or affect the conservation efforts in Mau; how the conservation efforts by households infringe on the livelihoods activities and the synergies and struggle that exist between conservation and livelihood activities

3.4.2 Key informant interviews

Key informants were purposively selected based on their resourcefulness in different areas of this study. A key informant guide was used to provide overall direction for interview. The key informant guide consisted of open ended questions to elicit responses and give more information regarding the study. There was in-depth interview with the informants

3.4.3 Secondary data

Extensive review of secondary data was carried out to inform and furnish primary data collection. This was done on published reference books, journals, scholarly articles, internet, and Mau forest reviews in order to have a broader knowledge on the study and inform the theoretical and empirical literature on forest conservation and livelihoods.

3.5 Data Analysis

Analysis of data was done using both qualitative and quantitative techniques. Completed questionnaires were cross-checked for data integrity and data cleaning. Data was then coded for analysis along key themes, emerging patterns and consistency. Qualitative data was analysed by content analysis and thematic analysis and coding interpretation was done along key themes to determine its relevance in answering the research questions. The results of the study were presented in the form of tables, explanatory texts, and summary statistics to show relationships between key variables. Quantitative data analysis was done using Statistical Package for Social Sciences (SPSS) and Ms Excel.

CHAPTER FOUR

STUDY FINDINGS AND DISCUSSION

4.1 Introduction

This chapter presents the findings of the study based on the research questions and study objectives. The first section discusses the background information about the study respondents. It also presents the information on household activities and issues on forest conservation and management. This chapter also discusses the struggles and divergences of forest livelihoods and conservations within Mau Forest. Figures and tables have been used to illustrate the study findings.

4.2 Basic Characteristics of Respondents

The basic characteristics of the respondents were based on the following indicators: sex, age and position of the respondent in the household. Household heads were the target respondents due to the patrilineal nature of most households in the study area. Where the male head was absent; the spouse or the eldest member of the household was interviewed. The above attributes were chosen because of the multidimensional nature of forest utilization and the significant influence of the household head in decision making.

4.2.1 Distribution of Respondents by Gender

Gender is an important socio-economic, cultural and demographic factor. The unit of analysis for this study was the household, with the household head as the respondents. The household head retains rights over land disposal, controls household income and expenditure, and makes decisions on behalf of the rest of the family members. From the study findings, 63% of sampled household's heads were male while 37% of the sampled households were women headed. Gender of the household head is important for this study as it may influence participation of the family with regard to forest access and utilization. Men and women have different opportunities, motivation and capabilities to involve themselves in collective action (Pandolfelli, Meinzen-Dick, and Dohrn, 2007). Domestic responsibilities may also reduce chances of women to participate in groups (Meinzen-Dick and Zwarteveen, 1998). Therefore, gender of the household head is important in the analysis of forest conservation and livelihoods.

Table 4.1 Sex of the respondent

Gender	Frequency	Percent
Male	76	63.3
Female	44	36.7
Total	120	100.0

Source: Field Data, 2014

4.2.2 Household Age Distribution

Household age structure assumes particular importance for the functioning of household. From the study findings, the minimum and maximum age was 27 years and 70 years respectively. The mean age was 36 years. As shown in Table 4.2 below, the age bracket between 20-30 years was 18%, whereas 28% was between the ages of 31-40 while the highest percentage (36%) was found to be between 41-50 years. Lastly, 16% was between the age of 51-60 years and 12% of the respondent fell within the range of 61-70 years.

Table 4.2 Age of Respondent

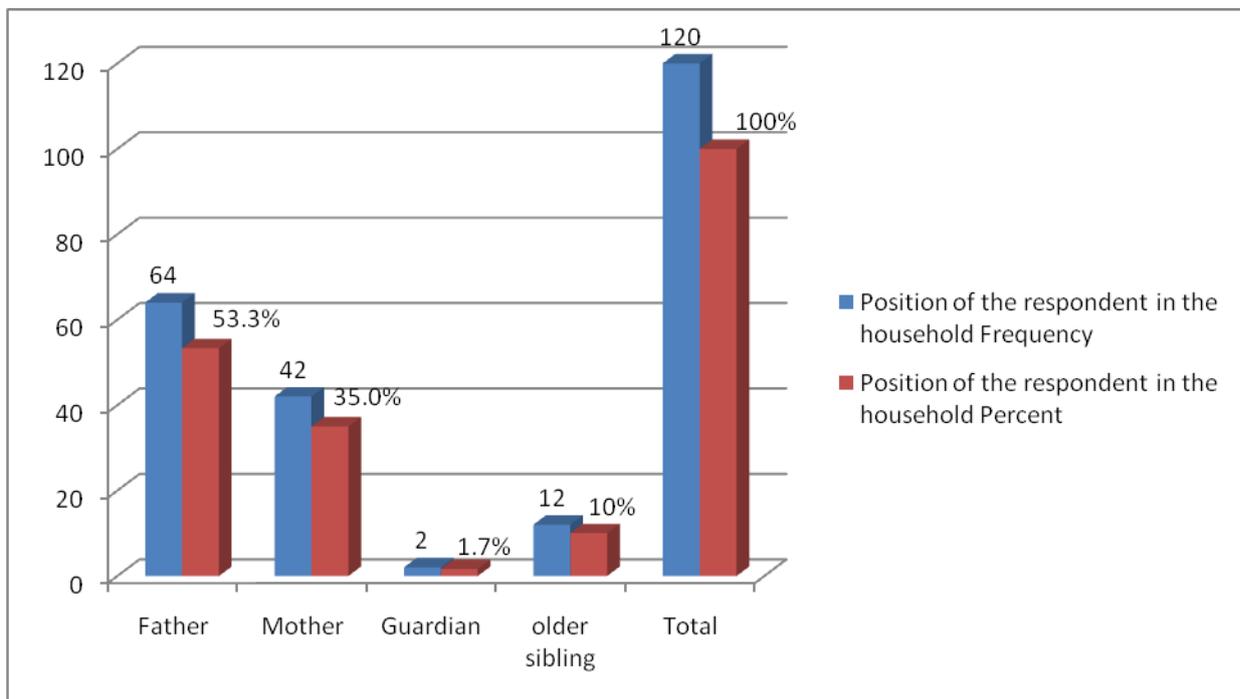
Age Group(Years)	Frequency	Percent (%)
20-30	22	18.3
31-40	34	28.3
41-50	36	30.0
51-60	16	13.3
61-70	12	10.0
Total	120	100.0

Source: Field data, 2014

4.2.3 Position of the Respondent in the Household

Household head or respondent interviewed during survey was the person who made all the major decisions on behalf of all the family and decides on the livelihood activities for the welfare of family members. From the study, it was established that 53.3% were fathers, while mothers accounted for 35%, guardians were 1.7% and older siblings were 10%. The older sibling interviewed were mainly sons who took on the roles of household heads in cases where the parents were not present.

Figure 4.1: Position of the respondent in the household



Source: Survey Data, 2014

4.3 Household Activities and Ease of Access to forest

4.3.1 Respondents Distance to the Forest

Forest utilization and the degree of forest dependency are highly determined by the households distance to forest (Sapkota and Oden, 2008). Distance to the forest has a major influence on how the forest communities access forest resources as well as their participation in forest conservation activities. According to Varughese and Ostrom, 2001, in many forest resource systems, users who live closer to the forest have a more secure and accessible supply of produce regardless of whether or not there are allocations rules in place. This implies that those households residing adjoining to the forest area collect more forest resources than those living far away from the forest. Families living close to the forest have the advantage of less

time required to reach a particular forest resource. Their links with forests are, therefore, expected to be high (Gunatilake, 1998).

The findings from Mau Forest indicate that 43.3% of the sampled respondents live less than 1KM from the forest. 42.5% of the respondents lived close to 1 to 2 kilometres and 5% of the sampled respondents lived within a three kilometres radius from the forest. The other sampled respondents who lived within 4 kilometres constitute 2.5%, while 6.7% lived within a radius of 5 kilometres respectively.

From the study findings on Mau forest, distance to the forest showed significant relationship with forest access and forest utilisation. Households residing close to the forest were more likely to depend on forest for their livelihoods and hence utilize higher amount of forest resources. On the other hand, households who join the forest association like Community Forest Association and other local organisations to benefit from accessing forest resources and are far from forests will have less impetus to participate because it would be more expensive for them to travel to the forests for such products and by extension may lack interest to be involved in forest conservation initiatives. Kerapeletswe and Lovett (2002) also found similar observation in Botswana and argued that the distance involves walking and carrying the harvest resulting in increasing difficulty in the collection and utilisation of forest resources.

Table 4.3 Respondents distance to the forest

Distance	Frequency	Percent (%)
Less than 1KM	52	43.3
1-2km	51	42.5
3km	6	5.0
4km	3	2.5
5km	8	6.7
Total	120	100.0

Source: Field Data, 2014

4.3.2 Respondents Ease of Access to Forest

Forest access was generated based on the distance to the forest. Close proximity to the forest has an influence over respondent's decision to access forest resources. From the respondents interviewed, 90% indicated that they access forest resources while the remaining 10% confirmed that they do not access the forest. Most of those who indicated that they could not access forest resources cited distance to the forest to be hindrance hence difficulty in utilising forest resources like firewood.

Table 4.4: Ease of Access to Forest

Respondents	Frequency	Percent
Yes	108	90.0
No	12	10.0
Total	120	100.0

Source: Field Data, 2014

4.3.3 Forest Products Accessed by Household

Out of 120 sampled households, most respondents confirmed having access to forest products. 66.6% of the respondents indicated that they only collect firewood from forest while 60.8% confirmed access to forest to collect fodder for animals and use the forest or forest fringe to graze their animals. 48% used the forest to access medicinal herbs while 16.6% use the forest to collect grass for thatching and roofing their houses. In addition, 4.1% of the sampled population confirmed using the forest to collect honey and the other 1.6% of the respondents used the forest as a source of timber wood and for employment purposes.

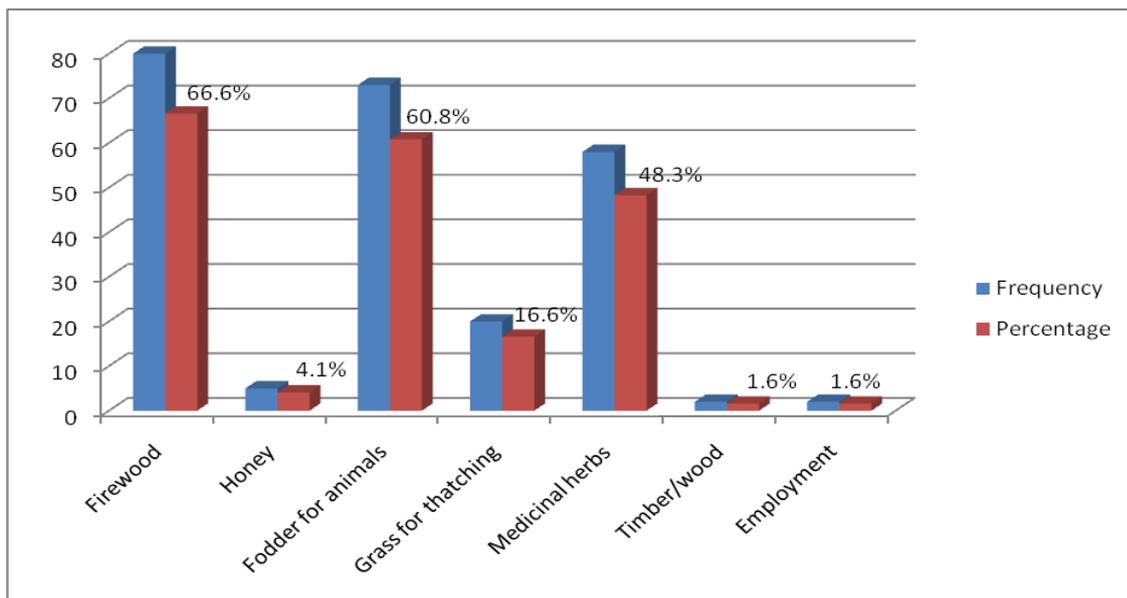
However, a key observation of this study is that fuelwood continues to be vital energy source for a disproportionate of poor forest households with the bulk of rural households in Mau forest using firewood as a domestic source of energy. Fuelwood has also been used for commercial purposes by the household. A survey done by Arnold et al. (2003) shows that its commercial role can also be significant. For example in Peri-Urban areas of sub-Saharan Africa, tens of thousands of poor farmers and small traders supplement their incomes by selling fuelwood. Sometimes this activity even becomes their main source of cash income.

Notably, this group also includes the poorest of the poor. For instance, many rural landless people are among those specialising in fuelwood production (Arnold et al. 2003).

Additionally, this study found out that inspite of the undeniable role of Non Timber Forest Products, timber is commercially the most important product in most forests. As much as non timber forest products tend to be the poor person’s lot, the benefits from timber often seem to be captured only by the rich. The fundamental characteristics of timber planting, harvesting and processing that proves to be anti-poor is that it requires capital, skills, land tenure, technology, production systems and time horizons that do not favour poor people (Angelsen and Wunder, 2003).

A small proportion of the study respondents at 1.6 percent confirmed having access to timber from the forest. When other household respondents were asked about accessing Timber from the forest, respondents confirmed that they are denied harvesting timber or wood from the forest yet they tend to the trees when farming. One of the Key Informant affirmed that harvesting of timber is done through competitive bidding and tendering and priority is given out to those with the capability to carry out the task. This has been perceived by the local households to eliminate them from accessing and selling the timber products since they do not have the capacity to bid or even hire the timber harvesting machines.

Figure 4.2: Products Accessed from Forest



Source: Field data, 2014

4.3.4 Frequency of accessing forest products

The results from data analysed on the frequency of accessing Mau forest, 43.3% of the respondents interviewed indicated that they collected the forest products daily, while 40.8% stated that they accessed the forest once a week and 7.5% of the sampled respondents collected forest products once a month. Only 0.8% of the respondents accessed the forest twice a month while 5.8% confirmed that they do not access forest resources at all. These findings show that the communities around the Mau largely depended on the forest for their livelihoods and survival. The decrease in frequency of accessing Mau forest by the local households is accrued to limited access to the forest and frequent changes in laws and regulations governing forest use.

Table 4.5 Frequency of Accessing Forest

Frequency of accessing forest	Frequency	Percent
Everyday	52	43.3
once a week	49	40.8
once a month	9	7.5
Twice a month	1	0.8
Not accessing	7	5.8
Total	120	100

Source: Field data, 2014

4.3.5 Household Sources of Income

Income is a crucial variable in the analysis of social welfare and as a key indicator of household wellbeing. Incomes provide the means to acquire goods and services for household wellbeing. Respondents reported deriving incomes from various sources, but the majority indicated they derive their incomes from trading off farm produce. Households around Mau forest are highly dependent on forest resources for subsistence foods and materials as well as for cash income. Households respondents confirmed to engage in some off-farm opportunities both formal and informal (self-employment). Formal off-farm opportunities include employment positions with organisations, private sector and government institutions. About 7.5% of the sampled households reported engaging in these off-farm activities.

In addition, 14.9% of household's respondents also confirmed that they are self-employed. Activities that were being considered under self-employment include; owning small businesses like kiosks, doing bicycle hire commonly known as 'boda boda', among others. The mainstay of the households in Mau forest is engaging in farming activities and thus 78% of the sampled respondents indicated to derive most of their livelihoods and income through subsistence farming. They cultivate their farms outside forests as well as forest farms set aside by the Kenya Forestry Service. The major crops grown are maize and beans mostly for domestic consumption and the surplus is sold.

The local communities depend highly on the neighbouring forest for fuelwood, timber, medicinal herbs, posts and poles and for grazing animals. An area within the forest has also been set aside for them to cultivate although they must pay duty fee and get license and permits from the Forest Department each year for the allocation of forest farms. Since their land sizes are small, most of the interviewed respondents confirmed that forest farming has greatly improved their livelihoods.

Table 4.6 Household sources of income

	Frequency	Percent
Employed	9	7.5
Farming	93	78
Self employed	18	14.9
Total	120	100.0

Source: Field data, 2014

4.3.6 Forest Products as a Source of Income

This study on Mau Forest observed that household respondents depended on the extraction or consumption of forest resources like firewood, fodder and other forest products. It was also found that the extracted amount of firewood, fodder and other forest products significantly varied between the distance to the forest, size of the land and forest access in Mau Forest.

The distance to the forest and access to the forest is one of the determinant factors of forest dependency among rural communities whose livelihoods are reliant on forest resources.

The forest fringe communities do not just collect these forest products for their own consumption but also for commercial sale, which fetch them some income. The income from sale of the forest products for households living in and around forest constitutes 40 to 60 per cent of their total income (Kumar *et al*, 2011). Forests are not only a source of subsistence income for millions of poor households but also provide employment to the poor in these forest areas. This makes forests an important contributor to the rural economy in the forested landscapes in the country. The widespread poverty and lack of other income generating opportunities often make these people resort to over-exploitation of forest resources.

Among the respondents who stated that forest products are a source of income, 68.3% confirmed that they used forest for income generation purposes, while on the other hand 31.7% of the sample respondents did not use forest as a source of income. Forest resources have been attractive for investment because they typically involve poor people living in relatively remote areas close to large area of Mau forest. The local households identify the forest products as important and investments are made with implicit or explicit objectives to improve livelihoods and/or encourage conservation. Therefore, the local household's decision to depend on forest products for income largely depends on household's income and other alternative sources of income for livelihoods.

Most households living near Mau forest do not have any other source of income hence the forest products present their main source of income. In a subsistence economy, poor households found in remote locations of Mau forest tend to have lower incomes than the local average people and they devote most of the available resources to producing food, maintaining shelter and security. With subsistence strategy, households tend to rely fully on forest products and the Non Timber forest Products (NTFPs) to provide cash income in otherwise subsistence oriented economies and use a larger number of other forest products in their overall economic portfolio. Moreover, the Forest Products produced by the households from the Mau forest tend to be lower-value products, and few household devotes only a small proportion of the produce for commercial purposes to complement other sources of income.

From the livelihood framework, households with little or no agricultural land, their main opportunities to improve their livelihoods is through collecting forest products which is an important supporting activity for such households. This is mainly because non-agricultural livelihoods are particularly vulnerable to seasonal fluctuations in demand. Changes in the entitlements or access conditions can vitally affect their livelihoods, as can changes in the condition of resources. Therefore, forest resources in Mau forests have played a key role in changing or in improving the livelihoods of the poor households through accessing the resources or “assets” they needed to make a living. They are able to engage in 'livelihood activities'.

These findings suggest that the Mau forest households are highly dependent on forest for their income to support their livelihoods and this is highly influenced by the household’s incomes. These findings are in consonance with Reddy and Chakravarty, 1999, who mentioned that the poor have less land and so are dependent on the forest for greater income.

Table 4.7 Forest Products as a Source of Income

	Frequency	Percent
Yes	82	68.3
No	38	31.7
Total	120	100.0

Source: field data, 2014

4.3.7 Forest Products Point of Sale

The study found out that the vast majority of forest products are consumed directly by the people that collect them, or are traded in small quantities. Some provide a regular part of households’ current consumption either through direct consumption or trade (subsistence function). From the respondents interviewed, 16.7% stated that forest products they harvest from forest farms are sold to local households or members of the community, while 52.5% of the surplus products are sold in the market. Only 1.14% of the sampled population uses middle men to sell their produce and some sell directly to the industries. Some studies done also asserts that other forest products are used infrequently, but can be critically important to fill gaps created by agricultural shortfalls due to droughts or pestilence, for example, to respond to other emergencies (Angelsen and Wunder, 2003; Neumann and Hirsch, 2000).

Many forest products are available as common-property resources in traditional systems or as de facto open-access resources, in state forest lands, for example. They can be harvested and used with little processing, using low cost (often traditional) technologies. Forest products have “a certain degree of no covariance with respect to agricultural output” (Cavendish, 1998). That is, some Non timber forest products are likely to be available for direct consumption or sale when crops fail due to drought or disease, or when shocks hit the household such as unemployment, death, or disease. Therefore, the need and opportunity combine to give Non Timber Forest Products (in a collective sense), an important role in the livelihoods of the rural poor. Such “safety net” functions can make a difference between life and death for local communities as observed during field work in this research study.

These results suggest that households within Mau forest do not impose strict profit maximizing behavior on rural households because their decision to commercially exploit local forest resources for cash income is generally to sustain their livelihoods. Consequently, households have established their own market in which to sell the forest products. Therefore, the need to have stable demand and supply functions is usually hindered by the institutional factors that impose constraints on the household production function such as the nature of the forest management regime which has hindered access of forest products and access to input and output markets. These have had a major impact on the livelihoods of the forest households who are highly dependent on these resources for livelihoods.

Table 4.8 Forest products Point of sale

	Frequency	Percent (%)	Percent of the cases (%)
Middle men/ brokers	1	0.8	1.14
households / Local members	20	16.7	22.9
Industries	1	0.8	1.14
Market	63	52.5	72.41
Total	87	72.5	97.59

4.3.8 Proportion of the Products Sold in the Market

The major forest products reported by households include firewood, poles, timber, honey, fodder for animals and medicinal plants. However, the highest total forest income came from farm products that are cultivated in the forest. In terms of relative income, firewood is the most important forest product for all households although it was more important to the lower income groups. Whereas products such as firewood and poles, which can often be obtained from dead and dying trees, are the most frequently used products by all income classes, timber appears to be more accessible by fewer and better off households. Production of timber and poles was mainly to generate cash income.

Findings in this study indicate that the proportion of firewood collected and sold by the household is approximately 105 kg firewood per week and the households also collected 65.7 kg fodder on a weekly basis from the forest, while the produce from farming activities carried out within the forest by households is approximately five sacks per harvest. The amount of honey collected per week is 3.99kg while timber harvesting stands at 4.9cf per year. From these study findings it indicates that there is high forest dependency among the population living near the forest.

Table 4.9 Proportion of the products sold in the market

Products	Quantity/week	Value per week	Per unit price
1. Firewood	105kg	525	Ksh. 5
2. Honey	3.99kg	119.7	Ksh. 30
3. Fodder for animals	65.7kg	328.5	Ksh. 5
4. Medicinal herbs	0.5kg	75	Ksh. 150
5. Farm Products	5 sacks per harvest	6000	ksh.1200
6. Timber/Wood	4.9cf/year	1960	Ksh.400
Total		Ksh. 9008.2	

Source: Field Data, 2014

4.4 Information on forest conservation and management

The action to protect and preserve biodiversity has increased and ultimately led to the establishment of many forms of protected areas, like forest reserves, national parks and game reserves (Adams and Hutton, 2007). Protection of forest through forest conservations and management was to reduce on degradation of forest ecosystem and hence forest conservation practice has been based on an assumption that people's actions harm the physical environment and leads to destruction of the ecosystem.

Given the livelihood linkage of forests in many developing countries, forest conservation imposes several direct and indirect costs. Fore instance, there was no consideration of local farmer's land use practices and natural resource management as a way of sustaining the environment (Chatty and Colchester, 2002, Hulme and Murphree, 2006). Focusing on the displacement, impoverishment and marginalisation that local rural people have experienced due to the establishment of protected areas, it promotes the view that displacement of local people is not the ultimate strategy to achieve biodiversity conservation (Brockington and Igoe, 2006; Schmidt-Soltau, 2003).

According to Turyahabwe et al. (2006) there has been a global trend to transfer forest management responsibilities from central governments and administrations to local governments. Some argue that this is a way to include local knowledge about the surrounding resource base and that monitoring can be easier to manage on a closer distance. For enhanced forest conservation and management, it should take into account both the rights and traditional knowledge of indigenous and local communities. Therefore, the main principle for achieving this balance in forest management is through effective participation of indigenous peoples and local stakeholders in decision-making and forest governance processes, on the basis of free and informed consent to any forest conservation practices and or changes that affect the communities' sustainable livelihoods and environment.

4.4.1 Impetus to Participate in Forest Management and Conservation

Apart from forest management aspects, people's perceptions of conservation issues are likely to be influenced by an array of socio-economic including the geophysical or the distance of household from the forest (Hill, 1998, Mehta and Kellert, 1998). This finding is consistent with previous studies which found that households living further away from forests will have less impetus to participate in forest activities because it would be more expensive for them to

engage in forests livelihoods activities. This is also seen to influence their positive attitudes towards conservation, mainly because they do not engage in any destructive activities in the forest (Shrestha and Alavalapati, 2006).

Households were sampled at 1 km, 2km, 3 km, 4 km, and 5 km distances from the forest and this was to capture the differences in benefits and costs and households perceptions towards livelihoods and conservation from forest. These forest benefits reduce as distance from the forest boundary increases from 1 km to 5 km. The results show that the forest has costs to households living around the forest, the costs are three-fold, For instance crop damage by wild animals, and livestock infections due to tick -and tsetse fly-borne diseases from the forest.

From the study, 80.8% of the respondents lived at approximately 1km from the forest, and these respondents confirmed that they have a very close interaction with the forest. Most of the respondents interviewed had mixed reactions towards conservation of forest, and they asserted that forest conservation and management which is implemented by the Kenya Forest Service has limited their resource access. Another 8.3% lived within the 2km radius while 7.5% were within 3 km to 4km radius while 3.3% lived more than 5km of the forests.

Distance from forest had a negative influence on people’s perception of ‘involvement in decision-making’ and ‘conservation incentives’. This finding is line with past studies on forest ecology because with increasing distance from the forest, people are likely to have increasingly less interaction with forest management.

Table 4.10 Distance to the boundaries of the forest and incentive to manage forests

	Frequency	Percent
1KM	97	80.8
2KM	10	8.3
3KM-4km	9	7.5
More 5KM	4	3.3
Total	120	100.0

Source: Field Data, 2014

4.4.2 Forest Access and Utilisation of Forest Resources

Access is described as the right to enter and to use common-pool resources such as forests (Grima and Berkes, 1989; Schlager and Ostrom; Baumann, 2002). Resource access is influenced by physical as well as social factors. Physical access implies accessibility in terms of proximity to the resource. An individual having physical access to the forest may not necessarily have social access. The notion of ability is required to understand access of the poor to the forest because it takes into account the social relationships, including individuals influence and social position within particular sets of social relationships (Sen, 1993; Johnson, 2004).

From the study, community households including both poor and well-off households have different positions in social relationships and as a result they have different access to the forest resources. From the households sampled, 85% of the population confirmed that they were able to access forest resources, while 15% of the sampled households could not access forest. Adhikari *et al.* (2004) concludes that poor people have more restricted access to products from community forests than well off households. Poor households may be fully dependent upon the forest for their livelihood needs but utilise low quantities of forest products or no access at all to forest products such as Timber.

Conservation of Mau forest has restricted access to forest resources. This has been contributed by displacement and eviction of the households who have been encroaching on forest and changes in regulations and rules governing forest access. The population who are mostly affected are the poor and rural households and this has led to marginalization and disempowerment which would complicate the pursuit of sustainable livelihoods.

Table 4.11 Forest access and utilisation of resources

	Frequency	Percent
Yes	102	85.0
No	18	15
Not applicable	120	100.00

Source: Field data, 2014

4.4.3 Households allowed to access forest resources

These results indicate that households living adjacent to the Mau forest depend on the forest for their livelihoods in one form or another. The findings indicated that in the forest zones, benefits exceed costs and result in net positive benefits. The findings are in line with previous studies; for example, Suda (1992) and Emerton (1993), who found that forest-adjacent communities within the 5 km buffer zone depend on the forest for their livelihoods. The results are also in line with Wass (1995) whose studies showed that forests support a wide range of direct uses, including timber and non-timber forest products as well as non-consumptive services, which benefit the local, national, and global population.

Despite these major contributions of the forest to the community livelihoods, there are rights which influence the household's access to forest resources. According to Ostrom, (1986), these rights determine who has access to the resource, who is excluded from using the resource, how the resource should be used, and whether or not these rights can be transferred. Under a state property right, ownership and management control of resource are held by the state. Under a common property rights, access is limited to a specific group of resource users who hold their rights in common(Ostrom,1986), while under open access, resource use rights are neither exclusive nor transferable and these rights are owned in common but are open to everyone(Grima and Berkes, 1989). Many forests resources are managed under state property rights by law but a part of such resources is managed either under de facto that is in practice or customary. Common property rights theory emphasises the importance of common property right for successful governance of a common-pool resource (Ostrom, 1990)

A study done by Berkes, (2004) and Fisher et al. (2004) confirms that the poor often cannot improve their access to the resource governed under common property rights. Consequently, access to forest resources in Mau forest is based on the rights that have been issued to households who live adjacent to forest resources and they have close interaction with the forest. The Households sampled during the study asserts that they are not allowed to access forest resources unless they are members of forest associations, community based organisations or forest user groups who are headed by umbrella organisation Community Forest Associations which is managed by Kenya forest Service. The study established some of the main organisation which has been formed and implemented among the households to help in educating households on the importance of the forest conservation to reduce pressure on forest resources. Among the organisations involved in forest conservation activities

include; LEKAFKA which stands for Lesot Kabianga Farmers and Kamwangi. Other organisations which were formed are the Nyakinyua Associations and Kamara Associations. From these organisations members are issued with Licenses and Tickets which give those rights to access forest and utilize forest resources. These licenses are valid for 3months, 6 months or 1 year and they are issued based on the utilisations forests products and activities they engage in at the forest e.g. Farming. Hence, 1 year license are given out mostly to households who have been allocated lands to farm within the forest. Licenses and Tickets issued either for 3 months or 6 months gives the households rights and permission to harvest other forest products except Timber harvesting. Joining any of these organisations requires each member to pay a standard fee.

These organisations have helped to bolster good relationships between the Kenya forest service and individual households. One of the Key Informant affirmed that these organisations were formed to increase their influence in making decisions with regards to forest utilizations and forest conservation. He asserts that that despite their effort to be involved in decision making, most of the time the community looses and this is due to the fact that government implement rules which runs parallel to community needs and does not consider or integrate the local decisions and livelihoods requirements.

Literature argues that households participate in CFAs because of perceived benefits (Ongugo et al., 2007), distance to the forest and the forest management agency are likely to influence participation. Households that are close to the forest are more likely to participate because they stand to gain more as they incur lower costs to access the forest. This is reasonable because if households join Community Forest Association(CFA) to benefit from extraction of forest products, households will have impetus to participate because it would be more expensive for them to seek forest access and rights as individuals as compared as a group.

4.4.4. Difficulties Experienced Accessing and Utilizing Forest Products

Many local communities have been experiencing difficulties in accessing forest livelihoods yet these ‘common’ resources have been shown to be ‘safety nets’ especially in reducing the impact of poverty (Adhikari et al., 2004). The value local people attach to forest conservation and also their support for forest conservation objectives would be largely dependent on the balance between forest benefits and forest costs to forest-adjacent households. But despite these benefits, the costs exceed benefits and result in losses and difficulties in trying to access

and get the forest products to the local people. These findings are supported by past studies, especially by the Kenya Forests Management Programme (1994), whose findings indicate that indigenous forests incur a range of costs which includes the direct costs of management as well as non-management costs incurred by local people due to the existence of forests.

Rules of access for the forest products within Mau forest have been prohibitive. From the study on Mau Forest, respondents interviewed within the Kamwangi and Kabianga villages who live adjacent to the forest, shows that the perception of the rules governing access to forest resources coincide. The sentiment expressed by most of the respondents was that the rules are not stated and the mechanisms in place are highly prohibitive and at times they are violent. This lack of awareness is attributed to lack of involvement in decision making with regards to forest conservation and management and the government.

Respondents also indicated that lack of awareness of the rules that govern forest utilisation is due to presence of numerous rules governing use of trees around their fields and their homesteads. These overlapping natures of rules and regulations within the forest have led to poor coordination which has had adverse impacts on the utilisation of forest for sustainable livelihoods. Some Key informants reported that the rules and regulations that have been implemented do not take into consideration the livelihoods of the adjacent community. One key informant asserts that the rules keep changing and community members are never involved in the design neither informed in decision making. The local households do not have any rights to claim ownership to forest use in order to sustain their livelihoods.

Respondents further confirmed that difficulty in getting the forest permits and license has been a major hindrance to forest access. They complain about difficulties in getting tickets which allows them to access forest resources despite being part of the forest organisations. This difficulty in getting the permits has been due to Kenya Forest Service controlling the number of households who access forest at any given time. For instance, the allocation of farms within the forest is only for few individuals who cultivate for a certain period and then it's closed for the rejuvenation of trees. One of the Key Informant, who heads the conservancy of Mau, defends the limited allocation of permits and Tickets as a way to ensure sustainable livelihoods among the locals, while at the same ensuring there is consistent forest conservation. He further asserts that permits or license system would conserve forests by restricting forest use to permit holders.

Patterns of use differ among groups or households and within households by gender and age. Forest foods and forest products income can be particularly important for poorer groups within the community (Siebert and Belsky, 1985; Fernandes and Menon, 1987; Jodha, 1990; Gunatilake et al., 1993; Cavendish, 2000). But the poor may not have access to the skills, technology or capital necessary to be able to benefit from the opportunities presented by growing markets for NTFPs. As a consequence, control over these opportunities and the resource, are often progressively captured by the wealthier and more powerful, and the households with the most labour, at the expense of the poorer within the community. Market forces can in this way create pressures on local collective systems of control over forest resources used as common property that can contribute to their breakdown, leading to open access and uncontrolled and often destructive use of the resource (McElwee, 1994).

The study further sought to identify if the household were well informed about any major changes that have been put in place in relation to management of forest. 71.7% of the respondents who were interviewed confirmed that they are aware of the changes that are implemented in the management of forest. About 28.3% of the sampled households stated that they were not aware of any changes that have been implemented. Many respondents pointed out lack of reliable information about the role of forestry and its contribution both to people's livelihoods and in the macro-economy.

Table 4.12 Households are informed on changes in forest management

	Frequency	Percent
Yes	86	71.7
No	34	28.3
Total	120	100.0

Source: Field data, 2014

4.4.5 Communications of the Forest Changes and Information to Households

The respondents were also required to state how they were informed about the changes in forest conservation and management. From the respondents interviewed, 19.79% indicated that they are informed about the changes directly through Kenya wildlife Service and forest department. 2% indicated that they get the information from local chairman and media.

19.79% stated that they are mostly informed by the elders while the highest percentage at 56.25% affirmed that they are informed about the changes through Barazas.

Table 4.13 Communications of Forest Changes to Households

Ways of communications	Frequency	Percent	Percent of cases (%)
Directly from the KWS and Forest Department	19	15.8	19.79
From the Local Chairman	2	1.7	2.08
Elders	19	15.8	19.79
Media	2	1.7	2.08
Barazas	54	45	56.25
Total	96	80	100

Source: Field Data, 2014

4.4.6 Participation in Forest Management and Conservation

The World Bank forest strategy, for example, clearly states that “the sustainable use of forests requires the participation of all rural populations, including women” (World Bank, 2002). Participation in forest conservation has been influenced by the development narrative of continuous degradation of natural resources while overlooking local traditional uses and giving priority to conservation over the participation of local groups. The participatory agenda was set externally in a top-down way which mainly attempted to reverse a presumed open access situation (ibid).

From the study, household respondents understand participation as involvement in collective activities to benefit their community. It entails active participation in various stages of meetings and decision-making which they consider their contribution to be important and thus has an influence on their attitude towards forest which will promote conservation. Only 23.3% of the respondents interviewed confirmed that they are involved in forest management and conservation. 69.2% acknowledged that forest dependent communities are involved in the management on few cases or occasionally while 7.5% of the household asserts that they are never involved in forest management and conservation initiatives.

One of the Key informant acknowledged that the level of participation of forest dependent communities in the institutionalisations of the forest does not have as much influence on change, leaving the local people with low levels of participation and minimally enhanced benefits in the process. Local level organizations, despite their mandate to organize collective action and manage common goods, they have no prior experience in natural resource management (common property management) and they are often discredited by the government.

Thus the efforts to promote conservation are not supported with the necessary commitment and enthusiasm from the local people and are even met with resistance that ended with little outcome to show for the enormous investments made (ibid). This is also consistent with Admassie (2000) who indicated that the lack of appropriate local level institutions and the ineffective mode of the participation process that failed to implement successful community based natural resource management.

Table 4.14 Household’s involvement in Forest Management and Conservation

Statements	Frequency	Percent%
In most cases the forest dependent communities are involved in forest management and conservation.	28	23.3
In only a few cases are forest dependent communities involved in forest management and conservation	83	69.2
Forest dependent communities are never involved in forest management and conservation	9	7.5
Total	120	100.0

Source: Field data, 2014

The study further sought to determine if the local communities are knowledgeable about formal rules regarding ownership, access, and use of forest land. In decision-making processes, information plays an important role, but information perspectives differ across the users with different social status defined by caste and ethnicity, economic class, gender, education and access to resources. According to Banjade, Schanz, and leeuw, 2006, discourses of information in the Forest User Groups were linked to the community forestry aspects including the Forest policies that is information about general policies influencing,

determining and supporting forest management of the Community Forest User Group(CFUG) or its organization; information about actual availability (access, use right and harvest ability) of forest products in the forests and the information about the quality and quantity of the forest resource, such as standing stock, growth or other resource monitoring and inventory information.

Most of the households interviewed 83.3% confirmed that only few local communities are well informed about the rules regarding formal ownership and access of forest resources while 9.1% agreed that there are no local communities who are well informed about the formal rules on ownership and access of forest resources. Only 7.5% of the sampled respondents acknowledged that most of the rural households who live adjacent to forest have knowledge on the formal ownership and access of the forest. Most respondents generally emphasized that lack of awareness in the formal rules on ownership, access and use of forest resources is mostly influenced by the people who have high position like politicians or influential people in the society as well as the educated.

This they say is because they have better chances of participating in informative activities for example Community Forestry Associations (CFA) meetings and Kenya Forestry service (KFS) meetings where they discuss about forest issues, yet these same people who represent them do not have the proper channels to engage with local level households and pass the information which will benefit them. For instance, some respondents complained that they have never succeeded in trying to get the license which will allow them to cultivate the forest land for certain period. Head of Mau conservancy who was also one of the Key informant added that they have a programme where those who hold positions or have influence are taken to attend meetings and training programmes on forest access and use with the believe that such information will be passed down to the local forest users. He says local users are encouraged to attend the user group's forums where such issues are discussed. These differences in information dynamics which is connected to forest use and conservation has led to conflicting perceptions and divergent interests among the forest users.

Table 4.15 Knowledgeable about formal rules regarding ownership, access, and use of forest land

Statements	Frequency	Percent
Most local communities are well informed about these.	9	7.5
Only a few local communities are well informed about these.	100	83.3
No local communities are well informed about these	11	9.1
Total	120	100.0

Source: Field data, 2014

4.4.7 Secure access to forest resources

Access is described as the right to enter and to use common pool resources such as forest (Grima and Berkes, 1989; Schlager and Ostrom, 1992; Baumann, 2002). Legal access of forest resource has had significant influence on the way a resource is governed with respect to access of the poor to the resource. Most resources are managed under the property rights which include state, private, common and open access (Bromley, 2001). These rights determine who has access to the resource, who are excluded from using the resource, how the resource should be used and whether or not these rights can be transferred (Ostrom, 1986).

Although theory differentiate these property rights, in reality many resources for instance Mau Forest are held in overlapping and sometimes conflicting combinations of these arrangements (McKean, 2000; Meinzen-Dick *et al.*, 2001). From the theory on common property rights, it emphasizes on the importance of a common property right for successful governance of a common pool resource (Ostrom, 1990). However, other studies report that the poor often cannot improve their access to the resource governed under common property rights (Adhikari, 2002; Shackleton *et al.*, 2002; Berkes, 2004).

Mau forest is managed and governed by the state property rights by law and thus the authorised users have been allowed to enter and use the resource with no rights to manage or exclude others. From the findings, 95.8% of the sampled respondents affirmed that they forest dependent communities have no legal access to necessary forest resources while 4.2% of the respondents confirmed that there are only few forest dependent communities who have legal access to the forest resources. Most respondents interviewed confirmed that the access

given is to allow them utilise low quantities of products such firewood, fodder and medicinal herbs etc. On the contrary the influential or well off people are able to obtain more forest products including Timber harvesting.

These findings were further confirmed by some key informants in whom one of them reported that

“.....reported that legal access to some forest resources like Timber is through competitive bidding and tendering and those who are capable to carry out these activities are given priority...”

Most respondents also conveyed dissatisfaction in how legal accesses are distributed among the forest users. One of the major issues they experienced is that despite the legal access they are given to access forest farms and cultivate, they are still given several conditions and requirements. For instance they are required to carry out Agroforestry activities that allows them to plant trees between their crops and tend to this trees and until they are fully grown but on the contrary they have never benefited from these trees. This is because Timber harvesting is auctioned out to few individuals who are powerful and have resources to carry out the harvesting. Respondents feel that this is given out to few individuals because of the high value it has when sold out in the market or industries. This is usually allocated to few individuals who have the resources to manipulate the process.

The findings is consistent with the study by Amanor (2004), notes that the past and existing formal rules in the forestry sector do not provide an acceptable framework for equitable sharing of forest resources and the benefits that they provide nor do they intend to sustain resources in the off-reserve area. Rather, they enable and justify the appropriation of the benefits of forestry to a narrow sector of society; to the rich, powerful and politically well-connected, which usually include timber companies, forest officers, politicians and some traditional authorities, but exclude the farmer and tenants from benefiting from the off-reserve area.

Table 4.16 Secure Access to Forest Resources

Statements	Frequency	Percent
All forest dependent communities have legal access (licenses, free issues) to necessary forest resources, and their rights are respected.	0	0
All forest dependent communities have legal access (licenses, free issues) to necessary forest resources, but rights are not fully respected.	0	0
Some forest dependent communities have legal access to necessary forest resources.	5	4.2
No forest dependent communities have legal access to necessary forest resources.	115	95.8
Total	120	100.0

Source: Field data, 2014

4.4.8 Organizations Managing Mau Forest

Mau forest is a state owned forest and it's managed by Kenya forest service. The Ecosystem Conservator Officer and Head of Kenya Forest Service explained that there is a memorandum of understanding which was signed by the government and forest department which guides the management of the forest. Forest Act, 2005 is also used as a framework to guide the forest management and conservation plans within the forest. This framework has also been used by the forest department to manage the local communities involvement in forest conservation and also used as a guide to management agreements to carry out joint forest management activities among the various organisations and forest user groups

Most respondents confirmed that Kenya forest service has been instrumental in decision making and conservation of Mau Forest. Kenya forest service conducts patrols across the forest on daily basis. This frequent monitoring and control of forest access is meant to reduce encroachment of forests and it is believed to reduce forest destructions by more than 50%. Respondents interviewed confirmed that the Forest wardens are very strict and people found without permits accessing the forest are arrested. Some respondents asserted that the forest departments are very keen to define the forest boundaries to ensure that there are no land conflicts with the locals.

The respondents think that there are numerous organizations involved in the forests management. They mentioned several organisations including Community Based Organisations and Non Governmental Organisations which they thought were involved in decision making as well as management of forest.

Table 4.17 Organizations households mentioned to be involved in Forest Management

	Frequency	Percent
Kenya forest Service	70	58.3
Friends of Mau CBO	10	8.3
LEKEFAKA CBO	25	20.8
Others	10	8.3
Don't Know	5	4.1
Total	120	100

Source: Field Data, 2014

The aforementioned organizations work closely with local communities. They help to mobilize the local communities to participate in forest conservations and management activities. These organizations works with the forest department to sensitize the forest dependent communities on the importance of the forest conservations while at the same time tries to promote the livelihoods of forest users.

More than half of the household respondents interviewed that is around 58.3% confirmed that they are aware of the Kenya forest service which has been managing the Mau forest. 20.8% of the respondents mentioned that they know the LEKEFAKA which is a local CBO working with KFS. 8.3% of the respondents also mentioned that they are aware of the Friends of Mau which is a Community Based Organisations (CBO). 8.3% mentioned other organizations which have been working as a forest User groups among the local communities, for example Nyakinyua and Kamara. 4.1% mentioned that they were not aware of any organisations working within the forest management.

The study further sought to identify if the respondents interviewed were members of this organizations. 70% of the respondents interviewed confirmed that they are members in one of the community based organisations, while 30% have never joined any of the organisations.

On further probing to identify some of the reasons they cited that they have no information on forest conservations and some indicated that they lack time to participate in the organisation.

Table 4.18 Members of Organisation

	Frequency	Percent	Percent of cases
Yes	84	70	73
No	31	25.8	27
Total	115	5.8	100

Source: Field data, 2014

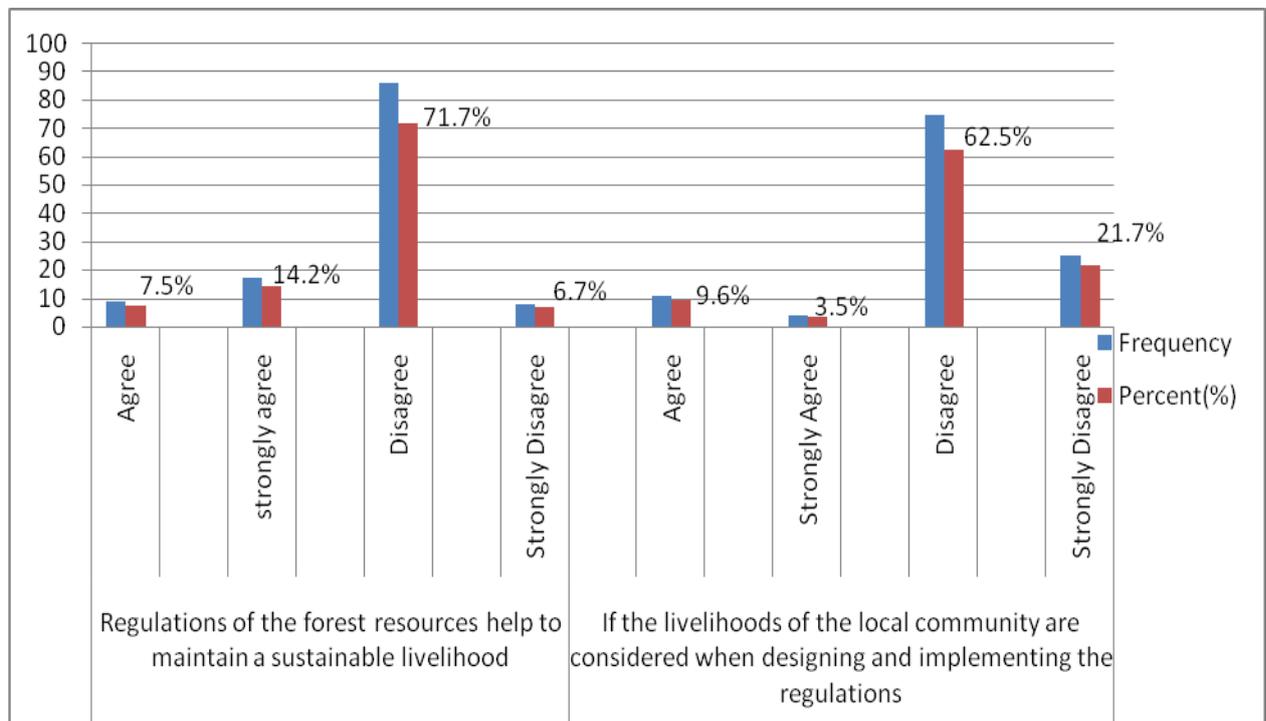
4.5 Struggles and Divergences of Forest Livelihoods and Forest Conservation

Government policies often assert state control over the forest resource, or over-ride local rights, thereby undermining the authority and effectiveness of community level institutions to control and manage forest use. Government policies can also constrain local efforts to realise more of the potential that Non Timber Forest Products can contribute to household livelihoods. Because they give high priority to conservation objectives, many governments have set in place forest and environmental policies and regulations designed to limit rather than encourage production and sale of Non Timber Forest Products (Deweese and Scherr, 1995).

Restrictions placed on forest use in order to protect forests and promote sustainable forest management, can impose costs on local people which reduce their incentive to become involved. Allowable harvests may be reduced, and the structure of benefits changed as the composition of the forest changes under management. From this study on Mau Forest, the respondents sampled from the study to determine if the regulations of the forest resources help to maintain a sustainable livelihood highlighted how these regulations have had an influence on the livelihoods of the forest users. The highest percentage 71.7% of the respondents disagreed that the regulations that have been implemented within the Mau forest have helped to sustain the livelihoods while 6.7% of the sampled respondents strongly disagreed on the statements that the regulations have helped to sustained their livelihoods. Among those who agreed on this statement were 14.2% of the sampled respondents while 7.5% just agreed.

To further assess the influence of the regulations on the community’s livelihoods, the respondents were asked if their livelihoods needs were considered when designing and implementing the regulations. 62.5% of the respondents disagreed and confirmed that they have never been involved in decision making and the rules and regulations that are designed by government are punitive while 9.6% of the sample respondents agreed that they have been involved in designing the regulations for forest conservation. One of the respondent interviewed asserts that despite their involvement in forest conservation, most of the regulations and laws that are implemented at the local level do not involve the local users neither are they aware on how they are designed. He adds that they are only informed by the Kenya forest services on the changes that have been made.

Figure 4.3 Struggles and Divergences of Forest Livelihoods and Forest Conservation



Source: Field Data, 2014

4.5.1 Effects of forest conservation and management of the forest to the local people living in the forest

Forest conservation and management has been implemented through development and enforcement of coherent national forest programmes, reforming forestry laws, fiscal regimes and policies. The main concerns behind the forest law and policies enforcement have been to curb forest loss and to promote forest management. Although it is anticipated that better

governance, increased rent capture by the state and improved forest management can benefit all the poor indirectly, the direct impacts of illegal logging and forest law enforcement on rural livelihoods have not been a priority consideration to date. For instance, the projects implemented for illegal logging with an overarching goal to ‘realise the potential of forests to reduce poverty’ and main goal of achieving ‘policies, processes and institutions that promote sustainable and equitable use of forests in the interests of the poor’, in its inception paid little attention to rural livelihoods.

From the respondents sampled, all respondents confirmed that the forest conservation have had a transitional adverse impact on their livelihood, some said they have had to cut back or give up earlier gathering or grazing activities while some have stopped accessing forest resources completely. In addition, most households respondents interviewed confirmed that Forest conservation came up with various changes which have had a major influence in their lives. 18.3% of the sampled respondents confirmed that forest conservation through changes of regulations has led to evictions and displacements of some of the household from the forest due to encroachments. Peasant farmers and smallholders in the Mau forest lack secure rights in lands and forests under state control. Tenurial insecurity is especially great and hence heavy competition over valuable resources has contributed to endemic conflicts.

Access and utilization of forest resources bestows society a sense of empowerment since products obtained play a crucial role in the sustenance of livelihoods (Lechapelle et al., 2004). According to the households respondents interviewed, enforcement of the rules restricting collection of forest resources for a long period affects their livelihoods. 51.7% of the sampled respondents affirmed that forest conservation has led to controlled access to forest resources while 20.8% acknowledged that forest management has led to changes in rules and regulations which affect forest use. This is because forest conservation and management tend to adopt a narrow approach to legality and enforcement, which could have negative impacts on forest conservation, livelihoods and rights of the forest users within Mau forest. Their approach assumes that if current legal frameworks are enforced forests will be managed sustainably and equitably. The current practice of forest management arrangement often involves giving access to specific forest groups with user rights to specific forest resources on a very limited amount time without due regard to the amount and value of forest benefits actually available to member households, particularly the needs of the most dependent poor households.

On the one hand, 8.3% of the sampled respondents acknowledged that through forest conservation it has led to improvement in forest livelihoods. This is because the respondents acknowledged that through conservation and protection of forest by the government through Kenya Forest department, they are allocated forest farms which they can farm and earn income through sale of the farm products. This means that regardless of forest dependence and less dependence on forest income with better performance indicates that households value and are willing to protect and manage the forest within the current user right arrangement. On the other hand, however, it may indicate the need to take into account differences among local people in their dependence and the values attached to the forest by different groups.

These findings highlight challenges facing implementation of complete prohibition of community access to the forest for resource extraction. It also confirms assertions by Lawrence (2003) that complete prohibition of forest products harvest could be counterproductive since these products sustain livelihoods and neighbouring communities may resort to unsustainable means to obtain them.

These findings are also consistent with study by (Kaimowitz, 2003), who concluded that there are grounds for concern that forest law enforcement initiatives are failing to take account of the rights and interests of forest-dependent communities and so could negatively affect rural livelihoods. This is because existing laws often limit or prohibit ownership, access to and use of forest resources by indigenous peoples and local communities, and much of illegal forest resource exploitation is actually carried out by, or with the connivance of, politicians and government agents. They empower these officials and give them more resources which make it easier for them to act with impunity and further marginalise poor people who depend on forest for their livelihoods.

Table 4.19 forest conservation and management of the forest to the local people living in the forest

	Number of responses(N)	Percent of cases (%)
Eviction from the forest	22	18.3
Reduced access to forest resources	62	51.7
Changes in forest rules and regulations	25	20.8
Improved livelihood	10	8.3
lack of information	1	0.83
Total	120	100

Source: Field Data, 2014

4.5.2 Conflicts in Forest Conservation and Forest Utilization

Conflicts in forest management are inevitable due to the multiple-function and multiple-uses and the nature of forests, as a result of which there is a wide array of stakeholders with varying and sometimes conflicting interests in the forest. These conflicts are diverse, but usually involve the problem of control, access and power of the actors (Marfo, 2006).

Natural resource conflicts arise from competing claims over a single resource, overlapping and nested claims, conflicting sources of legitimacy and negotiations over the meaning of the resources (Dietz, 1996). Forest conflicts are inevitable as long as there are competing rights, claims, interests, values and power struggles that are enmeshed in complex institutions and multiple legal systems of land tenureship (Marfo, 2006). Forest conflicts arise when decision rights are ambiguously defined (Schmid, 1995).

Government formal rules and regulations and informal customary rules have contributed to the causes of forest conflicts. From the study on Mau forest, 40.8% of the respondents interviewed acknowledged that conflicts frequently interfere with forest use, 28.3% affirmed that due to conflicts it is impossible for the government to enforce laws and control forest management. 18.3% confirmed that serious conflicts occur and occasionally interfere with forest use and the remaining 12.5% confirmed that conflicts between the state and stakeholders do not interfere with forest use. As a result of these conflicts, poor households

who are dependent on forest lose their access to forest resources and are unable to protect user rights and hence they will not be able to obtain benefits from the forests.

Table 4.20 Conflicts in forest conservation and forest utilization

	Frequency	Percent (%)
Conflicts between the state and stakeholders are not serious and rarely interfere with forest use	15	12.5
Serious conflicts occur and occasionally interfere with forest use	22	18.3
Conflicts frequently interfere with forest use	49	40.8
Conflicts make it impossible for the government to enforce laws and control forest management	34	28.3
Total	120	100.0

Source: Field Data, 2014

The study further sought to determine if there were any serious conflicts between communities and user groups. About 20.8% sampled respondents indicated that there are no serious conflicts between communities and users, while 22.5% of the sampled respondents indicated that there are chronic conflicts but it does not interfere with forest management or use. 29.1% of the sampled respondents confirmed that conflicts are making some forests difficult to manage or use while only 27.5% of the respondents stated that conflicts are making some forest impossible to manage and leading to unsustainable uses.

The impact of these forest conflicts has led to struggles within the Mau forest in an effort to converge the forest conservation and sustainability of livelihoods. These forest conflicts arise when the interests of the communities and forest users are not put into consideration by the government when deigning their policies and regulations. Forest conflicts at the community level has had a direct effect on forest conservation by providing challenges to sustainable forest management as well as adverse effects on the daily activities of the forest fringe communities.

Table 4.21 Conflicts between different communities and user groups in the context of forest access and use

	Frequency	Percent (%)
There are no serious conflicts between communities and users.	25	20.8
There are chronic conflicts, but they do not interfere with forest management or use	27	22.5
Conflicts are making some forests difficult to manage or use	35	29.1
Conflicts are making some forests impossible to manage, and leading to clearly unsustainable uses	33	27.5
Total	120	100.0

Source: Field Data, 2014

4.5.3 Conflict Resolution

The respondents were also required to indicate if the conflicts over forest resource use and management tend to persist or do they get resolved. 32.5% indicated that the conflicts tend to be resolved quickly, while 50.8% stated that the resolution of conflicts is variable that is some are resolved efficiently while others persist. 9.2% stated that the conflicts get resolved by themselves slowly and imperfectly and the remaining 7.5% indicated that conflicts tend to persist indefinitely.

Table 4.22 Conflicts resolution over forest resource use and management

	Frequency	Percent
Conflicts tend to be resolved quickly and efficiently.	39	32.5
The resolution of conflicts is variable: some are resolved efficiently while others persist.	61	50.8
Conflicts get resolved (or resolve by themselves) slowly, imperfectly, or at great expense.	11	9.2
Conflicts tend to persist indefinitely	9	7.5
Total	120	100.0

Source: Field data, 2014

4.5.4 Forms of Resolving Conflicts

Table 4.23 Forms of Resolving Conflicts

	Frequency	Percent
There are informal ways that are socially acceptable and widely used	41	34.1
Informal ways are not used at all.	13	10.8
Formal ways eg courts are used	24	20
Both formal and informal ways are used	52	43.3
Total	120	100.0

Source: Field Data, 2014

According to Ostrom (1990), formal and informal resource access and management rules have been found critical to inducing collective action and enforcement regulations in resource management. The restriction of forest fringe communities was based on access and hence forests are managed under overlapping formal and informal frameworks. The former are derived from the sovereign right of the state to regulate the management of state forests and the latter are locally-based management systems that may have developed over many generations. The outcome is contesting claims over forest tenure that can result in conflict and depletion of the forest resource (Andy, 2006).

From this study on Mau Forests, 34.1% of the respondents interviewed, indicated that conflicts are resolved through socially acceptable informal ways while 10.8% of the sampled households asserts that informal ways are not used at all. 20% of the respondents confirmed that only formal ways eg courts are used and 43.3% indicated both formal and informal ways are used.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of findings, draws conclusions from the findings, and gives policy recommendations, and suggestions for further research. The study sought to find out the struggle between livelihoods and forest conservation in forest management. The ultimate goal of forest conservation is protect the forest ecosystem and ensure that there is sustainable forest management but contrary to this, little effort has been made to integrate the livelihoods of adjacent communities who depend on forests.

5.2 Summary of Key Findings

The study established that households living adjacent to Mau Forest depended highly on forest resources for their livelihoods. Most households acknowledged that forest resources are beneficial and add value to their lives because they are able to compensate for the resources they lack. Local people extract different types of products from the forest such as fuel wood and thatch grass; domesticated animals are also allowed to graze inside the forest. Local households are able to farm within Mau forest, where they are allocated farms and allowed to cultivate thus improving on their livelihoods. Even though employment in some cases has been promoted as a benefit from Mau forest; this has not been the reality to the majority of the households.

Household characteristics and factors such as proximity to the forests, position of the respondents in the households and landholding sizes shows both a positive and significant relationship with utilization of forest resources in Mau forest. For instance, land holding size and level of income is a crucial socio-economic determinant for harvesting fuel-wood and other forest resources. These characteristics have had an influence on the degree of reliance on forest products by the households and their ability to invest in the resources needed to extend their collection of forest products. Moreover, these forest resources have been a source of basic needs for a household that helped in sustaining their livelihoods, and hence cannot be easily substituted.

Mau forests have been destroyed to varying degrees through various forest use and conversion. In addition, forest utilization has done little to develop rural households or

improve the livelihoods of people living in and near forests. This has been mainly due to overwhelming problems of unclear land tenure and local communities' lack of participation or involvement in the management and use of forest resources.

Despite the extensive resources that Mau forest provides, the local households still complain of minimal benefits that they derive from the forest. For instance utilization of forests by timber and plantation companies has not brought benefits for local communities. This is because timber which is considered to be of higher value is captured by the elite. Even though some community members earn money working for the timber companies, generally they are only "silent watchers" to the companies' logging and conversion activities in their traditional forests.

The study further established that forest rules and regulations which include formal and informal rules have resulted in several conflicts among the forest users and government in Mau forest. The domination of government in designing and implementing the rules and regulations that govern access and forest use has infringed on the sustainable livelihoods of the forest households. These conflicts have been associated with the government implementing rules and regulations without involving the local forest users. In addition, the governance of the forest through the formal rules at the expense of the informal rules and or the informal institution have created a powerful interest in forest resource management by few powerful and influential individuals or a small sector in the society and thus initiated a struggle for power and resource use among the forest households and local users as well as the government.

Majority of households dependent on forest do not have secure access to the forest resources. This has led to a huge struggle among the forest users on their ability to have a secure access to the forest which in turn has exacerbated conflicts among the forest users as well as the government. Having legal forest access and rights to forest resources enables the forest dependent households to be able to utilize the resources and sustain their livelihoods. Contrary to this, local forest users in Mau forest do not have secure access; neither do they have legal rights to utilize resources. Most households confirmed that they need to apply for permits and licenses to access forest to which they have to pay and sometimes it takes long to process or such applications or requests gets rejected.

Although access to these resources are vital in promoting sustainable livelihoods for the forest fringe communities, most policies and rules designed and enforced by government do not have much consideration on the role and rights to secure access and benefits of the poor and marginalised local users. These narrow approach on having secure access and legal rights of forest resources in Mau forest justifies the appropriation of the benefits of forestry to a narrow sector of society: to the rich, powerful and politically well-connected, which usually include timber companies, forest officers, politicians and some traditional authorities, but exclude the forest fringe communities from benefiting and sustaining their livelihoods.

Government's legal measures and formal institutions have influenced the issue of access rights and benefits to forest resources in Mau forests yet their implementation procedures do not take into account the needs of the local households. This has had a far reaching implication on the level of participation of forest dependent households in the institutionalisation of Mau forest and thus they do not have as much influence on change, leaving the local people with low levels of participation and minimally enhanced benefits in the process. Consequently, it is clear that formal rules and institutions in Mau forest restrict access and benefits to the resources. It does not provide an acceptable framework for equitable sharing of forest resources and the benefits that they provide nor do they intend to sustain resources for forest users. The consequence of this has led to increase open access problem in Mau forest which has contributed to degradations of the forest and hence loss of livelihoods.

Forest resources are highly subtractive and thus there is need to converge forest user's needs to ensure effective forest management. This is because access and utilization of forest resources bestows forest households with a great sense of empowerment since products harvested from forest play a crucial role in sustaining their livelihoods. From the study findings, the nature of forest products extracted from the forest by sampled forest households follows a particular trend of importance. This is based on the role it plays within the household and legality of access and extraction from the forest. Considering this view from the findings, it can be confirmed that firewood was more important to households living around Mau forest followed by benefits obtained through grazing of livestock and fodder, medicinal herbs and lastly honey.

The study also established that there is low level of active participation by the forest-adjacent community in forest management in general. Though some local households stated that they have participated in forest conservation in Mau forest, they had conflicting views on the role of local forest users and authorities in protecting and participating in forest conservation initiative. 23 percent of respondents indicated that they were responsible for sustaining the forests themselves or in co-operation with the forest authorities in forest management and conservation; many also felt that they did not own the forest and therefore are never involved in forest management and conservation. The struggle to converge forest conservation and livelihoods can be further attributed to limiting forms of information dissemination. Local communities indicated the lack of forums for discussions and exchanges with the policy makers and forest department. This in turn has contributed to lack of active participation.

The study further established that the effort to create synergies between conservation and livelihoods has led to introduction of livelihood diversification activities. Communities are no longer occupied with passively conserving forests in exchange of modest subsistence forest resources. The forest users are moving towards dynamic mobilization of forest resources for their wider livelihood development. For instance the introduction of shamba system within Mau forest has ensured that there is continued source of livelihoods among the forest households, while at the same time it promotes conservations of forest resources. The introduction of Plantation Establishment and Livelihood Improvement Schemes (PELIS) in Mau forest has enabled the forest users in Mau to access forest farms where they cultivate and intercrop their crops with the small trees, hence allowing them to take care of the trees until they are mature.

This scheme has enabled the forest user groups to recover from shocks and vulnerability resulting from loss of sustainable forest livelihoods. In Mau forest, the greatest effect of this Shamba system on the vulnerability context has been to reverse the threat of a loss of forest products due to changes in rules of accessing forest resources. Most households have been highly dependent on the forest for daily subsistence and there has been a great improvement to their day-to-day lives as well as reduction in longer-term vulnerability. In addition, these forest communities have been engaged in forest conservation and forest products have been sustainably harvested and thus are a constant source of household incomes.

5.3 Recommendations

Based on the findings from this study, the following recommendations have been advanced in order to enhance and promote the balance between forest livelihoods and forest conservation.

5.3.1 Accounting for the real value of forests to local forest users

Forests have been a source of important level of livelihood components to forest dependent communities. This is especially so in Kenya and where the majority of the households still live in rural areas and are predominantly dependent on farming and forests for their livelihoods. Hence there is need to develop a much more overt recognition of the forest resources contributions to livelihoods. Local communities have depended on forest as a source of income and greater proportion of forest income goes to support the household through direct consumption and through cash sales. But contrary to this contribution, most of the forest resources that forest users draw from forests do not enter the market or are valued correctly based on the market value. It is therefore essential that ways be established to get these contributions and value of forest resources recognised and understood, since they profoundly affect sustainable livelihoods capability and at the same time the application of various mechanisms to protect and conserve forest.

In addition, accounting for the value of forest resources will not only account for timber and employment value of forest but it will establish the value of forest to numerous households dependent on the resources for a substantial proportion of their annual livelihoods. Further more, having such valuation will make it clearer to the government authorities where costs and benefits lie when making decisions on implementing policies and regulations to promote forest conservation eg eviction from forest and reducing access to forest resources. This will enable policy makers and government authorities make decisions that will create synergies both for forest conservation and ensuring that livelihoods of forest communities are sustained.

The study established that there is poor involvement and participation of the rural households in forest conservation. Therefore the study recommends that for greater involvement of the local communities in the management of forest, there is need to devolve power through access and ownership rights which will ensure tenurial security and improved forest management and conservation. Through creation and enforcement of secure tenure rights in the forest, it will allow for legal, equitable resource access and land use among the local users

and indigenous communities who are dependent on forest. Significant effort in involving the local communities in management of forest should be emphasized. This can be strengthened by empowering the local communities with adequate power and responsibilities which will in turn encourage the formation of association and alliances among forest user groups, livelihoods promotion groups and government. This will build the capacity which will have a substantial contribution in forest protection, conservation and enhancing livelihood based activities in forest and community driven innovative management practices.

Policies and regulations for forest resource management should be developed with a clear objective towards sustainable forest management and sustainable livelihoods. For instance, policies that recognize the role of forests in promoting livelihoods among the forest dependent households can jointly address forest management and other forest livelihoods dimensions. Policies in Kenya, particularly forest policies have been sectorial and have generally been strongly influenced by economic interests and influential individual with vested interest that tend to marginalize both the interests of local communities. Moreover, these weak policies and law enforcement coupled with unclear land tenure and local communities' limited access to resources have led loss of livelihoods and forest degradation.

In spite of their failure to improve local communities' livelihoods and their contribution to the massive destruction of forest resources, these policies have not been redesigned and enforced to enhance forest conservation and promote livelihoods among the households. This has resulted in continued forest degradation through conversion of forest land to agricultural lands, uncontrolled legal and illegal forest logging, encroachment and other kinds of forest resources destruction. Therefore, there is need to design and implement cross sectoral policies that will encourage sustainable forest management and incorporate economic and livelihood objectives. These policies should capture and create synergies on land allocation and forest utilization policies as well as alternative livelihood diversifications to promote forests re-creation and growth.

5.4 Conclusion

Based on the findings from this study, several conclusions can be made. First, household characteristics such as position of the respondents, income level, level of education and distance to the forest significantly influences access and utilization of forest resources among the forest households. Majority of the households depended on Mau forest as a source and a means to sustain their livelihoods. Mau forest is very important in supplying the local communities with forest products not just for their own consumption but also for commercial sale, which is a source of income. These includes: firewood, charcoal, fodder for livestock, herbal medicines, thatch grass and structural materials and collection of a range of marketable non-timber forest products. Further, the findings indicate that firewood and livestock grazing are a major undertaking from Mau forest by local communities.

Strategies for forest conservation and ensuring the maintenance of forest livelihoods can be unrealistic. This is because there are different goals which the forest dependent communities seek to achieve and the varied strategies employed to promote forest conservation. For instance, it is unlikely that the livelihoods of forest users will yield or achieve the same objectives as the conservation goals aimed at protecting the forest. From the study findings, struggles in Mau forest for conservation and to sustain the forest livelihoods have created divergent interests. Forest-related conflicts between government and local communities and among local community groups themselves have significantly increased. These conflicts are associated with lack of secure access to forest resources and land tenurial rights which are still unclear.

Therefore, it is evident that in order to create a balance on forest conservation and livelihoods, there is need to create more focus on understanding the areas that are in conflict within Mau forest and those which coincide and assess their levels of divergence and synergies. This is because in determining the balances and struggles that exist between forest conservation and forest livelihoods will be critical in the assessment of different situations and limitations that may call for different contextualized responses. Harvesting of forest resources and products can contribute as a component of conservation strategy.

Finally, management of Mau forest has been through conventional approaches which are designed and enforced by government through the forest department. The issue of creating a balance and synergy between forest conservation and livelihoods has been based on flawed

assumptions about how forest dependent households in Mau forest interact with forest. The realities of changing modern times calls for the need to move a way from conventional approaches and ways of addressing such issues like policies, laws and regulations to a more holistic and situation specific approaches that the local forest users may adopt and willingness to protect the forest resources that they value and seek to conserve. This will undoubtedly contribute to sustainable forest conservation and livelihoods in Kenya which is a reality of the 21st century and beyond in the wider context of global climate change.

5.5 Recommendations for Further Research

This study was based on household survey data using a small sample, which cannot provide an overall insight into how households access and utilize forest resources across time. Therefore a longitudinal study is necessary which will use a larger sample and hence it will bring out the bigger picture on utilization of forest. In addition, since there is no good panel data set the struggles that exist in balancing the forest conservation, utilization and sustainable livelihoods among the forest dependent communities in Kenya, such a study would greatly contribute to generating information for conservation and livelihoods dynamics within the forest.

There is need for a research study on the implications of the widely different roles that forest resources play in the livelihoods of different categories of the poor who draw on forests. There is need to assess and analyse separately the very poor and disadvantaged rural households who rely on forest products for survival and those that utilize forest resources to compliment their livelihoods and enhance the process of growth and development. This will be necessary in designing and enforcing policies and institutional interventions to compliment each of the categories.

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APPENDIX 1: HOUSEHOLD SURVEY QUESTIONNAIRE.

My name is Nelly Bore, a postgraduate student at the Institute for Development Studies, University of Nairobi. I am conducting a study on the Struggle between livelihoods and forest conservation in forest management. I would highly appreciate if you spare a few minutes and share your thoughts on this subject. The information you give will be treated in confidence and will only be useful in informing this study. Please answer the questions as honestly and openly as possible. Thank in advance for your cooperation.

Section A: Questionnaire Log Book

1. Questionnaire Number _____
2. Date of Interview _____
3. Name of the Administrative Location _____

Section B: Respondent's Background Information

4. Name of the respondent (*optional*) _____
5. Sex of the respondent 1. Male 2. Female
6. Age of the respondent (*in complete years*) _____
7. Position of the respondent in the household
1. Father 2. Mother 3. Guardian 4. Other (*Specify*) _____

Section C: Information on household activities

1. What is the Distance to the Forest?
2. Do you have access to forest?
1. YES 2. NO
3. Which products do you access or does household members access from the forest?

Products	Quantity/week	Value per week
1. Firewood		
2. Honey		
3. Charcoal		
4. Fodder for animals		
5. Grass for thatching houses		
6. Medicinal herbs		
7. Farming		
8. timber/wood		
9. wildlife meat		
10. trees seedling		
11. Wild fruits		
12. Employment		

4. How often do you go to the forest

1. Everyday
2. Once a week
3. once a month
4. Twice a month
5. Why do you go to the forest? (Tick all that are appropriate)

1. To collect forest products	
2. To graze animals	
3. To farm	
4. To harvest timber	
5. To collect wood fuel	
6. To collect seedlings	

6. What is your source of income?

7. Do you use the forest products as a source of income?
 1. YES
 2. NO

8. Where do you sell those products?
 1. Other households / Local members
 2. Middle men/ brokers
 3. Industries
 4. Market

9. What proportion of the products do you sell in the market?

Products	Quantity/week	Value per week
1. Firewood		
2. Honey		
3. Charcoal		
4. Fodder for animals		
5. Grass for thatching houses		
6. Medicinal herbs		
7. Farming		
8. timber/wood		
9. wildlife meat		
10. trees seedling		
11. Wild fruits		
12. Employment		

10. How has this household activities affected forest conservation?

Name:

Section D. Information on forest conservation and management

11 How far is your home to the boundaries of the Forest?

12 How are the boundaries of the Forest defined?

13. Are you allowed to access the forest?

14. Who are allowed to collect forest resources?

15. Does your household collect any resources from the forest inside the boundaries?

16. Do you experience any difficulties in trying to get access and get the forest products?

Name:

17. Are you aware of any major changes that have been put in place in relation to management of forest?

If yes specify:

18. How were you informed of changes?

1. Directly from the KWS/ Forest Department

2. From the Local Chairman

3. Elders

4. Media

5. Others(Specify)

19. Are community members actively involved in forest management and Conservation?

(Tick one)

a) In most cases the forest dependent communities are involved in forest management and conservation.	
b) In only a few cases are forest dependent communities involved in forest management and conservation.	
c) Forest dependent communities are never involved in forest management and conservation.	

20. Are the local communities knowledgeable about formal rules regarding ownership, access, and use of forest land?

(Tick one)

a) Most local communities are well informed about these.	
b) Some local communities are well informed about these.	
c) Only a few local communities are well informed about these.	
d) No local communities are well informed about these.	

21. Do forest dependent communities have secure access to the forest resources that they depend on?

a) All forest dependent communities have legal access (licenses, free issues) to necessary forest resources, and their rights are respected.	
b) All forest dependent communities have legal access (licenses, free issues) to necessary forest resources, but their rights are not fully respected.	
c) Most forest dependent communities have legal access to necessary forest	

resources.	
d) Some forest dependent communities have legal access to necessary forest resources.	
e) No forest dependent communities have legal access to necessary forest resources.	

22. Are you aware of any local organisations or individuals who participate in decision-making and conservation of the forest?

Name:

23. Are you a member of such group?

1. YES 2. NO

If No, why wouldn't you like to be involved in the decision making?

1. It is of no use to me
2. I have no information on forest conservation
3. I don't have time
4. Too political

24. How has forest conservation within the Mau forest affected your livelihoods?

Section E: Struggles and divergences of forest livelihoods and forest conservation

25. Do you agree that the regulations of the forest resources help to maintain a sustainable livelihood?

1. Agree 3. Disagree
2. Strongly Agree 4. Strongly agree

26. Do you think the livelihoods of the local community are considered when designing and implementing the regulations?

1. Agree 3. Disagree
2. Strongly Agree 4. Strongly agree

27. How has the forest conservation and management of the forest affected the local people living in the forest?

28. Are there serious conflicts between the government and community that interfere with forest use and conservation?

a) Conflicts between the state and stakeholders are not serious and rarely interfere with forest use.	
b) Serious conflicts occur and occasionally interfere with forest use.	
c) Conflicts frequently interfere with forest use.	
d) Conflicts make it impossible for the government to enforce laws and control forest management.	

29. Are there serious conflicts between different communities and user groups in the context of forest access and use? (*Tick one*)

a) There are no serious conflicts between communities or users.	
b) There are chronic conflicts, but they do not interfere with forest management or use.	
c) Conflicts are making some forests difficult to manage or use.	
d) Conflicts are making some forests impossible to manage, and leading to clearly unsustainable uses.	

30. Do conflicts over forest resource use and management tend to persist or do they get resolved? (*Tick one*)

a) Conflicts tend to be resolved quickly and efficiently.	
b) The resolution of conflicts is variable: some are resolved efficiently while others persist.	
c) Conflicts get resolved (or resolve by themselves) slowly, imperfectly, or at great expense.	
d) Conflicts tend to persist indefinitely.	

31. What ways of resolving conflicts over forest resources and management widely used?

(Tick one)

a) There are informal ways that are socially acceptable and widely used.	
b) Informal ways are not used at all.	
c) Formal ways eg courts are used	
d) Both formal and informal ways are used	

32. Is there a good relationship between the forest officers and the local people

1. Strongly disagree

2. disagree

2. Agree

4. strongly agree

33. Do you think forest conservation can be achieved while accessing forest for livelihoods?

1. YES

2. NO

If Yes, How can it be achieved?

Section F: Basic household information

34. What is your current Occupation?

35. How long has your family lived here?

36. Where did you live before?

37. Why did you move to this area?

38. What is the size of your land?

39. What is your land tenure system?

40. What is the total household income per month?

APPENDIX 2: INTERVIEW GUIDE FOR KEY INFORMANTS.

My name is Nelly Bore, a postgraduate student at the Institute for Development Studies, University of Nairobi. I am conducting a study on the Struggle between livelihoods and forest conservation in forest management. I would highly appreciate if you spare a few minutes and share your thoughts on this subject. The information you give will be treated in confidence and will only be useful in informing this study. Please answer the questions as honestly and openly as possible. Thank you in advance for your cooperation.

Checklist for Forest Officials

1. Name:
 2. Role/ employment:
 3. Level of Education:
-
1. How are boundaries defined?
 2. What are the main objectives of forest Conservation?
 3. How are decisions made? As of level. Nationally, district, locally?
 4. Do you involve the locals in decision making? If yes, how do you get them to participate?
 5. Do you participate in community's initiatives to conserve the forest?
 6. How would you explain the importance of the forest conservation to the local people?
 7. Do you allow the local people to access forest resources?
 8. Which products do they harvest from forest?
 9. Are there any regulations and institutions that stop them from accessing forest resources?

10. Are they informed on the regulations and changes that affect their livelihoods?

If yes, how do you inform them?

11. Do you feel that the local communities agree with the regulations and institutions set up for forest conservation?

12. How will these regulations and institution help achieve forest conservation while ensuring forest livelihoods?

13. Does the forest management create any specific opportunities or challenges to the local people?

14. Do you think this balance for forest conservation and forest livelihoods can be achieved?

Explain?

15. Are forest dependent communities actively involved in forest management and planning?

16. Are local communities knowledgeable about formal rules regarding ownership, access, and use of forest land?

17. Do forest dependent communities have secure access to the forest resources that they depend on?

18. Are there serious conflicts between the government and stakeholders that interfere with forest use?

19. Does the government help in resolving these conflicts?

20. If YES, how does the government resolve such conflict without compromising the livelihoods of the households?