BENEFITS TO FOREST ADJACENT COMMUNITIES UNDER THE OLD (1968) AND REVISED (2005) KENYAN FOREST LAWS

BY

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DECLARATION

DECLARATION BY THE CANDIDATE

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Special thanks go to my family for the overwhelming support which they gave me.

ABSTRACT

Kenya reviewed its forest law in 2005, in part to enhance community participation in sustainable forest management (SFM) by enabling greater direct and indirect benefits to forest adjacent households as an incentive. Thus, this study was undertaken to compare benefits to forest adjacent households under the current Forests Act, 2005 and old Kenyan forest Cap 385 of 1968.This study was done in Kimondi and Masaita forests. Questionnaires were administered to 306 forest adjacent households to determine quantities and value of forest products extracted, their contribution to household livelihood, and factors influencing their extraction level from the forests. Completed questionnaires were coded and entered into a Statistical Package for Social Sciences (SPSS version 16) for analysis. The result showed that the major direct benefits to households were firewood, cultivation, grazing/fodder, wood/timber, and medicinal herbs. Socio-economic factors which positively influenced the quantity of household benefits from forests were household size, farm size, educational level and income of household head. Those which negatively influenced the quantity were types of crops cultivated, cost of production and low income. Pearson correlation test showed that there exists a positive significant (α=0.05) relationship between farm size and grazing (r=0.409), household size and firewood extraction (r=0.336), age and honey collected (r=0.205). There was a significant negative relationship between education level and size of land under cultivation (r=-0.154). The benefits enjoyed by households from the two forests were comparable. However, the quantities of benefits under the old legislation (Cap 385 of 1968) were more than those under the Forests Act No 7 of 2005. The value annually extracted by a household under the old Act Cap 385 of 1968 was Ksh.32830 (USD 381) compared to Ksh. 23700 (USD 276) under the current Act,2005 The large difference mainly resulted from benefits in grazing (Kshs.3000 (USD 35)- Cap 385 versus Ksh.1200 (USD 14))-Forests Act 2005, firewood (Ksh.16250 (USD 189)-Cap 385 versus Ksh.7000(USD 81)-Cap 385, and cultivation on forest land (Ksh.5000 (USD 59) –Cap385 versus Ksh.1750 (USD 20 –Cap 385). Cited reasons were lengthy and costly bureaucratic procedures as major hindrance to household benefitting from forests, which is a disincentive to community participation, while this was a prime objective of the revised law. There is need to mitigate these barriers to make community participation in SFM more effective.

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ABBREVIATIONS AND ACRONYMS

AFORNET	African Forest Network
ASALS	Arid and Semi-Arid Lands
CAP	Chapter
CFA	Community Forest Association
CSO	Civil Society Organization
DPM	Direct pricing method
FAO	Food and Agricultural Organization
FCC	Forest Conservation Committee
FD	Forest Department
FMA	Forest Management Agreement
GOK	Government of Kenya
IIN	Indigenous Information Network
JFM	Joint Forest Management
KEFRI	Kenya Forestry Research Institute
KFMP	Kenya Forest Master Plan
KFS	Kenya Forest Service
KFWG	Kenya Forest Working Group
KIFCON	Kenya Indigenous Forest Conservation Programme
LFMC	Local Forest Management Committee
MENR	Ministry of Environment and Natural Resources
MFL	Monthly fuel wood licenses
NRC	Non-Residential Cultivation

NTFP   Non- Timber Forest products

PELIS   Plantation Establishment and Livelihood improvement Scheme

PFM   Participatory Forest Management

PFMP   Participatory Forest Management Plan

PRA   Participatory Rural Appraisal

RRA   Rapid Rural Appraisal

SFM   Sustainable Forest Management

SUMAWA   Sustainable Management of Rural Watersheds Project

US $ United States Dollars

DEFINITION OF TERMS

Benefits: This term refers to benefits arising from forest resources accessed or direct benefits derived from employment related to the resource/area or indirect benefits such as those accruing to entire community from resource management agreements as described by Worah, (2008).

Community: Groupings of people who physically live in the same place. It may also mean a group of people with common interests like forest management (GOK, 2005).

Community Forest Association: An organization formed by members or persons resident in the same area and registered under the Societies Act which is permitted to participate in the conservation and management of a state forest or local authority forest in accordance with the provisions of the Forest Act (GOK, 2005).

Forest adjacent community: This refers to all people living within a five kilometers radius from the forest boundary who are likely to be affected directly either positively or negatively by any activities taking place within the forest (Wass, 1995).

Forest benefits: This refers to many tangible and intangible benefits derived from forests by forest adjacent communities.

Participatory Forest Management: It is an arrangement where all stakeholders in particular the forest adjacent communities are incorporated by entering into mutually enforceable agreements with forest department that define their respective roles, responsibilities, benefits and authority under set rules and regulations in the conservation and management. The aim of the approach is to ensure sustainable management of forests as well as improve the livelihoods of forest adjacent communities (Wily, 2002).

*Sustainable Livelihood***:** A livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living. A sustainable livelihood is one which can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long term, while not undermining the natural resource base. (Www. Wikipedia. 9/1/2014)

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CHAPTER ONE

INTRODUCTION

1.1 Background Information

Since time immemorial forests have provided valuable products and services to forest adjacent communities such as food, medicine, firewood, stock grazing among others (Hedge *et al.,* 1996). It has been noted that the users of the forest resources vary with proximity to the forest for households within five kilometers of the forest (Wass, 1995). The closer to the forest the household is, the more the forest benefits they are likely to accrue (Kenea, 2008). It is estimated that 2.9 million people, representing 530,000 households live within five km of forest areas in Kenya (Wass, 1995). Most of the Kenyan communities lost their direct interaction and use of forests with the establishment of gazetted forest reserves or trust land forests and wildlife conservation areas (Mbuvi *et al.*, 2009). This was as a result of the government rules that excluded communities from control and management of forest resources. The management approach adopted by the government in forestry management in Kenya is what often referred to as the command and control with minimal involvement of local communities. In the absence of adequate capacity from the government agencies mandated to protect the forests and to enforce these rules, and support from the local communities, a lot of problems such as indiscriminate felling of forest trees were experienced, consequently large areas of forests were lost. The failure of state controlled measures to protect natural resources led to re-emergence of interest in participatory resource management. In the 1980s and 1990s, there was a lot of pressure on the government by donors, civil society and NGOs to

change Forest policies and legislations to be in line with realities and global trends (KEFRI, 2007).

The unceasing pressure on the forests and issues of issues of community rights persuaded the government to shift to a new system of forest management where other stakeholders including the adjacent forest communities were to be involved in the management of forest resource in order to minimize degradation.

Since the establishment of forests in the country in 1900s its management approaches has undergone several changes overtime in response to the country's changing needs. The most recent was the introduction of the concept of participatory forest management (PFM) that is widely adopted in developing countries as an alternative method of managing forest resources with a view of sustainability (Wily, 2002). The Kenya Government embraced the globally recognized new paradigm shift - that is moving from command and control system of forest management to participatory forest management, since late 1990s (KEFRI, 2007). Wily (2002) also notes that PFM is a system in which communities (forest users) and managers of the Kenya Forest Service (KFS) work together to define rights of forest resource users, shared forest management responsibilities and agreed benefit sharing mechanisms , putting into consideration the costs incurred.

In order to have the legal support for PFM, as a tool of sustainable forest management, the Forest Act Cap 385 of 1968 was repealed and replaced by the Forests Act No.7 of 2005 that outlined the legal basis for public participation in forest resource management.

PFM in Kenya is now guided by the Forests Act No 7 of 2005 sections 46 to 49 which provides for the formation of Community Forest Associations (CFAs) and their registration under the Societies Act. The Forests Act (2005) under section 46 (1 and 2), specifies the forest user rights for local communities to include collection of medicinal herbs, harvesting of honey, collection of fuel wood, grass harvesting and grazing of domestic animals. The general provision and rules for community participation in forest management is further elaborated by the supplementary legislation (Participation in Sustainable Forest Management) rules No. 47 of 2009 (GOK, 2005).

The repealed Forest Act Cap 385 of 1968 provided forest adjacent communities some rights to exploit some specified forest products/benefits, that included collection of dead wood, fodder, grass, wild fruits, bark, poles, withies, firewood, medicinal herbs, grazing, cultivation and honey production. The rights under its subsidiary rules were varied depending on the ethnic groups and regions. Examples includes; the Kwale Forest Rules. the Kakamega and Bungoma Forest Rules, the West Pokot Forest Rules, the Tugen-Kamasia Forest Rules , the Elgeyo Forest Rules for and the Nandi Forest Rules for Kwale,Kakamega/Bungoma,West Pokot,Baringo,Elgeyo and Nandi District respectively (GOK,1982). All these rules applied in their respective regions, forest access was not restricted but community participation in the management of these forests was quite weak. Though communities concerned were allowed to utilize particular forest resources and to carry out specified activities on forest land without license or fee by virtue of their customary practice or permission from the foresters in charge. These rules varied for each forest hence could not be administered across varying forest landscapes in the country

uniformly. The recognition of customary rights to communities on the forest use was very clear and had no much legal condition attached to them this in itself was an advantage to community to encourage conservation and management. Furthermore all the residents of the above concerned districts where the users' rights were applicable; were eligible to access the forest products/benefits provided they abided by requirements of the forest rules (KEFRI, 2007). And where some fee was required was quite minimal. The Forests Act No.7 of 2005 stipulates on how the community can benefits from forests under forest participation in sustainable management and harvesting rules. However, the requirements in the rules are cumbersome and costly to fulfill such as provision of management plans and signing of management agreements as stipulated under the Act because the transaction costs involved are quite high. Moreover, article 45 of the rules require professional input in writing the management plan, that is a big challenge to the community (GOK, 2009). It should be noted that permitting forest adjacent communities to continue to utilize the forest is a necessary tool for effective management leading to sustainability of forest resources.

Given that under the current Forests Act No. 7 of 2005, adjacent communities are engaged in management under the 4Rs (Rights, Rewards, Relationship and Responsibilities) it may appear that the terms and conditions for the forest adjacent households to accrue any benefits have been raised in the Forests Act No.7 of 2005 as compared to the provisions under Forest Act Cap 385 of 1968. However, the 4Rs are intended to be incentives for communities to partake in co-management. Then what need to be addressed is whether the current terms and conditions in Forests Act No.7 of 2005

are going hand in hand with the benefits which forest adjacent communities are able to accrue from the forests under this current Forests Act 2005. The current study therefore attempts to answer the question by comparing the benefits under the Forest Act Cap 385 of 1968 and Forests Act No 7 of 2005. The study considers the aspects that attract communities to participate in forest management and be engaged in it fully under prevailing terms and conditions as outlined in the Forests Act 2005. All these transactions are costly and are likely to contribute to a slow rate of adoption of the PFM programs. The study presumption is that economic incentives is necessary condition for community involvement in sustainable forest management through motivated financial and livelihood gains rather than to degrade or deplete them in the search for their economic activity (KEFRI, 2007). Through the study, the benefits accruable to forest adjacent communities under the two forest Acts (Forest Act Cap 385 and forests Act No. 7 of 2005) were evaluated.

1.2 Statement of the Problem

Kenya's first comprehensive forest legislation was the Forests Ordinance of 1941 which was amended to the Forest Act Cap 385 in 1968. The Act provided for the establishment, control and regulation of public forests and on un-alienated government land (Mbuvi *et al.*, 2009). However, the piece meal changes were not able to accommodate new and emerging national and global forest related challenges such as poverty reduction or payment of environmental services (Mbuvi *et al.*, 2009).

Forest Act Cap 385 adopted the command and control approach of management where community participation was not possible but only allowed extraction of specific forest benefits by the communities under the special forest user rights outlined in the subsidiary legislations. These benefits included collection of firewood, dead wood, wild berries and fruits, grazing of cattle and honey production. The user rights were applicable to specified forests in different regions in the country. This Act lacked a clause on community participation, hence did not allow participation of the private sectors, other stakeholders and communities in management of gazetted forests which led to conflicts between forest managers and forest adjacent communities over access to forest resources. The resentfulness made the local communities to engage in illegal activities such as illegal logging, encroachment and settlement, unsustainable utilization of forest resource, thus leading to degradation of forest resources (Mwanzia, 2006).

On the Global scene, increased promotion for participatory forest management (PFM) approach for sustainable forest resource management was being encouraged at many forums. The Kenya government adopted PFM through the Forests Act No. 7 of 2005 as a result of many emerging issues on forest resource such as degradation, community rights enhancing sustainable forest management and need for equity benefit sharing. The Act anticipated that there were benefits arising from involvement of local communities and other stakeholders in forest management as there will be increased access to forest products such as fuel wood, medicinal herbs, honey, thatching grass and fodder. Furthermore, beside the above forest products, communities were allowed to do some activities within the co-management framework which include eco-tourism, beekeeping,

fish farming and growing crops that aims at improving their livelihood. Therefore, with these benefits it was expected that communities would embrace the system and participate effectively. But the challenge is that the transaction cost needed to meet the terms and conditions for their participation such as formation of Community Forest Association (CFAs), registration of the Associations under Societies Act and development of management plans among others were not evaluated. Further the rules stated in part three of the subsidiary legislation No.47 of 2009 provides procedures or types of agreement for community participation, rules for commercial activities and non-residential cultivation (GOK, 2009). Some of these rules are not particularly attractive to forest adjacent communities. For example there is range of costs involved in CFA formation and corresponding benefits accruing to forest adjacent communities as they participate in forest management.

Therefore the study aimed at determining whether terms and conditions of PFM for access of forest benefits by community under Forests Act No.7 of 2005 are more attractive for communities to participate in sustainable forest management or not. It also aim at determining whether it is worthwhile for forest adjacent community to participate in co- management of forests in relation to forest benefits they accrue.

1.3 Justification

Forest adjacent communities accrued forest products from the forests under the provision of forest user rights in the forest subsidiary rules in forest Act Cap 385 of 1968 and the same provision is provided in the forests Act No.7 of 2005. The change of the Act was

intended to encourage community participation in management for sustainable forest management.

It is acknowledged that numerous benefits are expected to accrue to individuals from participating in CFA through increased access to forest products and activities allowed within the co-management frame aims to improve the livelihood of the household. It would therefore be expected that communities would embrace the system and participate effectively.

The Forest Act Cap 385 of 1968 provided limited room for community participation that Forests Act No. 7 of 2005 was anticipated to enhance community participation in forest management. Therefore the major aim of this study was to compare the benefits accruable to forest adjacent communities under the two legislations.

1.4 Objective of the study

1.4.1 General objective

The general objective of the study was to compare forest benefits to forest adjacent households under the Forests Act, 2005 and the Forest Act Cap 385 of 1968 in Kimondi and Masaita Forest Stations.

1.4.2 Specific objectives

The specific objectives of the study were to:-

(i) Identify the forest benefits allowable to forest adjacent households under the Forest Act Cap 385 of 1968 and Forests Act No.7 of 2005.

(ii) Determine the quantities and value of forest products and other tangible benefits extracted under the two legislations by households' adjacent to Kimondi and Masaita forest stations and the contribution to their livelihood; and

(iii) Determine the household socio-economic characteristics that influence the quantities of forest products extracted from Kimondi and Masaita forest stations.

1.5 Research Questions

(i) What are the forest benefits allowable to forest adjacent households under the forest Act Cap 385 of 1968 and forests Act No 7 of 2005?

(ii) What are the quantities and value of forest products and other tangible benefits extracted under the two legislations by households' adjacent to Kimondi and Masaita forest stations?

(iii) What are their contributions to households' livelihood in Kimondi and Masaita forest stations?

(iv) What are the household socio-economic characteristics that influence the quantities of forest benefits they extracted from   Kimondi and Masaita forest stations?

1.6 Scope of the Study

The scope of the study was limited geographically to Kimondi forest station in Nandi County and Masaita forest station in Kericho County. These are among the blocks of Mau complex in Kenya. These places were chosen because they are representative of

forests where a number of adjacent communities previously benefitted under the forest user rights and are currently benefiting under Forests Act, 2005 through PFM program. Basing on that evidence the study explored in-depth the situation of direct forest products accrued to the households of forest adjacent communities in reference to the two legislations in the two forests of Kimondi and Masiata.

1.7 Limitations to the Study

The most important constraints to the study included; the challenge of recalling past information due to failure by farmers to remember clearly unrecorded information about their past income. To minimize the challenge more time was spent per respondent and only detailed data for the previous one year was collected.

The study was carried out in only two forest stations that is, Kimondi and Masiata focusing on directly consumable forest products, therefore the findings may not be representative of other forests with diverse product/services.

1.8 Delimitations to the Study

The study was carried out in the forests where adjacent forest communities have benefited under the Forest Act Cap 385 of 1968 and now are benefiting under the current Forests Act of 2005 hence the results are representative and applicable to other forests.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter discusses the related information to this study. Relevant research information and publications have been reviewed on the subject under investigation. It is used to identify missing gaps, which form the basis of the study.

2.2 Forest Benefits To Forest Adjacent Households

The households adjacent to forest are dependent on forests for a wide range of resources and services. Forest benefits include both wood and non-wood products and services that are important because they contribute significantly to national wealth of many countries especially in sub-Saharan African (Emerton, 1997). Appasamy (1993) showed that the rural subsistence economy of populous developing countries has traditionally depended to a large extent on primary products from the forest. He states that if the consumption of these products is computed, they form a reasonable proportion of the natural resource base of a country.

Forests occupy less than 3% of Kenya's land area (GOK, 2007) and yet, they are reservoirs of forest goods and services. These forest good and services are important because they contribute to the wellbeing of Kenyans, especially those in the rural areas and indirectly to the main agricultural economy and other sector of economic importance to the country at large. In Kenya more than 4 million (80%) rural households depend on

forest benefits for their day to day needs that are estimated at US$100 million a year (Emerton, 2001).

During the recent decade, forest resource degradation has reduced supply of forest fibres and fuel wood from forests and farmland without much thought to sustainable alternative options (McNeely, 1994). According to FAO, a country with less than 10% of its land covered by forest is environmentally unstable (FAO, 2001). Kenya's land area being occupied by forests is less than 3% forest implying that the country is environmentally unstable.

Forests play an important role in the livelihoods of local people in most developing countries for they supply various products such as firewood, construction materials, medicine and fibres. However, Kenya, the continued provision of these products and services are threatened by forest degradation and accelerated conversion of forestland to alternative land uses (Langat and Cheboiwo, 2010).

Forests in Kenya are well known for their direct and indirect use values. For example, in Kenya forest direct use values in terms of timber, fuel wood and poles are estimated at about Ksh.3.64 billion (US$ 0.0364 billion), with timber alone contributing 75% of the value (Kakamega Forest Management Plan, 1994). The government collected royalties amounting to Ksh.128.9million in 1999/2000, this being 0.07% of the total government revenue. This depicts the importance of the sector (Gichere, 2001).Other use values of the forests include tourism, human habitat and the use of genetic material from the plant and

animal species, food, pharmaceuticals, industrial purposes and support to other sectors of the economy especially water and energy.

Forests indirectly support and protect a wide range of production and consumption processes. A lot of human settlement and economic activities would be very expensive or impossible without the services provided by the forests. Emerton *et al., (*1998*)* calculated the presence of Mt. Kenya forest alone to be worth, more than Ksh. 2000 million (US$ 20 million) through protecting the catchment of two of the country's main river systems, the Tana and Ewaso Nyiro. Additionally, Uganda's forests through carbon sequestration, help to offset the effects of global warming, generating global products of nearly Ksh. 400 million (US$ 4 million) a year in terms of damage avoided (Emerton*,* 2001).

It has been pointed out that a major cause of the failure of sustainable forest management, or the cause of deforestation and transfer of forest to other land uses, is the inadequate recognition and underestimation of the value of many goods and services provided by the forests at the local, national, regional and global level (UN, 1996). Therefore it is of paramount importance to value the forest benefits for generalization for adequate information to support forest sector policy making process.

Studies conducted elsewhere have shown that forests yield substantial products to the household economies (FAO*,* 1996, Gunatilake *et al.,* 1993., Godoy *et al.,* 2002.*).*But this study has showed that forest adjacent household accrued mainly firewood and land for cultivation that contribute a great deal in their income. It is assumed that the more the

household accrue substantial products, the more they will be encouraged to participate in the management of forests. Though community involvement in forest management and environmental conservation has been encouraged on the promise that forest provides intangible and often tangible benefits to those communities who participate in their management (Koech *et al.*, 2009),however, so far limited work has been done to determine the quantities of the available forest products for extraction to avoid depletion of forest resources. Moreover, it is important in the early stages of implementing PFM to establish the quantities and value of tangible forest products available to the communities in order to determine whether the value of those products constitute an incentive for them to invest their time, money and energy in forest management activity. Furthermore this can help to lay down procedures in law on allowable extraction by communities. This is because the idea of managing forests that provide only intangible products to the communities may not encourage their involvement in the management of such forests and other natural resources. This is because they would like to get products which they could convert into monetary value and put in use in order to improve their incomes and meet basic needs. Studies have shown that the tangible forest products that are available to CFAs from the forests contribute to the cohesiveness of CFA's members (Ongugo *et al., 2005).*

2.3 Values of Forest Benefits

Forest benefits are known to play an important role in supporting rural livelihoods and food security in many developing countries (Pimentel *et al.,* 1997), and this is not an exception for Kenya. Though products from forests are well recognized, they are publicly

dependent on the functioning of markets, where market failures can be only corrected through interventions (Bujosa and Riera, 2010). However, products obtained from ecosystems are seen as the needed incentives to conserve nature, but their valuation has proved difficult as they are not captured in conventional markets and market-based economic activities (Balmford *et al.,* 2002). A number of past studies, such as those made in South Africa (Shackleton and Shackleton, 2006) attempted to fill this information gap by adopting various economic valuation methods.

Forest values continue to be imperfectly captured and inequitably distributed. Therefore, because of that they are not considered to be meaningful by national policy-makers (Adger *et al*., 1995). Furthermore, Godoy et al., (2002) noted that it is contended that policy makers need quantitative evidence of the importance of benefits accruing to communities from forest to enhance friendly policy making. The total economic value of forest is an aggregate of the use and non-use values of forests. This includes direct use values, indirect use values, option values, existence values and bequest values (Bishop, 1999; Lette and Boo, 2002).

Valuing forest resource use by rural households enables people to assess its quantitative contribution to rural livelihoods and the extent of dependency of rural people on such products. Moreover, estimating the economic value of environmental resource use in rural livelihood systems is important to provide a realistic measure of rural poverty. Economics is useful for valuation of forest benefits use since it provides data for making analysis among forest user groups consuming different quantities of a range of

differentially valued forest benefits (Richards *et al*., 2003). A quantitative assessment of product flows and values to different households is an important aid in designing effective project and policy interventions (Richards *et al*., 1999).

According to Cavendish *(*2000*)*, the traditional concept of poverty focuses on monetary income and wealth and therefore most government policies are focused essentially on the expansion of monetary income. However, a number of recent empirical studies on rural economies in developing countries show that non-monetary income and consumption may even be more important for market-remote rural households than cash income (Cavendish, 2000, Fisher, 2004).

The concepts of value used in evaluating forest products determine methods of approximation best suited for attribution of monetary value on the flow of such goods and service. According to Peters *et al.* (1989) direct methods that use market prices are usually applied, especially in valuation of products that are commercially traded.

One clear challenge in forest management and especially in community based approaches is how to ensure that local communities are provided with sufficient economic incentives so as to become involved in sustainable forest management (Mogaka *et al.*, 2001). It is therefore assumed that the reason why communities did not get involved in sustainable forest management in the past was mainly due to the absence of enough tangible opportunities and gains from the process. Therefore, the success of PFM will depend on how much opportunities and incentives are availed to the communities. The issue of

incentives and disincentives for user groups to engage in collective management of local forests revolves around the question of whether sustainable forest management will produce sufficient benefits for the participants to make this worthwhile (FAO, 2001).

2.4 Contribution of Forest Benefits to Household Livelihood

Many indigenous people have special claims on forests because their livelihood has historically depended on earning sustainable products from them. Livelihoods are means, activities, entitlements and assets by which people derive a living through natural or biological, social and economic benefits and are therefore paramount to the debate on sustainable development (KFS, 2009). Depending on the size of the resources and yield capacities, the forest can significant contribute in alleviation of poverty while at same time protecting environmental resources. People living in and around the forests have a particular interest in ensuring they receive its products in a sustainable manner. By pursuing ecologically and economically sustainable forest management practices, forest adjacent community can accrue necessary goods and services for themselves while preserving forest use options for future generation (McNeely, 1994). 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).

The use of forests for commercial purposes, subsistence needs and ecological security has lead direct competition for forest by various interest groups hence likelihood of conflicts. Further deforestation will destroy the resource base on which the poor depend on and only better management of the forest can achieve the reversal of this process (Appasamy,

1993).Therefore loss of large extents of forests, poses a serious threat to human welfare and the global environment. Extensive loss of forest benefits to households either by conversion or restriction of access without appropriate compensation will therefore result in decline in the welfare of communities living within and adjacent to forests. According to (Kenya Forestry Beyond 2000, 1994) report, over 530,000 households living up to a distance of five kilometers from the edge of forests, depend directly on them for cultivation, collection of fuel wood, herbal medicines and other economic gains. Mbuvi *et al.* (2009) noted that one of the objectives of communities in starting PFM was improving their livelihood through the products that accrue from the forest e.g. from farming, forest benefits and business like ecotourism. The participation of forest adjacent communities in forest management very much depends on the forest benefits available to them. Therefore it is important to evaluate the forest benefits in order to determine what is available for the purpose of making policy decisions on management. It is for this reason that the evaluation of the products under the two forest legislations is carried out to determine the impacts on the products to the communities.

According to Mogaka *et al.*, (2001) attempts of community involvement in forest conservation realized sustainable local utilization of the forest benefits. They further observed that, pure products based terms, allowing   local communities to continue using forests, should present them with sufficient incentives to support forest conservation endeavor. This is why it was important in this study to identify the forest products and other intangible benefits accrued to the adjacent forest communities and then adequacy to motivate households to participate in PFM programme under the current Forests Act

2005. The assumption is that the quantity of forest products and other tangible benefits accrued from the forest by the forest adjacent communities and then as a result of their participation in management should be sufficient to ensure that the concerned households are better off in livelihood and welfare as the result of the forest than they would be without it.

2.5 Knowledge Gap

In the Forest Act Cap 385, the adjacent communities were able to access the forest benefits under the provision in the provisions outlined in the subsidiary legislations as the user's rights provided that the acquire permission for accessing the forests. However the provision for the communities' participation in the management of the forest was not provided. The current Forest Act 2005, community participation has been spelt out clearly under section four and the accruement of the forest benefits as long as the concerned adheres to the terms in it. Whether users right without participation as is in the previous Forest Act 385 or the current Forest Act 2005 confer more benefits is not known. Again, it is worth noting that while several studies have been done using different variables to support PFM, very little has been done to determine whether quantity and values of forest products/benefits accrued by forest adjacent communities justify them to engage in PFM programs for sustainable forest management as outline in the current Act. The study, therefore has examined forests benefits accrued to forest adjacent households under the two legislations with a view to determine whether the revised legislation has more incentive for community participation in sustainable forest management

CHAPTER THREE

MATERIALS AND METHODS

3.1 Introduction

This chapter describes methods used during the study to collect, analyze data and present. It also includes detailed information on the location of study, sampling techniques and methods used to arrive at the sample size.

3.2 Study Design

The study design adopted in the study was descriptive survey. Descriptive survey is the method of collecting data by interviewing or administering questionnaires to samples of individuals (Orodho, 2003). Survey research design was appropriate for the study because it involved collection of data from varied number of responses which when analyzed provide descriptive, explanatory and exploratory purposes (Kothari, 2005). Survey design is suitable as it is economical, rapid in data collection and offers ability to understand population from part of it. The work involved collection of data by questionnaires and checklist. Both qualitative and quantitative data were collected and analyzed in SPSS version 16 package from households adjacent to the forests to enable drawing of a meaningful generalization on the forest benefits to households adjacent to Kimondi and Masiata forest stations.

The study identified the forest benefits allowable to forest adjacent household under the two Forest Acts, identified the quantities and value of forest products and other tangible benefits extracted under the two legislations by the forest adjacent households and

determined the household's socio-economic characteristics that significantly influence the quantities of forest benefits they extracted in Kimondi and Masiata forest stations.

3.3 Study Area

The study was done in Kimondi and Masaita Forest Stations located in Nandi County and Kericho County respectively as shown in Figure 3.1 below.
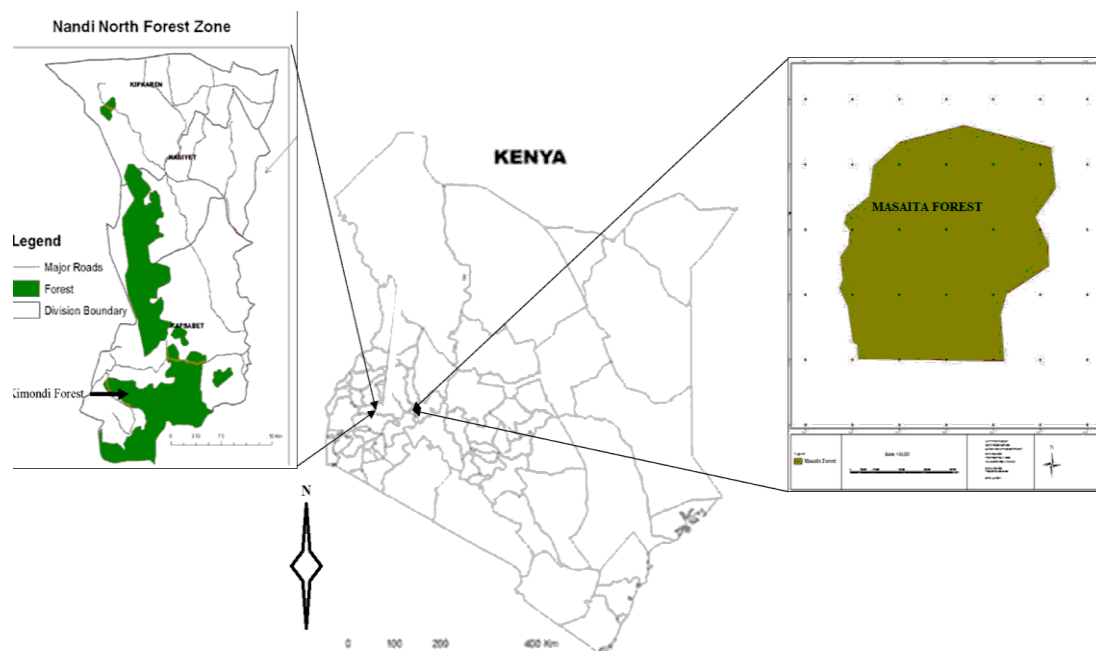
Figure 3. 1: Map of Kimondi and Masaita Forests Stations in Kenya.

The rationale for the selection of the two stations is as follows: - In Kimondi forest station, the communities around the forest have benefited from the forest ever since the period of special rules in the` old' Forest Act Cap 385 and have continued to benefit under the PFM program as stipulated in the `new' Forests Act No.7 of 2005 and hence

valuable for the current study purpose. In Masaita Forest station the communities around the forest benefits from the forest through PFM program under the Forests Act No.7 of 2005. At the moment communities in both forests have started Plantation Establishment and Livelihood Scheme (PELIS) program which is a component of PFM. The communities around these forests are basically farmers who highly depend on the forest in one way or another for their livelihood. The forests are more familiar to the researcher and more so this kind of study has not been carried out in the forests before.

3.3.1 Description of Each Study Station

3.3.1.1 Kimondi Forest Station

The Kimondi forest station of South Nandi forest reserve is located in western Kenya within Nandi County. It lies within latitude of 00° 18`N and $00^o$ 32`N and longitude 370° 05`E to $370^o$ 23`E, in the Rift valley province. The altitude ranges from 1700-2000m above sea level. It lies west of Kapsabet Town and south of the main Kapsabet- Vihiga road.

History of the forest

The Nandi and Kakamega forests used to be one single forest as evident from forest map of 1912. At that time, north and South Nandi forest were still connected and extended considerably to the east, up to the town of Kapsabet. The areas to the North of Kakamega forest and to the north east of North Nandi forest featured consisted of several forest patches from grass, glades and woodland-dominated land cover. The first European settlers started clearing of the forest in the south east of Kakamega forest and this led to the separation of the Nandi forest from Kakamega forest. This process was hastened by

the discovery of gold in the 1930s, when Kakamega forest was exploited for timber and firewood for the first time. The 1930s also saw the first gazettement of both Kakamega and the Nandi forests. The official forest boundaries of that time remain similar to today's boundaries (KPFMP, 2011). The natural forest cover was reduced through exploitation for timber and firewood. The overall natural forest covers about only 21000 ha today. The South Nandi forest is less than half the size of 1948 and slightly more than a third of the 1912/1913 size in Hectares (KPFMP, 2011).

Legal status and administration

The Kimondi forest station which covers 6,743.1 ha is part of South Nandi forest reserve which measures 26,903.1 ha and was gazetted vide legal notice number 76 of 1936. The forest reserve is defined by the boundary planno.75/68 LN 89 of 1937. The forest station is administered by KFS through a Zonal Forest Manager, Nandi North. The forest comprises 3,098.4 ha of closed-canopy forest, 1966.2 ha of exotic tree plantation, 210 ha planted with tea in the Nyayo Tea Zone and 1468.5 ha of shrub, grassland and wetland or under cultivation (KPFMP, 2011).

The forest has been managed by KFS with communities continuing to access resources both formally and informally. According to Nandi forest rules under Forest Act Cap 385 which was the legal framework that allowed the adjacent communities to accrue some forest resources, only allowed those adjacent households following forest products and tangible benefits without any charge or permit; collection of firewood, wild berries and fruits, placing of honey boxes in the forest and grazing of cattle other than sheep and goat

on open grassland. The resources outside the forest have continued to decline due to increasing population coupled with commercialization of the forest benefits and increasing range of users. This has resulted to increased pressure on the forest resource in public forest estates. To address this concern and meet the multiple needs, forest management strategy involving different stakeholders is desirable.

Site Characteristics (Biogeography)

South and North Nandi and Kakamega forests form part of the western rainforest and the eastern most fragment of the Guinea-Congolian phyto-geographical region. The area occupied by these forests was once extensive, but has steadily declined due to high population pressure. The South Nandi forest reserve was once adjoined to Kakamega forest but has been separated due to excision and deforestation (KPFMP, 2011).

Climate and hydrology

Nandi south receives a mean annual rainfall of 1600 to 1900mm per year. The rain is bimodal but the area is generally wet throughout the year. The district has temperature range of 18-24°C (KPFMP, 2011). The forest station is mainly drained by the Kimondi River, which merge with Sirua River to form the river Yala which flow into Lake Victoria. The forest is the source of water that flow into Nzoia cluster II water project that supplies water to Kakamega and adjacent towns. Other rivers include Chemogonja and Cheptaburbur. The rivers are perennial and provide water for domestic and industrial

use and have waterfalls, which can be harnessed for hydroelectric power (District Development Plan, Nandi South 2008-2012, GOK, 2008).

Socio- economic activities

The area is suitable for agricultural purposes and the major crops that do well include maize. Potatoes, green peas beans, tea and wheat. The area is also suitable for vegetable such as cabbages, tomatoes, and spinach. Livestock practiced include cattle, goat and sheep. Most farmers do mixed farming.

3.3.1.2 Masaita Forest Block

Masaita block covers 4152 ha and lies between longitudes 35°30`and 35°40` east and west. Latitude, it lies between 0°06` and 0° 09` south. On the eastern side it borders the Nakuru – Eldoret road while in the north, it borders Kamwingi settlement scheme, and Makutano forest. Toward the south is the Londiani Forest which was once part of Masaita. Part of the forest block is in Nakuru County while the remainder in Kericho County. The railway line which passes across the forest is a distinct feature which divides the forest into counties. The bulk of the forest is situated in Nakuru County (Masaita Management Plan, 1995).

History of the forest

This is an area or part of the previous great Abardare Forest reserve whose portion extended to some part of the Rift Valley. The great portion includes the present south

Mau Forest Reserve, Molo Forest Reserve, Mountain Londiani Forest Reserve and Londiani Forest Reserve among others.

Before 1972, Masaita block was part of the Londiani demonstration forest, which comprised Masaita, Kedowa and Londiani blocks. The three large blocks were administered by a forester stationed at Londiani Forest Station under the District Forest office- Kericho. In 1972 ,there was need to make the college independent from the large Londiani demonstration and have Masaita as a college block to be used for training forestry students. Hence that was done and to date the block is full under the management of the college (Masaita Management Plan, 1995).

The communities neighboring the forest had some provision to access some forest products which included collection of firewood, grazing of cattle ,collection of herbal medicine, fodders, honey and to engage in some activities such as growing of crops, charcoal production etc. under the forest Act Cap 385 of 1968.

Climate and hydrology

Most part of Kericho County receives high rainfall averaging 2280 mm annually. The maximum rainfall is received in the month of April to September. Since it is a high altitude zone, Masaita block has low temperatures throughout the year with maximum temperature at 21.20°C and minimum temperature at 9.68°C.The mean annual temperature is 15.48°C (Masaita Management Plan, 1995). The forest is drainage by river Masaita and other small seasonal rivers.

Vegetation

Masaita block is a tropical montane forest vegetation classification based on latitudes. It comprises plantation with exotic tree species that covers 40%, natural forest 45%, open grassland 7%, research plots 1%. The major exotic species are softwood which comprises *Pinus patula* and *Cuppressus lustanica*, and the major hardwood exotic species are *Eucalyptus saligna, Eucalyptus grandis, and Eucalyptus maculata.* The indigenous species include; Olea species, Croton *megalocarpus, Croton macrostachyus, Prunus african,Teclea* species and *Dombeya quetzenii*. The dominant herbs and shrubs found within the area are *Achyranthes aspera,barleria ventracusa,Cyathea humilis* and *Kalachoe densiflora.*

Socio- economic activities

The area is suitable for agricultural purposes and the major crops that do well include; maize, potatoes, green peas, beans, pyrethrum and wheat. The area is also suitable for vegetable such as cabbages, tomatoes, and spinach. Livestock practiced include cattle, goat and sheep.

3.4 Study Population

According to Obua (1996), local communities living within a range of five kilometers from the forest boundary are directly affected by the presence of a forest and the greatest impact is extended by them. This community would be important when formulating integrated strategies for sustainable management of forest. Therefore, the population of

this study was forest adjacent households, Community Forest Association officials, and Kenya Forest Service personnel. Basing on records from the administration officers on the ground, there are   approximately 1500 households consisting of 755 and 745 adjacent to Kimondi and Masaita respectively in the eight villages that are within 5km radius.

3.5 Sampling Design

3.5.1 Sampling Techniques

The target population was the households living in eight villages adjacent to the forests with a radius of 5km from the edge of the forest. In planning the study, a household was considered to be a family of people living in one homestead cooking and eating together. Stratified random sampling was used to select the sample. Stratification was based on village; a total of eight villages were selected among twenty two villages adjacent to the two forests. Random sampling was employed as a probability based sampling strategy to select the households in the stratum. Through this technique a random sample is selected without bias from the accessible population and it ensures that each member of the target population has an equal and independent opportunity of being incorporated in the sample (Mugenda and Mugenda, 2003). The sampling frame was derived from information provided by the chief of the areas on the total number and names of the households within the selected villages. The same sampling frame was generated by use of computer program that determined the number of households to be interviewed randomly. Three hundred and six households were selected from eight villages (four villages with each forest block being allocated to be interviewed based on the approximate to the forest

boundary) (Table 3.1) illustrate this information. The numbers of households sampled in each forest station in each village are shown in Table 3.1.

Table 3. 1: Description of the sampled households in the study area.

Forest Station	Area	Sample villages	Total households	Sample households
KIMONDI	6745.1ha	**Chepsui**	155	31
		Mwein	200	41
		Kaptobongen	150	31
		Kamobo	250	51
		Total	**755**	**154**
MASAITA	4152ha	**Kamwingi**	170	35
		Lelsotet	185	38
		Nyakinyua	240	48
		Kapkumsa	150	31
		Total	**745**	**152**
		Grand total	**1500**	**306**

3.5.2 Sample Size

The study targeted 1500 households surrounding the forest within the range of five kilometers from the forest boundary directly affected or are affected by the presence of the forest. For every forest station stratified random sampling was done on the population of households of the forest adjacent communities that depends on the forest. Simple random sampling was carried out in determining of the households to be interviewed. Mugenda and Mugenda (2003) stated that 10-30% of the population is viable and

representative enough to yield acceptable and reliable results for generalization. Therefore, the study applied Morgan's Model (Morgan and Krejcie, 1970); Table (Appendix.iii) in determining the sample size. The sample size was composed of 306 households since our targeted population consisted of 1500 households (Table 3.2).

Table 3. 2: Sample frame work.

Unit of analysis	Target population	Sample %	Sample size	Sampling techniques
Forest adjacent household	1500	20	306	Simple random sampling
Forest officers	4	100	4	Purposive sampling
CFA officials	4	100	4	Purposive sampling

3.6 Instruments for Data Collection

The study used both interview schedule and questionnaire (appended to this report) as instruments of primary data collection. Direct observation was also used in collecting primary data. The research population was forest adjacent households. The households and other stakeholders involved in forest management who are respondents in this case were free to provide the required information on the type of forest products and other tangible forest benefits and quantities extracted from forests, household socio-economic characteristics, farming information among others.

The secondary data was obtained from relevant offices, from both published and unpublished literature including books, journals, research reports, district development

plans and statistical abstracts among others. This helped to understand the historical evolution of forest management in the area. The questionnaires were semi-structured both open and closed ended. The questionnaire method of data collection was used because it allowed for an extensive coverage of large population in a structured and focused way that permitted statistical analysis and testing of hypothesis (Guijt and Woodhill, 2002). It also allowed the respondents to answer the questions at their own convenience. Interviews were appropriate for getting information face to face from the selected households. The questionnaire was administered by the researcher and some trained enumerators on the 306 selected households during the period of February to May 2012.

3.7 Validity and Reliability of Data Collection Instruments

3.7.1 Validity of Instruments

To ensure validity, the instruments were related in terms of how effectively they sampled significant aspects of the purpose of study. According to Mugenda *et al*., (2003) validity refers to accuracy and meaningfulness of inferences, which are based on the research results. It is the degree to which results obtained from analysis of the actual data that represent the phenomenon under study. Validity therefore, has to do with how accurately the data obtained in the study represents the variables of the study. If such data is a true reflection of variables, then inferences based on such data will be accurate and meaningful. This was established by pre-testing the questionnaires in two villages in each forest. The responses were expected to address the forest benefits issues in this research for it to be valid. The instruments were discussed alongside the objectives of the study and declared valid to elicit expected results.

3.7.2 Reliability of the Instruments

Reliability is the consistency of the evaluation results (Mugenda and Mugenda 2003). The instrument should elicit similar results when administered to different samples of the same population. This was established by comparing data obtained from the pilot study and the objectives of the study. Relevant adjustments on the instruments were then done.

To ensure that the data collected was reliable, a pre-test study was conducted. In order to test the reliability of the instrument used in the study, the test - pretest method was used. According to Mugenda and Mugenda (2003), the reliability of an instrument is the measure of the degree to which a research instrument yields consistent results or data after repeated trials. To test the reliability Pearson moment of Correlation coefficient was employed and tests at ± 0.7 and based on the results the questionnaires were deemed reliable.

3.8 Procedure for Data Collection

After obtaining the necessary permits to conduct the study, the researcher and trained enumerators visited households and the questionnaire filled in his presence. This reduced loss of questionnaires in the event that they are left behind. The leaders such as forest officers and Community Forest Association officials were also interviewed by interview schedules. The households were asked about the forest products/ benefits they obtain from the forest for household consumption and commercial, quantities of each commodity they consumed per day, frequency of household forest benefits use. The substitute products and quantities usually bought from market for household consumption

when forest products are not available and their prices and their socio-economic characteristics were also asked. During the interview only one person was interviewed per household and mostly the head of the household. Direct observation which is common research method for social issues and processes was also used. In research direct observation was applied during data collection with the researcher making field note and taking photographs relevant to study. This is a useful tool for cross-checking and complementing information obtained from interviews. It is used in understanding the context in which the data was collected and thus this helps in explaining the results.

3.9 Data Analysis

The completed questionnaires were evaluated for errors before subjecting them to analysis. After the data entry, they were examined to facilitate answering the objectives of the study. Analysis of the data was done statistically using Statistical Packages for Social Sciences (SPSS program version 16) after data coding. Qualitative methods of data analysis employing descriptive statistics were used to explain the results. Responses to each variable were tabulated and grouped accordingly. Tables, frequencies and percentages were used to summarize the data. This created vital statistics that were used to describe the data. Percentage occurrences of attributes' responses were done using frequency distribution. The significance differences among expected observed attributes were analyzed by Chi-square (χ^2) while the relationships between different variables were analyzed by the Pearson correlation test. All the results were accepted as significant at $\alpha=0.05$. After appropriate analytical procedures were undertaken, the data were

presented in synthesized form using graphical techniques such as tables, bar graphs and pie charts to enable for easy inferences of the results.

3.9.1. Methods for calculating household income

Household income is the sum of income received from the farm, off-farm and non-farm activities of a single household, generally considered for a period of one year. For convenience in data collection and analysis, in this study household income and its fractional income is defined somewhat differently in the following equation:

Household Income = f (Agriculture Income + Livestock Income + Forest Income + Non-farm Income)

Where,

 a). Agriculture income composed of income from cereal crops, horticulture crops, vegetables and other cash crops received from all lands cultivated by a household, considered for a period of one single year.

 b).Livestock income composed of income received from sell of livestock, their products like milk, manure, etc., value of consumed products by a household during one year period. The livestock considered in this study are cattle, goats, sheep and donkey reared by the household.

 c). Forest Income includes the monetary value of the forest products consumed from the forests and the income received from sell of the forest products by the household during one year period. The forest products

considered in this study are timber, fuel wood, fodder, herbal medicine, and land for cultivation, grazing and thatching grass.

d). Non-farm income in this study comprise of all the income other than agriculture income, forest income and livestock income that a household receives in one year period. The non-farm income activities include government service, non-government service, private service, business, wage labour, contract works, rent from house etc.

3.9.2 Methods for valuing products

3.9.2.1 Valuation of Agricultural and Livestock Products

Agriculture and Livestock products of the households are quantified in the local units and the incomes from such products are calculated on the basis of local price. Gross income from the products were calculated first and then converted to the net income deducting the variable and fixed costs of production.

3.9.2.2 Valuation of forest products

For the valuation of quantified items/products from the forests in the monetary term, the following methods were used;

  i.   Direct pricing method (DPM):- Timber, fuel wood, edible fruits.

  ii. Stumpage Value Method: Grass, fodder.

  iii. Direct trading/Indirect Market Price Method: - price of substitute goods, surrogate price.

The study adopted the direct method in valuing forest products accrued to forest adjacent community in the study area.

3.9.3 Calculation of Gross Income and Net Income of the household

Income of the household from various sources is calculated in terms of both Gross value and Net value. Gross and Net Incomes were calculated as follows:

Gross Income = Gross Value = Quantity consumed and sold × unit value (price)

Net Income = Gross Income – (variable costs + Fixed costs of production)

Where,

Variable Costs = Hired labour, in-kind payments (such as meals), marketing & transportation costs, fees/royalty payments

Fixed Costs = Family labour, loss in value of tools & equipments/depreciation costs (but depreciation cost is not considered in the calculation as it has very negligible effect in the cost of inputs)

Participatory methods were used to gather information on the price of products, opportunity costs and local wage rates.

3.9.4 Socio-economic factor correlated with forest products extracted

In order to establish the relationship between the household socio-economic factors that significantly influenced forest benefits extracted from Masaita and Kimondi forests, Pearson product moment correlation analysis was used.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter present carries out analysis, presentation, and interpretation of the findings, and is divided into two parts. The first part covers personal information of the respondents, while the second part encompasses information on the forest products and tangible benefits to forest adjacent communities.

4.2 Demographic information of the respondents

During the administration of the questionnaire, respondents were required to give some general information about their demographic and socio-economic backgrounds. This information was on gender, age, marital status, occupation and level of education. These variables are important as they play an important role in the way the community adjacent to the forest interacts with the forest, the level of awareness of forest policies and the extent and nature of their participation in forest management.

This demographic information of the respondents was presented in Table 4.1 below. Most respondents were male members of the communities adjacent to the forest who were involved in forest products extraction activities (Table 4.1). The number was significantly higher at p<0.01 (χ^2=13.65, df =1). Majority of the respondents were aged between 25-55 years (78%), 19% being above 55 year and the lowest percentage were under 25 years. This indicated that there was a significant difference at p<0.01 in the age bracket of the respondents sampled in the study area (χ^2=280.86, df =3). Most male and female respondents were married and had family responsibility to cater for. Males were significantly different at p<0.01 (χ^2=616.99, df =3) to female members that were involved

in forest extraction. A significant number of the respondents (p<0.01) practiced agriculture (χ^2=1031.28, df =5) as opposed to other forms of occupations. About a half of the respondents had primary education and 35% proceeded for secondary education. Primary educations significantly (p<0.01) influenced extend of involvement in the extraction from the forest products (χ^2=220.56, df =5).

Table 4. 1: Demographic information of respondents.

Demographic information of the respondents	n	%
Gender		
Male	182	60.7
Female	118	39.3
Age		
<25	9	3.0
25-55	234	78.0
>55	57	19.0
Marital Status		
Married	261	87.0
Widowed	21	7.0
Single	14	4.7
Unspecified	4	1.3
Occupation		
Agriculture	258	86.0
Business	15	5.0
Private job	9	3.0
Government job	15	5.0
Casual and others	6	2.0
Education		
Non formal	10	3.3
Primary	166	55.3
Secondary	105	35.0
Tertiary	19	6.4

4.3 Forest products and benefits from forest.

The results indicated that almost all forest adjacent households (97%) benefited in one way or the other from the forests. These benefits were categorized into five groups: grazing, land for cultivation (non-residential cultivation), firewood, medicinal herbs, fodder, timber logs, withies and others (poles, posts, rafters, ropes, thatching grass, wild honey and vegetables). Table 4.2 shows summary of these products/benefits that the community obtains from the forest ecosystem while Plates No. 9,10,13,15 and 16 (Appendix iv) illustrate some of these products and benefits.

Table 4. 2: Forest products/ benefits collected under two Forest Acts.

Forest Products	Percent of respondents for Forest Act Cap 385	Percent of respondents for Forests Act, 2005
Grazing	41	18.3
Land for cultivation	32.7	15
Firewood	18.3	29
Medicinal herbs	1	1.3
Fodder	1.3	10.7
Timber logs	2	3.3
Withies	0.3	3
Others	3.4	19.4
Total	**100**	**100**

The findings in Table 4.2 show that under Forest Act Cap 385, the respondents accrued the following products and benefits; grazing, land for cultivation, firewood, logs for

timber, fodder, medicinal herbs, withies, logs for charcoal, posts and poles. The percentage collection increased in the Forest Act Cap 385 with only grazing and land for cultivation percentage benefits reducing in the current legislation.

Based on the knowledge of any forest legislation in forest management, the findings revealed that 95% of respondents were aware of forests legislations while 5% they did not have any knowledge. This implies that awareness about the legislation is important determinant for household decision to legally accrue forest benefits and their role in sustainable management of the forest. Respondent's awareness of forest legislation on extraction of forest benefits was very high (92%). This implies that majority of respondents knew well about the laws although it shows the need to always provide civic education on the laws. Again, the findings revealed that 84% were aware of the changes in the legislation in relation to forest extraction. The expected goodness of fit deviation between observed and expected was highly significant (χ^2=138.72, df=1, p= 0.01). This implies that most of the respondents were aware of the changes in legislation which is an important determinant for household expected benefits from the forest and rules that governs access.

Table 4. 3: Effect of Legislation changes on the availability of forest benefits.

Criteria	Percent of respondents
Very difficult	6.7
Difficult	48.3
Easily available	30.0
Not applicable	15.0
Total	**100.0**

The findings indicated that 55% of the respondents said that there were difficult to very difficult availability of forest products in the current legislation as compared to 30% who indicated that it had became easily available. This shows that there was much effect imposed by the change in legislation. Respondent's participation in Community Forest Association was 68% compared to 32% who did not participate in CFAs. This implies that communities are positive about the legislation since majority has agreed to one of the clause that indicates for one to benefit they should be members of the association.
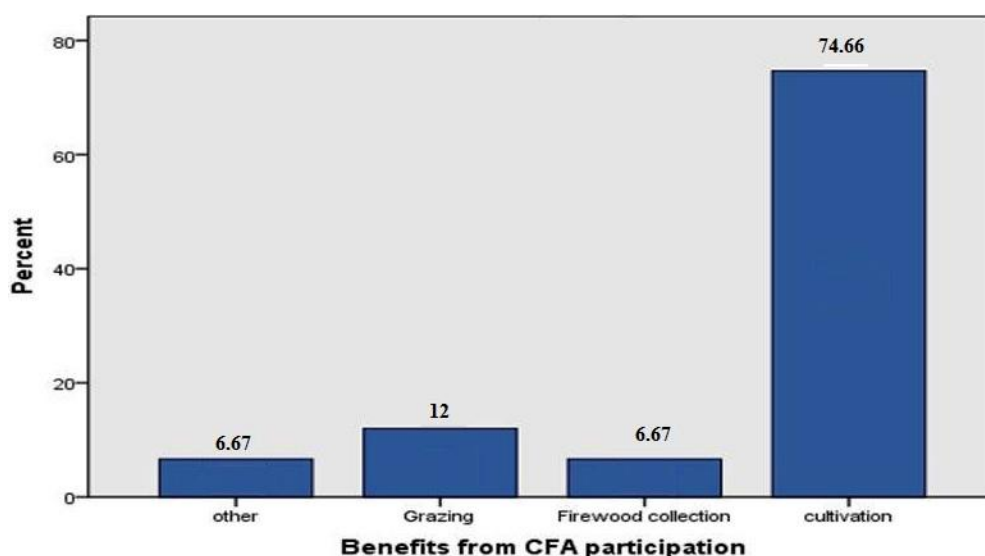
Figure 4. 1: Products to Community Forest Association

From the findings, CFAs members accrued more benefits from cultivation followed by grazing, firewood and other benefits respectively. There were significant differences in the proportion of expected and observed numbers of local community accruing various benefits as a result of joining CFAs (χ^2 =396.96, df =3, p < 0.01). This implies that there are products for communities who are members of community forest association.

4.4 Quantities and value of products and other tangible benefits extracted from forests.

Direct retail prices of forest products identified were obtained and the average can be seen in Table 4.4. The findings showed that with reference to Forest Act Cap 385, 41% of the respondents have been grazing in the forest with an average of 120 heads of cattle per year which contributed to Ksh.3000 annually to household income. The respondent that acquired land for cultivation from the forest on average of 3 acres contributed to Ksh.6000 p.a, while the respondents who had been collecting firewood on average of 325 headloads earned Ksh.16250 p.a. Annual log for timber collection amounted to 2 metric tonnes on average, which contributed Ksh.4500 p.a. The respondents have also been collecting withies of about 193 pieces which contributed to Ksh.1930 while an average of 5 kg of medicinal herbs were collected which contributed Ksh.150 p.a . In the order of priority, the communities adjacent to forest have been grazing without any problem and collecting firewood as indicated by the findings in the Table 4.4. All households sampled depended on the forest for forest products and benefits worth Ksh.32, 830 annually.

Under the current Forests Act, 2005 (Table 4.4), local community depends more on firewood from the forest. On average 100 headloads is consumed per household per year contributing Ksh. 7,000 annually. This product was reportedly consumed daily as it was the only readily available and affordable source of energy for most households adjacent to the forests. Fodder (grass cut) was valued at Ksh. 2,500 on average of 50 gunny bags per household. Logs for timber and withies extracted contributed Ksh. 2,000 and Ksh. 1,500 respectively to households. Grazing contributed only Ksh. 1,200 (KFS Royalties- Ksh. 50 per cow per month averaged within 12 months of grazing). Medicinal herbs contributed the least to each household (Ksh.250). Therefore basing on DPM method, it can be observed that all households sampled depended on the forest for forest products worth Ksh.23700 each in the year.

Table 4. 4: Quantities and value of forest product extracted.

Products	Units of extraction Forest	Quantity extracted per annum		Average unit retail price		Direct annual value in Ksh. per household	
		Act Cap 385	Act, 2005	Act Cap 385	Act, 2005	Act Cap 385	Act, 2005
Grazing	1*	120	24	25	50	3,000	1,200
Land for cultivation	Acres	3	0.5	2,000	3,500	6,000	1,750
Firewood	Headloads	325	100	50	70	16,250	7,000
Medicinal herbs	Kg	5	5	30	50	150	250
Fodder (cut grass)	Gunny bags	50	50	20	50	1,000	2,500
Logs for Timber	Metric tonnes	3	2	1,500	2,000	4,500	2,000
Withies	Pieces	193	100	10	15	1,930	1,500
Others e.g. wood for charcoal, Posts and poles							7,500
Total						**32830**	**23,700**

1- Measuring quantities consumed by cattle during the day of grazing was not easy to find because the extraction involved physical grazing of cattle in the forests.*

The values of forest benefits extracted were shown in Figure 4.2 below. The findings show that 30% of the respondents earn less than Ksh.10, 000, 28% earn between Ksh.10, 001 -20, 000, 19% earn Ksh.20, 001- 30,000 and 13% earn Ksh.30,001-40,000 while less than 10% earn more than Ksh.40, 001. This shows that, the majority of households'

benefits were more for domestic than commercial ways of making money from the forests.
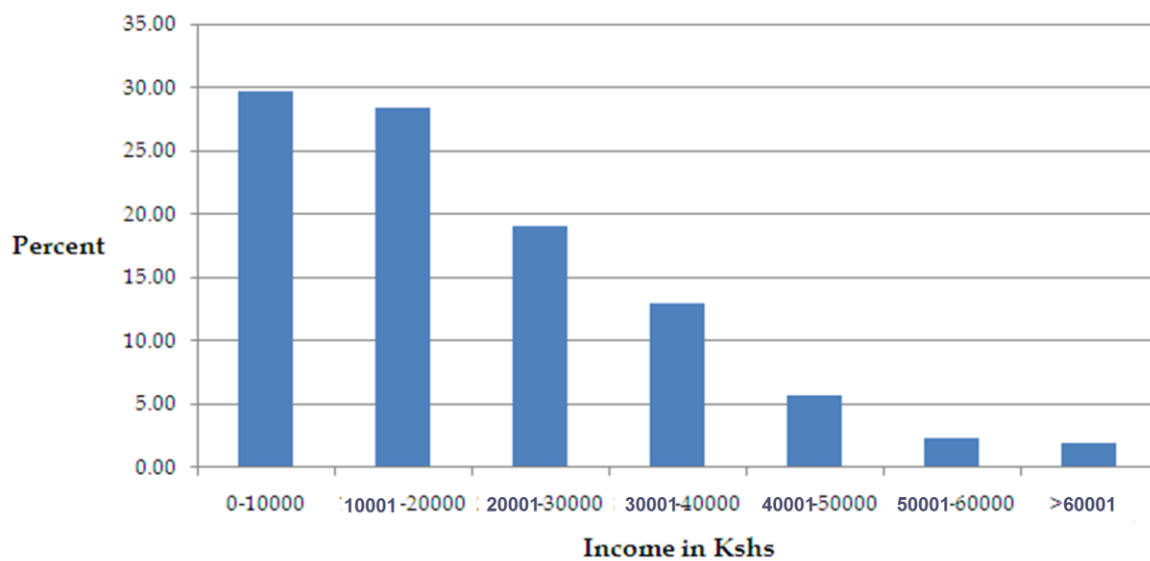
Figure 4. 2: Forests products income

4.5 Socio-economic factors influencing extraction of forest products.

Further respondents were asked of their household socio-economic characteristics. The findings are as represented below.

Table 4. 5: Number of members per household.

Members of household	Percent
0-5	34.3
6-10	49.3
11-15	13.3
15 and above	3.0
Total	**100.0**

From the findings majority had 6-10 household members, followed by 0-5, then 11-15 and least percentage was recorded in 15 and above members per household.
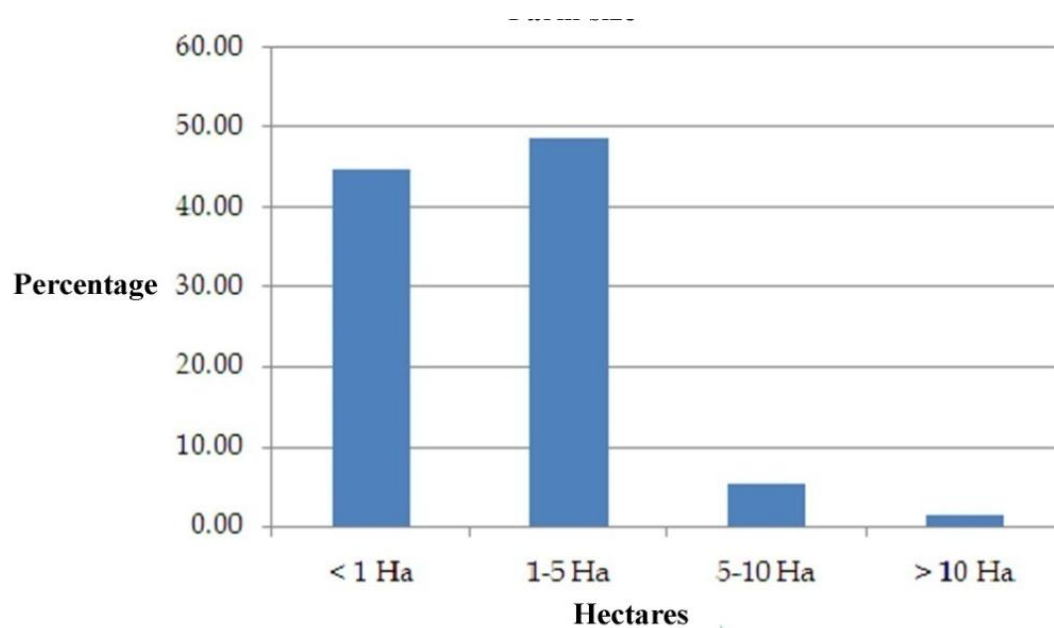
Figure 4. 3: Farm sizes of the households.

High percentage (49%) of respondents had 1-5 hectares of farm, 45% had less than a 1hectare, 5% had 5-10hectares while only 1% had more than 10.0 hectares. The majority of household have land less than 2ha.

Table 4. 6: Land use practices among respondents

Land use practices	Percent
Crop production	15.7
Livestock	1.0
Mixed farming	83.3
Total	**100.0**

From Table 4.6, larger population of the respondents practiced mixed farming. One quarter of the respondents practiced crop production while only 1% kept livestock.
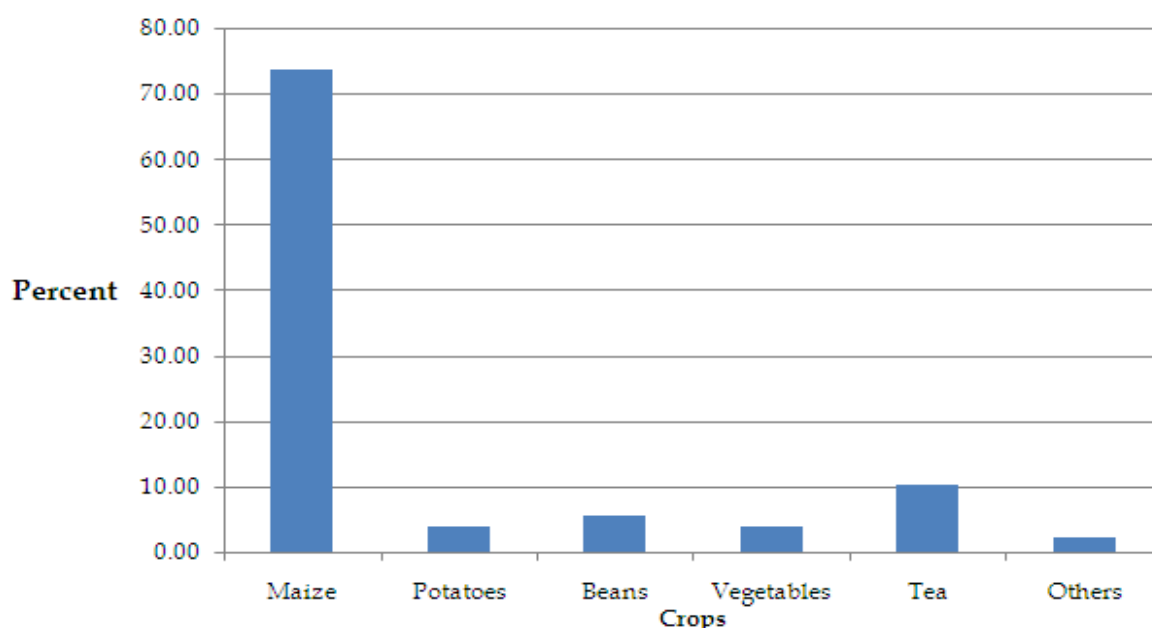
Figure 4.4: Types of Crops grown by the households.

Majority of the respondents grew maize. About twenty six percent of the respondents engaged in farming of potatoes, beans, vegetables, tea and other crops.
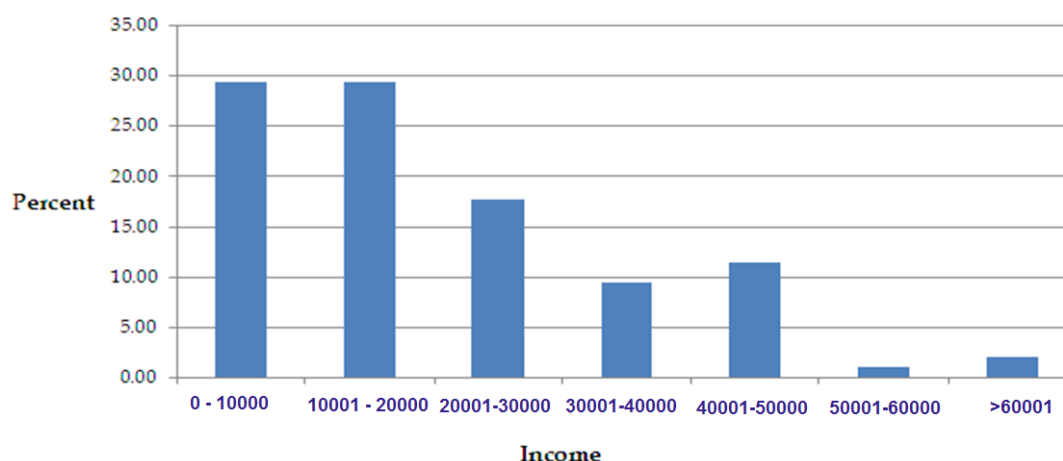
Figure 4.5 : Total income from on-farm activities

The Figure 4.5 revealed that two thirds of the respondents earned less than Ksh. 20, 000 from on-farm activities. The rest earned amounts more than Ksh. 20, 001 from on-farm activities.

Table 4. 7. Cost of Production of crops on farm.

Cost of production (Ksh.)	Percent
0-10000	34.7
10001-20000	30.0
20001-30000	16.3
30001-40000	3.7
40001-50000	5.7
50001-60000	1.3
> 60001	8.3
Total	**100.0**

Table 4.7 revealed that two thirds of the respondents spent less than Ksh. 20,000 on farms. A quarter of the respondents spend between Ksh. 20,001-30,000 while about 19% spent more than Kshs .30,000 for their crop production activities. Again, 81.7% agreed to

be keeping livestock in addition to crop farming while only 18.3% were not livestock keepers. About two thirds of the livestock keeper kept cows and 15% kept sheep while the rest kept goats, donkeys among other animals (Table 4.8).

Table 4. 8: Type of livestock Kept

Livestock	Percent
Cows	61.7
Sheep	15.0
Goats	3.0
Donkey	0.7
Others	19.7
Total	**100.0**

Table 4.9 revealed that majority of respondent earned less than Kshs.10, 000 form livestock. Income of more than Kshs. 20,000 to Kshs. 30,000 and above Kshs. 60,000 ranges accounted for one eight percent each. The rest of income range had less than 14% respondents.

Table 4. 9. Income from livestock.

Income range (Ksh)	Percent
0-10000	30.0
10001-20000	13.7
20001-30000	16.3
30001-40000	10.3
40001-50000	8.7
50001-60000	5.0
> 60001	16.0
Total	**100.0**

4.5. Correlation of socio-economic factor with forest products extracted

The correlation between the socio-economic characteristics of the respondents and the level of forest benefits extracted from the forest were as showed in the Table 4.10 and 4.11 below. The correlation during the period of the Forest Act, Cap 385 of 1968, shows that there existed also both positive and negative relationship of different magnitudes between household socio-economic characteristics and various forest products/benefits extracted from the forest. A Pearson Correlation (*r*) shows that there exist a positive relationship of significant among the following variables ($\alpha=0.05$); farm size and grazing (r=0.338), household size and firewood (r=0.292), Age and firewood (r=0.221), household size and grazing (r=0.199), Age and grazing (r=0.198), farm size and firewood (r=0.167), education level and thatching grass (r=0.166). This implies that these independent variables significantly influence the amount of forest product/benefits extracted. The negative correlation of significant was noted among the age and post/poles (r=-0.166) and education level and grazing (r=-0.153).

Table 4. 10: Correlation of socio-economic and quantity of forest products extracted under Forest Act Cap 385 of 1968.

		Age	Education level	Household Size	Farm Size
Logs for timber	Pearson Correlation	-0.034	0.069	0.012	.041
	Sig. (2-tailed)	0.557	0.231	0.831	0.484
Firewood	Pearson Correlation	0.221**	-0.086	0.292**	0.167**
	Sig. (2-tailed)	0.000	0.135	0.000	0.004
Wood for charcoal	Pearson Correlation	-.039	0.086	-0.003	-0.075
	Sig. (2-tailed)	0.498	0.137	0.952	0.196
Poles/post	Pearson Correlation	-0.116*	0.067	-0.067	0.012
	Sig. (2-tailed)	0.044	0.247	0.250	0.833
Medicinal herbs	Pearson Correlation	0.102	-0.033	0.016	0.060
	Sig. (2-tailed)	0.076	0.569	0.785	0.298
Fodder(grass)	Pearson Correlation	-0.007	-0.054	0.014	-0.072
	Sig. (2-tailed)	0.902	0.355	0.804	0.211
Fruits	Pearson Correlation	-0.050	-0.103	-0.078	-0.008
	Sig. (2-tailed)	0.393	0.075	0.177	0.892
Grazing	Pearson Correlation	0.198**	-0.153**	0.199**	0.338**
	Sig. (2-tailed)	0.001	0.008	0.001	0.000
Thatching grass	Pearson Correlation	-0.057	0.116*	-0.060	0.018
	Sig. (2-tailed)	0.327	0.045	0.303	0.762
Agricultural land	Pearson Correlation	0.039	-0.009	-0.113	0.029
	Sig. (2-tailed)	0.496	0.882	0.051	0.615
Honey	Pearson Correlation	0.147*	-0.055	0.012	0.039
	Sig. (2-tailed)	0.011	0.345	0.833	0.498
Withes	Pearson Correlation	-0.068	0.098	-0.016	-0.054
	Sig. (2-tailed)	0.238	0.090	0.789	0.355

**= Correlation is significant at the 0.01 level (2-tailed)
*= Correlation is significant at the 0.05 level (2-tailed).

Table 40. 11: Correlation of socio-economic and quantity of forest products extracted under Forests Act, 2005.

		Age	Education level	Household Size	Farm Size
Logs for timber	Pearson Correlation	0.007	0.149**	0.038	0.138*
	Sig. (2-tailed)	0.908	0.010	0.516	0.017
Quantity of Firewood extracted	Pearson Correlation	0.133*	-0.055	0.336**	0.063
	Sig. (2-tailed)	0.021	0.342	0.000	0.274
Wood for charcoal	Pearson Correlation	-0.034	-0.055	0.012	0.039
	Sig. (2-tailed)	0.560	0.345	0.833	0.498
Poles/posts	Pearson Correlation	-0.004	0.007	0.083	0.093
	Sig. (2-tailed)	0.946	0.905	0.153	0.106
Medicinal herbs	Pearson Correlation	-0.035	-0.053	0.005	-0.071
	Sig. (2-tailed)	0.548	0.359	0.929	0.221
Fodder (grass)	Pearson Correlation	0.022	0.120*	0.018	-0.008
	Sig. (2-tailed)	0.705	0.038	0.760	0.895
Quantity of Fruits	Pearson Correlation	-0.034	-0.055	-0.093	-0.080
	Sig. (2-tailed)	0.560	0.345	0.109	0.169
Grazing	Pearson Correlation	0.213**	-0.105	0.210**	0.409**
	Sig. (2-tailed)	0.000	0.069	0.000	0.000
Quantity of Land for cultivation	Pearson Correlation	-0.072	-0.154**	-0.059	-0.052
	Sig. (2-tailed)	0.212	0.007	0.312	0.371
Quantity of Honey	Pearson Correlation	0.205**	-0.076	0.017	0.055
	Sig. (2-tailed)	0.000	0.188	0.769	0.346
Quantity of Withies	Pearson Correlation	-0.014	0.106	0.096	-0.063
	Sig. (2-tailed)	0.811	0.066	0.097*	0.277
	N	300	300	300	300

**= Correlation is significant at the 0.01 level (2-tailed).
*= Correlation is significant at the 0.05 level (2-tailed).

In Forest Act,2005, the positive significant correlation at α=0.05, was noted to exists among Education level and logs for timber (r=0.149), Farm size and logs for timber(r=0.138), Age and firewood(r=0.133), household size and firewood(r=0.336), education level and fodder(r=0.120), Age and grazing (r=0.213), household size and grazing (r=0.210), farm size and grazing (r=0.409), and among age and honey (r=0.205). While the negative significant correlation at α=0.05, was noted between education level and land for cultivation (r=-0.154).

CHAPTER FIVE

DISCUSSIONS

5.1 Introduction

This chapter contains the discussion of the results of the study.

5.2 Demographic and socio-economic information of the respondents

The high number of male that are involved in the forest extraction in both Kimondi and Masaita forest would be because more men were interviewed than female which was not mere coincidence. This state may have been influenced by a state where the interviewer found the man and woman of the sample household and by design and culture, the man will talk as the head of the household. In such a circumstance, it was only logical to administer the questionnaire to the man. Women were also a bit timid to talk when their husbands were around, again due to cultural inhibitions. This is further an indication that male have more say on the household decision making process on utilization opportunity given to forest adjacent communities under the forest Act Cap 385 of 1968 and forests Act No 7 of 2005.

Most respondents were middle aged people. These are elderly and mature people who were in-charge of decision making in the household followed by old aged and young respondents. The age structure is important because it gives the clear picture of respondents' involvement in forestry activities into the future. The high percentage of respondents being in the middle age is an indication that they are most beneficiaries of

forest products. Hence, the need to determine how it influences the quantity of forest products extracted from the forest in the future.

Most respondents were married in both Masaita and Kimondi forests. This implies that they are in a position to procreate and hence more dependents on the forest resources in the future hence the need for legislation that takes into consideration the needs and aspiration of the future.

The greater number of respondents in agricultural practice means that the respondents depend more on forest to fulfil their farm needs to be received from the forest. This was an indication that most of the population adjacent to both Masaita and Kimondi forests were either crop or livestock farmers. The Forest Act Cap 385 of 1968 and No. 7 of 2005 gave forests adjacent households' permission to practice agriculture in the forest hence providing more land to extend the farming activities into the forest land thus expanding their horizon economically.

Kenya Forest Working Group (KFWG) (2008) indicated, the adoption of PFM by Kenya government and enacting it in the Forests Act No. 7 of 2005 was a noble step, that was defined as forest management approach which deliberately involves the forest adjacent communities and other stakeholders in management of forests within the framework that contribute to community's livelihoods.

The majority of respondents of the communities around the forests had only basic education background. This indicates that members having lower education are involved

in forest activities and hence this enabled them to give accurate information on economic and other benefits accrued to them from either their own farms or forest.

These variables are important as they play an important role in the way the Community adjacent to the forest interacts with the forest, the level of awareness of forest legislations and the extent and nature of their participation in forest management.

5.3 Forest products and benefits from forest

High number of the respondents depended on the forest resources for domestic need and to some extend for commercial. The extracted products included: Grazing, land for cultivation (non-residential cultivation), firewood, medicinal herbs, fodder, and timber for logs, withies, posts, poles, rafters, ropes, thatching grasses, wild honey and vegetables. Grazing was a very important benefit accrued by the adjacent household under the forest Act Cap 385 of 1968. This was followed by cultivation (non residential), and then firewood. This is attributed to the fact most of the community around the forest are livestock farmers and crops grower. Generally speaking, the types of products/benefits that the communities adjacent to forests collected were for their subsistence needs and surplus for sale. This definitely contributes to their livelihood. Temesgen *et al (2007)* noted that unless communities access forest resources to support their livelihoods, the pressure will rise to breaking point and further forest destruction will follow. Therefore sustainable forest management is enhanced when communities are provided with clear and recognized access rights to the forest resources In the current Forests Act, 2005, high number of communities collected firewood, grazed their animals

in the forest and rented land for cultivation in that order. On average, each household kept up to 10 livestock. KFS grazing royalties stipulated Ksh. 25 for every cattle per month. In the current legislation, grazing fee has increased to Ksh. 50 and consequently decreased the number of livestock kept by each household to 2 averagely. Firewood was most collected product since most households depend on it as the only source of energy in the rural set up because it is cheap source of energy. This shows again that the types of products/benefits that the communities adjacent to forests collected were for their domestic needs and little surplus for sale. This study reveals that under the two legislations households were allowed to collect various forest products from the forests under the user right but Forests Act ,2005 restricted such access more to only CFA members and has various terms and conditions   to be observed by the community before collection of forest products from the forests (GOK 2005). This generally may not become an incentive to trigger them to participate more in management and conservation of the forest as it was the objective of reform.

The high numbers of respondents were aware of the forest legislations in place and the changes that had been effected in the new legislation to govern forest benefits available and their accessibility. Thus this will have some impacts on decision to legally accrue forest benefits and their role in sustainable management of the forest.   This is a remarkable step by the civil societies and foresters to ensure that communities adjacent to the forest are aware of the rules governing the resource extraction. This enables the respondents to determine the ease of extraction of forest resource in the current legislation as compared to the previous one. Since they have small parcels of land for cultivation, they have to satisfy their needs with forest resources. The Forests Act No 7 of

2005 restricts households' participation in PELIS to members of CFA only (GOK, 2005). Under PELIS forest adjacent communities are allowed to grow crops which encouraged forest tree growth. Joining CFA enhanced the community members' access to forest products, implying that PFM conferred high access to CFA members than non-CFA members (Koech *et al*., 2009). Also this gives them a chance to to participation in conservation and management of forests through CFAs. It was similarly noted in Nepal that households involved in various decision-making activities, collected more fuel wood and other benefits (Adhikari *et al*, 2004). This observation concurs with the results in this study under the current legislation.

The high percentage of the respondents expressing their un-ease to access forest products noted that the impact was from the new rules of extraction. CFAs non-membership, increase in population that has cause pressure on the forest resources hence their high market demand, change in priorities in KFS to establishment of more plantations e.t.c. would also contribute to the scenario.

5.3 Quantities and value of forest products and other tangible benefits extracted

Under Forest Act Cap 385, grazing was the highest benefit for the respondents while in Forests Act, 2005, the highest benefit is from firewood. This implies that more people used to keep animals in the previous legislation probably due to availability of more land for grazing and low grazing fee compared to under Forests Act, 2005. The high demand from the ever increasing population may also the driving force behind the demand for cheap source of energy (firewood) and also the high value of the forest products in the conventional market. This is also observed in the demand for other forest products like

fodder, logs for timber, withies e.t.c. Contrary to the expectation, the old legislation seems to have offered more benefits to the forest adjacent communities and hence more returns annually. The low per capita in the current legislation could be due to current value fluctuation, low amount of firewood available for extraction currently and reduced renting space for cultivation. Therefore, the respondents' income from sells of forest products was low. This shows that, the majority of households' benefits more domestically than commercially from forests. This was also observed by Odera (2003), who found out in his study that 'Although colonial forest policies quite often stressed "satisfaction of the needs of the people must always take precedence to revenue generation", communities were, at best, restricted to subsistence extraction, of prescribed items such as head loads of fuelwood' .The study also revealed that the two legislations allowed planting of both crops and trees on logged areas and when trees attains three years the moved to other areas. However, the households allowed cultivate in the forest are not allowed to fell trees on those land unless they have a license.

5.4 Socio-economic factors influencing extraction of forest products

Large household members of communities adjacent to forests need a lot of resources from the forests to cater for their needs. This implied that they needed more land for cultivation and for livestock grazing hence more extraction as the number of the households increase. These results agrees with Chhetri (2005) that household with large family size are in better position to utilize the forest resources and hence likely to participate more in PFM to meet their needs for forest products. Forest products extraction is exacerbated by the fact that the same respondents have small parcels of land for their cultivation and holding large number of animals. This causes them to engage in

mixed farming practices that are sometimes less rewarding hence low annual returns as is seen in this study. Furthermore, this contributed to pressure on them to earn more mean for off-farm activities including forest extraction in order to supplement their meager means. Therefore, due to small parcels of land owned by most households (1-5ha), land size as a factor has prompted the need to produce more forest products to meet the household material needs that results to access to forest.   Also, depending on the cost and expertise needed to grow certain crops or keep certain animals, most households resort to maize farming and cattle rearing which seems to be the cheapest form of farming. This is the scenario in this study area. The low education level of the household head is also a contributor to their inability to secure more remunerative employment opportunities elsewhere, thereby resorting to farming activities. Education increases household's off-farm employment opportunities. Furthermore, highly educated members of the household tend to look for greener pastures in off-farm activities.

5.5 Correlation of socio-economic factor with forest products extracted

A correlation is a number between -1 and +1 that measures the degree of association between two variables. The correlation coefficient value (r) ranging from 0.1 to 0.29 is considered to be weak, from 0.3 to 0.49 is considered medium and from 0.5 to 1.0 considered strong. A positive value for the correlation implies a positive. A negative value for the correlation implies a negative or inverse correlation.

The significant positive correlation implies that an increase in the household socio-economic characteristics is associated with an increase in the quantities of forest products

extracted from the forest and vice versa. Significant negative correlation implies that an increase in the household socio-economic characteristics is associated with a decrease in the quantities of forest products extracted forest and vice versa.

As noted in the results, more animals were kept in the previous legislation due to availability of large farm sizes. The reverse was true for the current legislation which then favoured extraction of more fodder instead. This would be because people with large farms tend to keep more livestock hence they will need more grazing space from the forest. However, the relationship is stronger in the current Act compared to Forest Act, Cap 385 of 1968. Previously, there was more space for grazing which allowed farmer to keep as many livestock as possible. The current Forests Act 2005 restricts the farmers to keep a limited number of livestock and that for them to continue enjoying the accruable benefits they have to participate in the forest management.

Household size significantly correlated positively with firewood extraction (r=0.336, p<0.001), similar to Forest Act, Cap 385 of 1968 (r=0.292, p=0.001). This implies that increase in Household size will result to demand of more firewood extracted and vice versa. More individual in a household will demand more source of energy which is easily obtained from firewood. This result agrees with what were the observations of Chhetri (2005) that households with large family size are in better position to utilize the community forest resources. Similarly, Dolisca et al. (2006) in a case study from Haiti identified household size to have a positive effect on social level participation in forest management. Again, according to Ogada ,(2012) in his study of Kakamega he found

out that large households would be better placed in terms of labour for extraction of forest products as they may also be viewed as having greater demand for forest products which they may not satisfy front on-farm production. However, the relationship is stronger in the current Act 2005 compared to Forest Act, Cap 385 of 1968. This implies that people are extracting less firewood under the current Act because of the restrictions and higher demand for firewood due to increase in population.

The age of the household head significantly correlated positively with grazing in Act, 2005 ($r=.213$, $p<0.001$), similar to Forest Act, Cap385 of 1968 ($r=0.198$, $p=0.001$). However, the relationship is stronger in the current Act 2005 compared to Forest Act, Cap 385 of 1968. This implies that older household heads were the owners of the livestock hence the need to for grazing space. Currently, change in culture has resulted to livestock ownership even among young aged household heads. This means that they will also strive to obtain this grazing space for their livestock in the forest. In PFM system this age-group are encouraged to participate more in forest management since they will be the long time beneficiaries from the forest.

Again, age of the household head correlated negatively with poles/posts extracted from the forest under Act 2005 ($r= -0.004$) but was not significant. The same significantly negatively correlated with poles/posts extracted from the forest under Forest Act, Cap 385 of 1968 ($r= -0.116$, $p<0.005$). This implied that older households needed less poles/posts for majorly house construction since they had house already. They would go

for other construction materials in case they needed better houses. The young aged household heads would need more poles/posts since they still had young members of their household who needed to construct their own houses as they grow up.

Consequently, education level significantly correlated negatively with land for cultivation from the forest under Act 2005 (r= -0.154, p< 0.001), similar to Forest Act, Cap 385 of 1968 (r= -0.153, p= 0.001). Since the relationship is weak, higher education level resulted to lesser demand for forest land for cultivation since the respondent had acquired another means of income for the household up keep. However, the relationship being weak means that members of household adjacent to the forest could still cultivate from the forest in spite of the education level of the household head. The change of the Act has not had a big impact on the extent of land for cultivation demanded in relation to the level of education of the household head.

Generally, it is noted that the household socio-economic characteristics that influence the household adjacent to forest to extract forest products are: farm size, household size, age of household head and education level of the household head. They show strong relationship under Forests Act 2005 than in Forest Act, Cap385 of 1968. This implies that they are getting fewer products from the forest under the current Act 2005 which might be as a result of restrictions imposed to them by the Act. This is likely to discourage participatory management of the forests in Kenya which in essence was the core reason for revising the Act.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

This chapter highlights information on conclusions and recommendations for management and for further research.

6.2 Conclusion

This study concluded that:

i.   Forest Adjacent communities were highly dependent on both forests for forest benefits and products mainly grazing, land for cultivation and firewood. Collection of medicinal herbs, fodder, timber logs, withies, ropes, thatching grass, wild honey and vegetables were subsistent harvested. Poles, posts and rafters gained commercial value in the Forests Act 2005.

ii. Forest benefits and products in term of quantity and value enjoyed by households under the old legislation (Cap 385 of 1968) were more than those under the Forests Act No 7 of 2005.

iii. Socio- economic characteristics that significantly influenced the quantity of forest benefits and products extracted from the forest by the adjacent Communities in the two forests under both forest Acts were mainly household size, farm size, education level and Age of household head.

6.3 Recommendations

6.3.1 Recommendations for management and policy makers.

Based on the findings the study recommends the following:-

(i) There is need for capacity building in the forest adjacent communities on their roles and the range of products they are allowed to collect from the forest.

(ii) There should be proper mechanisms put in place in the law on how the community could continue accruing the forest benefits on sustainable basis.

(iii)There is need for revision of policies and law that govern forests to favour the communities adjacent to the forest benefiting more from their participatory involvement in the management of the forests.

(iv)There is need to involve and support households who depends mostly on forest products in forest management strategies since they will appreciate the need for sustainable management.

(v) The communities should be enlightened on the wide range of forest environmental products and services, and their potential contribution to house hold income and welfare

6.3.2 Recommendations for Further Research

The study recommends the following areas of study

    (i) A study should be conducted on optimal benefit sharing mechanism.

    (ii) A comprehensive research should be conducted to evaluate the potential for value addition by the forest adjacent households in collaboration with private sectors.

    (iii)A research should be conducted to establish on the wide range of forest environmental products and their potential contribution to house hold income and welfare.

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APPENDICES

Appendix: i. Questionnaire

TITLE: 'EVALUATION OF FOREST BENEFITS TO FOREST ADJACENT COMMUNITIES UNDER THE FOREST ACT CAP 385 OF 1968 AND THE FOREST ACT NO0.7 OF 2005 IN KIMONDI AND MASAITA FOREST STATIONS'

I am a student of M.Sc. Forestry (Forest Economics and Management), in University of Eldoret. This interview is part of a research program that will contribute to my studies. The study evaluates the forest benefits to forest adjacent communities under the two legislations. Based on the result of this survey, the basket of products in the current legislation will be vindicated/unjustified and look into ways of developing and implementing a long term strategy for sustainable use and management of the forest under current legislation.

All information given will be treated confidential.

DATE OF INTERVIEW--

PART A. GENERAL INFORMATION
1 (a) Name of respondent---
   (b)Date of interview--
   (c)Division -- (d) Location----------------------------
   (e) Sub-location-------------------------------------- (f) Village--------------------------------
PART B. SOCIO-ECONOMIC CHARACTERISTICS
 2 (a) Gender: Male   ( )   Female   ( )
 (b) Age :   <25 years   ( )   25-55 years   ( )   >55 years ( )
 (c) Marital status: Married ( )   widower ( )   Single   ( )   others ( )
 (d) Occupation: Agriculture ( ) Business ( ) Private Job ( ) Government job ( ) Casual labor ( )   others (specify)

3. Education status

Level of education	Tick	Level of education	Tick
Illiterate		Primary	
Secondary		Tertiary College	
University		Others(specify)	

4. What is the size of your household? (Use the table below)

Family structure	Husband	Wife/wives	Children(male)	Children (female)	Other dependants	Total No.
<18 years						
19-36 years						
37-55 years						
>55 years						
Total						

Part C. Agricultural income of household

4. What is size of your farm (hectares)?

      <1 ( )   1-5   ( )   5-10   ( )   >10 ( )

5. (a) What land use do you practice on your own farm

   (i) Crop production   Yes   ( )   No   ( )

   (ii) Livestock   Yes   ( )   No   ( )

   (iii) Mixed farming   Yes   ( )   No   ( )

   (iv)Others specify   ----------------------------, ----------------------------------, -----------

Income from crops

5. (b) (i) Specify crops in the year 2011

Crop grown	Acreage	Quantity produced per year	Quantity consumed(kg)	Quantity sold(kg)	Market price (Ksh.)	Total income (Ksh.)
Maize						
Potatoes						
Beans						
Vegetables						
Tea						
Wheat						
Others						
Total						

(ii) **Cost of production in 2011**

Type of crops	Cost of inputs					Total cost (Ksh)
	Fertilizer	Seeds	Agro-Chemicals	Labour	Transport	
Maize						
Potatoes						
Beans						
Vegetables						
Tea						
Wheat						
Others						
Total						

(b). In your own opinion, how does forest contribute to your income from crops production

   (i)   Allow recycling of crop residue as it provide firewood   Yes   ( )   No   ( )

   (ii) Improved water source   Yes   ( )   No   ( )

   (iii) Control soil erosion   Yes   ( )   No   ( )

   (iv) Increase rainfall   Yes   ( )   No   ( )

   (v) Other (specify)

Income from livestock

6(a) Do you have some livestock on your farm   yes ( )   No ( )

If yes specify the livestock you keep on your own farm and net income annually earned in 2010 using the table below.

Product type	Numbers/quantity	Income per month/year	Cost of purchase of inputs			Remarks
			Feed	Agro-chemical	Labour	
Cow						
Sheep						
Goats						
Bull						
Donkey						
Pigs						
Milk products						
Others						
Total						

6. (b) In your opinion , how has forest contributed to your income from livestock production

(i) Fodder and medicine for livestock to improve their health   Yes   ( )   No   ( )

(ii) Provide grazing land/grass and browse to livestock   Yes   ( )   No   ( )

(iii) Water for livestock   Yes   ( )   No   ( )

(iv) Materials for livestock shed construction   Yes   ( )   No   ( )

(V) Other (specify)

PART D: Income of household from forest

7. (a) Do you collect any forest benefits from the forests?

   Yes   ( )   No   ( )

 (b) If yes which one, how much and what is your household income from different types of forest benefits during the past twelve months in 2011 (use the table below)?

Forest benefits/service	Unit	Quantity extracted	Price per unit	Quantity consumed	Quantity sold	market price	Total value (Ksh)
Logs for timber	Metric tonnes						
Firewood	head load						
Logs for charcoal	Stacks						
Poles/post	Pieces						
Medicinal herbs	Kg						
Fodder (Grass)	Gunny bag of 25 kg						
Fruits	Kg						
Grazing	Number of cattle						
Thatching grass	Bundles						
Agricultural land	Hectares						
Honey	Kg						
Withes	Pieces						
Others (specify)							
Total							

(c) What is the estimated distance from your home to the forest ---------------------km

 (d) How long do you take to reach to the forest, collect the products and return back to your home with the following products?

Forest benefits	Unit	<1hour	1-4hours	5-8hours	9-12hours
Logs for timber	Metric tones				
Firewood	head load				
Logs for charcoal	Stacks				
Poles/post	Pieces				
Medicinal herbs	Kg				
fodder (Grass)	Gunny bag of 25 kg				
Fruits	Kg				
Grazing	Number of cattle				
Thatching grass	Bundles				
Agricultural land	Hectares'				
Honey	Kg				
Withes	Pieces				
Others(specify)					
Total					

8. (a) Are you aware of any forest legislation that governs forest Management in Kenya.

    Yes   ( )   No   ( )

   (b) If yes are you aware of the forest user right in the forest legislation through which there are provision for you to extract some forest benefits

    Yes   ( )   No   ( )

    (c) If yes, what are some of the forest benefits you used to get from the forest in the past five years ago as of the provision of forest users right. Please rank them in order of priority

Forest benefits	Quantity extracted per year	Tick as applicable	Rank (1,2,3,)
Logs for timber			
Firewood			
Logs for charcoal			
Poles/post			
Medicinal herbs			
fodder (Grass)			
Fruits			
Grazing			
Thatching grass			
Agricultural land			
Honey			
Withes			
Others(specify)			

(d) Are you aware of any changes that has taken place in the forest legislation in Kenya
Yes ( )   No ( )

If yes, in what way have it affect the availability of forest benefits you drive from the forest
(i)   Very difficulty
(ii)   Difficulty
(iii)   Availability with ease

9. (a) Do you participate in Community forest Association (CFA)?
     Yes   ( )   No   ( )
   (b). If yes, what products do you get as a result of participating/being a member of CFAs.
   (i) Cultivation   in the forest   Yes   ( )   No   ( )
   (ii) Grazing in the forest   Yes   ( )   No   ( )
   (iii) Firewood collection   Yes   ( )   No   ( )
   (iv) Other (specify)
   (c) If No, why are you not participating/being a member of CFAs?
      (i)Cost of participating are high   Yes   ( )   No   ( )
      (ii) Am not aware of any products which can be accrued from PFM.
           Yes   ( )   No   ( )
      (iii)Others specify

(d) Are you aware of any cost incurred as a result of your participation/ being   CFAs Member?

      Yes   ( )   No   ( )

  If yes, what are the costs?

(i)   Registration fee Yes ( ) No   ( )

(ii)   Preparation of management plan Yes   ( )   No   ( )

(iii)   Participation in forest fire fighting   Yes   ( )   No   ( )

(iv)   Participation in forest planting and protection Yes   ( )   No   ( )

(v)   Time spent on association activities Yes   ( )   No   ( )

(vi)   Others (specify)

(e)   If no why are there no cost you incur?

..---

(f). Are you involved in plantation Establishment and Livelihood Improvement Scheme (PELIS)?

      Yes   ( )   No   ( )

  (g) .if yes what is the acreage of land you have under PELIS

(i) 0.5 hectares   (ii) 0.75 hectares   (iii) 1.0 hectares

(h) What crops do you grow on your plot (use the table below?)

Type of Crops	Acreage	Quantity produced per year(kg)	Quantity consumed(kg)	Quantity sold(Kshs0.)	Market price (Ksh.)	Total income (Ksh.)
Maize						
Beans						
Potatoes						
Vegetables						
Peas						
Others (specify)						

Cost of production in 2011

	Cost of inputs					
Type of Crops	**Fertilizer**	**Seeds**	**Agro-Chemicals**	**Labor**	**Transport**	**Total cost(Ksh)**
Maize						
Beans						
Potatoes						
Vegetables						
Peas						
Others(specify)						

10. (a) Apart from participating in PELIS are there any other economic activities you are involved in as an association   Yes   ( )   No   ( )

   If yes which of the following

(i)   Beekeeping   Yes   ( )   No   ( )
(ii)   Tree nursery   Yes   ( )   No   ( )
(iii)   Sawmilling   Yes   ( )   No   ( )
(iv)   Ecotourism   Yes   ( )   No   ( )
(v)   Butterfly farming   Yes   ( )   No   ( )

(c) How much do you earn per year from the above economic activities

Income group (Ksh)	Tick as appropriate	Actual income (Ksh.)
Below Ksh.10000		
Ksh.10001-15000		
Ksh.15001-20000		
Ksh. 20000 +		

Part E: Cash income of household (non farm income)

(11) (a) Mention the number of your household members engaged in different off farm activities and the amount of income earned from each source during the past twelve months

Type of employment	Number of person involved		Income earned per year (Ksh.)
	Male	**Female**	
Service (GOs and NGOs			
Employment abroad			
Contract			
Labor wage			
Family business(shop, hotel etc)			
Pension			
Other (specify)			

(b) How has forest contributed to your income from off and nonfarm sources?

(i) Employment in forest related industry /business

(ii) Increase income opportunities due to increase in forest benefits business

(iii) Employment in community development activities of CFAs

(iv) Others (specify)

12.   What challenges do you face while implementing participatory forest management?

(i)Lack of collaboration from forest authorities   Yes ( )   No ( )

(ii)Conflicts with forest authorities   Yes ( )   No ( )

(iii)Limited products compared to costs   Yes ( )   No ( )

(iv)Continued destruction of the forest by outsiders   Yes ( )   No ( )

(v)Interference by politicians   Yes ( )   No ( )

(vi)Other (specify)……………………………………………………………………….

13.   Generally, how do you compare the forest benefits today and when you were not involved in participatory forest management

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14.   Do you have any suggestions regarding the improvement of existing situation under PFM especially the forest benefits accruable to you.

Thanks you for providing me with this valuable information

Appendix: ii. Interview schedule

1. GUIDE QUESTIONS FOR KEY INFORMANT INTERVIEWS

1. Who is involved in the management of Kimomdi /Masaita forest?

2. Who has user rights over what resources/ areas of Kimomdi/ forest?

3. Sales of land that is part of Kimondi /masaita forest not allowed? Why?

4. How much do the communities contribute towards the management of the forest? Do they do a lot of management work in return for little or the other way round? Are the people doing the most forest managing work the ones benefiting from it the most?

5. Who makes decisions on how to manage the forest? Are locals (common people) represented in decision-making concerning the forest? How are their representatives chosen? What about other stakeholders (NGOs, Kenya Forest service, Private sector), how involved are they in decision-making concerning the forest?

6. Are the decision makers/ those in positions of authority accountable and to whom? Downwardly or upwardly accountable?

7. Are decisions/ regulations made by local authorities binding? Kenya Forest service or political leaders overrule decisions made by local authorities/institutions?

8. Apart from the harvesting of forest resources, what else is Kimondi /Masaita Forest used for by the local community?

9. What do you know about forest Act No 7 of 2005 and Forest Act Cap 385of 1968?

10. Are there changes in terms of forest benefits the community gets as a result of changes in legislation?

2. INTERVIEW GUIDE-KENYA FOREST SERVICE   MANAGERS

1. In what way has the communities adjacent to forest been benefitting from the forest?

2. What challenges have characterized new forest Act No.7 of 2005 structure implementation in these areas? (Generally, and specifically for each pilot area)

3. What would you say have been the successes of new forest Act No 7 0f 2005 in these areas?

4. What legal provisions have been established for PFM in Kenya? Have these been adequate in the work on PFM that has been done so far?

5. Guidelines for starting PFM in Kenya have been drafted by the government0. What, if any have been some challenges/ limitations/ constraints associated with these guidelines in the implementation of PFM in Kenya?

6. What kind of benefits are local communities allowed / not allowed to enjoy under new forest Act No.7 of 2005? How is the sharing of benefits from jointly managed forests to be shared between communities and government/ forestry dept?

7. What are/ have been the weaknesses of communities involved in forest management the former legislation? Is there anything that can be done to overcome these weaknesses now by the new legislation?

8. What have been/ are potential strengths of communities involved in forest management?

9. Could you comment on the implementation of PFM without the Kenya Forest service being in place? This question is put forward on the basis that current forest legislation on PFM in Kenya makes specific references to this service.

10. According to the Guidelines for PFM, the CFAs has be formed and registered under society Act and apply to the Director for permission to participate in management they

Appendix: iii. Morgan table for determining the sample size

Population size	Sample	Population size	Sample size	Population size	Sample size
10	10	100	80	4000	351
20	19	150	108	5000	357
30	28	200	132	10000	370
40	35	250	162	20000	377
50	44	300	169	50000	381
60	52	400	**196**	100000	384
70	59	1500	306		
80	66	2000	322		
90	73	3000	341		

Appendix: iv. Photo glimpse of the study (Author, 2012)

Plate 1

Plate 2

Plate3

Plate4

Plate5

Plate6

Plate7

Plate8

Plate9

Plate10

Plate11

Plate12

| Plate 13 | Plate 14 | Plate 15 |

| Plate 16 | Plate 17 | Plate 18 |

Legend

Plate 1- Researcher visit to Kimondi forest office

Plate 2- Researcher besides Kimondi tree nursery

Plate 3- Researcher in forester office taking note of relevant data

Plate 4- Interview in progress

Plate 5- Researcher interviewing the household head

Plate 6- Researcher interviewing the CFAs officials

Plate 7- Destruction along the river in the forest due to sand harvesting

Plate 8- Sand harvested- ready for sale

Plate 9- Cattle from grazing in the forest

Plate 10- Maize farming in the forest under PELIS program

Plate 11- Tree growing along with maize in the forest

Plate 12- Soil erosion in the forest due overgrazing

Plate 13- Maize growing in the forest

Plate 14- Children grazing cattle in the forest

Plate 15- Firewood collection from the forest

Plate 16- Tree logs got from the forest by neighbouring farmer

Plate 17- Splitting logs into timber

Plate 18- Loading of timber after sawing

Appendix: v. Research authorization

REPUBLIC OF KENYA

NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Telegrams:"SCIENCETECH", Nairobi
Telephone: 254-020-241349, 2213102
254-020-310571, 2213123.
Fax: 254-020-2213215, 318245, 318249
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Our Ref:
NCST/RCD/17/011/71/4

Fredrick Sikuku Otsieno
Moi University
Chepkoilel Campus
P. O. Box 1125
ELDORET

PAGE 2	PAGE 3
THIS IS TO CERTIFY THAT:	Research Permit No. NCST/RCD/17/011/71
Prof./Dr./Mr./Mrs./Miss....FREDRICK	Date of issue.. 20TH DECEMBER 2011
SIKUKU OTSIENO	Fee received.... KSH. 1000
of (Address) MOI UNIVERSITY	
P.O BOX 1125 ELDORET	
has been permitted to conduct research in	
.................................Location,	
NANDI & LONDIANI ....District, s	
RIFT VALLEY ....Province,	
on the topic EVALUATION OF FOREST	
BENEFITS TO FOREST ADJACENT	
COMMUNITIES UNDER THE FOREST ACT	
CAP 385 OF 1968 & THE FOREST ACT	Applicant's Signature
NO. 7 OF 2005.	For Secretary National Council for
for a period ending 31ST DECEMBER 2012	Science and Technology

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on *"Evaluation of forest benefits to forest adjacent communities under the forest Act Cap 385 of 1968 & the forest Act No.7 of 2005"* I am pleased to inform you that you have been authorized to undertake research **In Nandi & Londiani Districts** for a period ending *31st December 2012.*

You are advised to report to **the District Commissioners, the District Education Officers & the District Forest Officers in Nandi & Londiani districts** before embarking on the research project.

On completion of the research, you are expected to submit **one hard copy and one soft copy** of the research report/thesis to our office.

SAID HUSSEIN
FOR: SECRETARY/CEO

Copy to:
The District Commissioners
Nandi & Londiani Districts

The District Education Officers
Nandi & Londiani Districts

Appendix: vi. Cross-tabulations

Table 1. Quantity of Logs of timber vs Age of respondent   cross-tabulation Under Forests Act, 2005

			Age			Total
			<25	25-55	>55	
Logs of timber	0.00	Count	8	221	62	291
		% within Age	1000.0%	960.9%	960.9%	970.0%
	80.00	Count	0	4	0	4
		% within Age	00.0%	10.8%	00.0%	10.3%
	400.00	Count	0	1	0	1
		% within Age	00.0%	00.4%	00.0%	00.3%
	500.00	Count	0	0	2	2
		% within Age	00.0%	00.0%	30.1%	00.7%
	1500.00	Count	0	2	0	2
		% within Age	00.0%	00.9%	00.0%	00.7%
Total		Count	8	228	64	300
		% within Age	1000.0%	1000.0%	1000.0%	1000.0%

Table 2.Quantity of Logs of timber vs Age of respondent   cross-tabulation Under Forest Act, Cap 385 of 1968

Crosstab

			Age			Total
			<25	25-55	>55	
		Count	8	224	64	296
	0.00	% within Logs for timber	20.7%	750.7%	210.6%	1000.0%
		% within Age	1000.0%	980.2%	1000.0%	980.7%
		Count	0	2	0	2
Logs for timber	80.00	% within Logs for timber	00.0%	1000.0%	00.0%	1000.0%
		% within Age	00.0%	00.9%	00.0%	00.7%
		Count	0	2	0	2
	10000.00	% within Logs for timber	00.0%	1000.0%	00.0%	1000.0%
		% within Age	00.0%	00.9%	00.0%	00.7%
		Count	8	228	64	300
Total		% within Logs for timber	20.7%	760.0%	210.3%	1000.0%
		% within Age	1000.0%	1000.0%	1000.0%	1000.0%

Table 3. Grazing vs Age of respondent cross-tabulation under forests Act, 2005

			Age			Total
			<25	25-55	>55	
Grazing	0.00	Count	8	48	20	76
		% within Age	1000.0%	210.1%	310.2%	250.3%
	10.00	Count	0	26	2	28
		% within Age	00.0%	110.4%	30.1%	90.3%
	20.00	Count	0	38	6	44
		% within Age	00.0%	160.7%	90.4%	140.7%
	30.00	Count	0	38	2	40
		% within Age	00.0%	160.7%	30.1%	130.3%
	40.00	Count	0	32	10	42
		% within Age	00.0%	140.0%	150.6%	140.0%
	50.00	Count	0	24	4	28
		% within Age	00.0%	100.5%	60.2%	90.3%
	60.00	Count	0	12	4	16
		% within Age	00.0%	50.3%	60.2%	50.3%
	70.00	Count	0	0	2	2
		% within Age	00.0%	00.0%	30.1%	00.7%
	80.00	Count	0	0	2	2
		% within Age	00.0%	00.0%	30.1%	00.7%
	100.00	Count	0	6	10	16
		% within Age	00.0%	20.6%	150.6%	50.3%
	120.00	Count	0	0	2	2
		% within Age	00.0%	00.0%	30.1%	00.7%
	150.00	Count	0	4	0	4
		% within Age	00.0%	10.8%	00.0%	10.3%
Total		Count	8	228	64	300
		% within Age	1000.0%	1000.0%	1000.0%	1000.0%

Table 4. Grazing vs Age of respondent   cross-tabulation under forest Act Cap 385

			Age			Total
			<25	25-55	>55	
Grazing	0	Count	4	37	10	51
		% within Age	500.00%	160.20%	150.60%	170.00%
	1	Count	0	4	4	8
		% within Age	00.00%	10.80%	60.20%	20.70%
	2	Count	0	14	4	18
		% within Age	00.00%	60.10%	60.20%	60.00%
	3	Count	2	20	8	30
		% within Age	250.00%	80.80%	120.50%	100.00%
	4	Count	0	49	8	57
		% within Age	00.00%	210.50%	120.50%	190.00%
	5	Count	2	34	4	40
		% within Age	250.00%	140.90%	60.20%	130.30%
	6	Count	0	30	4	34
		% within Age	00.00%	130.20%	60.20%	110.30%
	7	Count	0	10	4	14
		% within Age	00.00%	40.40%	60.20%	40.70%
	8	Count	0	6	0	6
		% within Age	00.00%	20.60%	00.00%	20.00%
	9	Count	0	0	2	2
		% within Age	00.00%	00.00%	30.10%	00.70%
	10	Count	0	14	6	20

			00.00%	60.10%	90.40%	60.70%
		% within Age	00.00%	60.10%	90.40%	60.70%
	12	Count	0	4	0	4
		% within Age	00.00%	10.80%	00.00%	10.30%
	14	Count	0	0	2	2
		% within Age	00.00%	00.00%	30.10%	00.70%
	15	Count	0	2	2	4
		% within Age	00.00%	00.90%	30.10%	10.30%
	16	Count	0	2	0	2
		% within Age	00.00%	00.90%	00.00%	00.70%
	20	Count	0	2	4	6
		% within Age	00.00%	00.90%	60.20%	20.00%
	25	Count	0	0	2	2
		% within Age	00.00%	00.00%	30.10%	00.70%
Total		Count	8	228	64	300
		% within Age	1000.00%	1000.00%	1000.00%	1000.00%

Table 5. Honey vs Age of respondent   cross-tabulation under Forests Act , 2005

			Age			Total
			<25	25-55	>55	
Honey	0.00	Count	8	228	60	296
		% within Age	1000.0%	1000.0%	930.8%	980.7%
	200.00	Count	0	0	2	2
		% within Age	00.0%	00.0%	30.1%	00.7%
	300.00	Count	0	0	2	2
		% within Age	00.0%	00.0%	30.1%	00.7%
Total		Count	8	228	64	300
		% within Age	1000.0%	1000.0%	1000.0%	1000.0%

Table 6. Honey vs Age of respondent   cross-tabulation under Forest Act Cap 385

		Age			Total
		<25	25-55	>55	
Honey	0.00 Count	8	228	62	298
	% within Age	1000.0%	1000.0%	960.9%	990.3%
	200.00 Count	0	0	2	2
	% within Age	00.0%	00.0%	30.1%	00.7%
Total	Count	8	228	64	300
	% within Age	1000.0%	1000.0%	1000.0%	1000.0%