

**ATTITUDES AND PERCEPTIONS AMONG ISSEY AND MASESE
COMMUNITIES TOWARDS CONSERVATION OF FOREST RESOURCES
IN MAU FOREST COMPLEX, KENYA**

**NYANGWESO, HYLINE NYATICHI (BEd. Arts)
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the Degree of Master of Science (Environmental Education) in the School of
Environmental Studies of Kenyatta University**

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DECLARATION

Declaration by the Candidate:

This thesis is my original work and has not been presented for a degree or award in any other university.

Signature.....

Date

Hyline Nyatichi Nyangweso

N50/CE/22541/2011

Declaration by the Supervisors:

This thesis has been submitted for examination with our approval as the University supervisors.

1. Dr. James K.A. Koske
Department of Environmental Sciences and Education
Kenyatta University

Signature.....

Date

2. Dr. Daniel G. Mang'uriu
Department of Environmental Sciences and Education
Kenyatta University

Signature... 

Date 22/09/2020

DEDICATION

I dedicate this work to my mum Jenipha for the encouragement she gave me the first day I reported to high school which has brought me this far.

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LIST OF ACRONYMS AND ABBREVIATIONS

AI	Artificial Insemination
CBD	Conservation of Biological Diversity
CFAs	Community Forest Associations
FD	Forest Department
GOK	Government of Kenya
KIFCON	Kenya Indigenous Forest Conservation
KIIs	Key Informant Interviews
KNBS	Kenya National Bureau of Statistics
KWS	Kenya Wildlife Service
KWTA	Kenya Water Towers Agency
SDGs	Sustainable Development Goals
MFC	Mau Forest Complex
MTF	Mau Task Force
NFP	National Forest Policy
PA	Protected Area
SPSS	Statistical Program for Social Scientists
WRUA	Water Resource Use Association

DEFINITION OF TERMS

Attitude	A human psychological tendency that is expressed by evaluating a particular entity called an attitude object, with some degree of favour or disfavor.
Environmental Literacy	This is the ability to perceive and comprehend the well-being of the environment and take appropriate steps to sustain, restore or improve the health of those ecosystems.
Forests	A forest is a minimum area of 0.05-1.0 hectare (ha.) with canopy cover that is 10-30 per cent with trees that can reach minimum height of 2-5 meters at maturity. A forest may consist either of closed forest formations where trees of various storey and undergrowth cover a high proportion of the ground or of open forest. Forests provide uncountable ecological and economic benefits as is the case study of the Mau Forest Complex.
Perception	The association that people establish between the attitude object and various attributes
Sustainable development	Socio-economic development that caters for the needs of the present generation without comprising the ability of future generations to meet their own needs
Sustainable Forest Use	Using the forest while ascertaining that future generations are not deprived of the same benefits in future

ABSTRACT

Forests cover approximately 30% of the earth's land surface area and provide critical ecosystem goods and services to mankind. However, forest cover in Kenya is among the lowest in the world, currently at around 7.6%. The Mau Forest Complex is the largest water tower in Kenya, but is threatened because of land use change and rapid human population growth in the adjoining areas. The overall objective of this study was to assess community attitudes and perception towards conservation of the Mau Forest, and relate them to alternatives to forest resource use. Methodology for data collection involved a case study survey. Semi-structured and structured questionnaires were used to collect data from the local residents and Community Forest Association officials, respectively. The hypotheses tested were that communities living in the periphery of Mau Forest Complex have positive attitudes and perceptions towards the forest and alternatives to forest resources, and that proximity influences the community's attitudes towards the forest and people-wildlife conflicts. Pearson correlation was used to find relationships between variables, and Chi-square test was performed to determine statistical significance differences ($p < 0.05$) in responses between the study areas (Masese and Issey). A total of 200 residents from Issey and Masese areas of Bomet were interviewed. Men and female respondents interviewed were 86% ($n = 172$) and 14% ($n = 28$), respectively. There were positive attitudes towards the forest among most (89%) of the community members. As a result, respondents were practicing some form of conservation of resources on their farms, such as tree planting, and soil and water conservation. However, 60% of the respondents indicated that they have had a bad experience with the forest, and people wildlife-conflicts were causes of negative attitudes towards the forest. This study gives a number of recommendations that can be used to foster forest conservation in Kenya, such as training of residents about the environment, encouraging the use of alternatives to forest resources, fostering local decision making and participation in forest management, and compensation of losses as a result of wildlife invasion of farms and homes. As elsewhere, these recommendations have the potential to create positive attitudes towards the Mau Forest Complex and an apparent increase in positive forest interactions and behavior that will ultimately lead to forest conservation and well-being in Kenya.

CHAPTER ONE: INTRODUCTION

1.1 Background Information

Globally, forests face threats of destruction by human populations living along their periphery (Karanth and DeFries, 2010). In particular, tropical regions have witnessed the greatest loss of natural forests, with large areas recording net loss of forest cover (Hansen *et al.*, 2013). In Kenya, forests loss is still a major concern despite efforts to regenerate lost forest cover while at the same time halting deforestation for development activities (FAO, 2010). It is estimated that forest cover stands at about 7.6% of the total land-cover, which is against the 10% threshold recommended by the United Nations (FAO, 2015). Factors that have contributed to the loss of forest cover include deforestation for agriculture, settlements and grazing (Lambrechts *et al.*, 2015). These challenges have necessitated institutional and policy reforms over the years aimed at involving stakeholders in forest management.

In Kenya, the Mau Forests Complex (MFC) is among the forests facing a relatively fast rate of destruction. The forest complex is a rich and fertile landscape positioned in Nakuru, Kericho, Narok and Bomet Counties in Kenya. It is 416,542 ha in size. It comprises of seven forest blocks namely; South West Mau, East Mau, Transmara, Mau Narok, Maasai Mau, Western Mau and Southern Mau that together form the Mau Forest Complex. The MFC is a very important water tower in Kenya where many streams and rivers originate from and drain into Lakes Baringo, Turkana, Victoria, Nakuru and Natron. The forest is rich in both animal and plant species, making it a key area that was designated for the protection of biodiversity (Kenya Wildlife Service, 2008).

Because of its natural riches, the MFC has experienced degradation as a result of forest excisions and illegal extractions which have led to a loss of over 109,000 ha (Mati *et al.*, 2008; MTF, 2009). However, there have been recent efforts to rehabilitate and reclaim the forest (Olang and Kundu, 2011; Government of Kenya, 2015). The growing human and livestock populations in the adjoining areas has also resulted in increased pressure on the forest as they meet their goods and services. Many communities adjacent to the forest rely on it for the provision of firewood, herbal medicine, timber and grazing; although most of these activities are done

illegally. Because of high poverty levels, over extraction of forest resources has led to degradation with the potential that critical goods and services, including clean water supply, might not be sustainable. Due to the illegal extractions, people risk arrest and sometimes give money to corrupt forest guards as a bribe for them to be allowed to extract forest resources.

With the problems of environmental degradation such as deforestation, poaching, forest fires, lumbering, faming and hunting on the rise around the world, involving communities in conserving the environment has been recognized as a viable option (Norgrove and Hulme, 2006; Okeyo-Owuor *et al.*, 2011). Currently, stakeholder involvement is emphasized in a dynamic world that is having transformative changes on the environment (Soma and Vatn, 2014).

Calls for participatory processes that were in the past related to sustainability issues are in the forefront of environmental conservation and management discussions. For example, the United Nations Conference on Sustainable Development (Rio+20) emphasizes the role of public participation, free access to data and judicial processes as means of promoting sustainable development (UN, 2012). This is contrary to command-and-control approach that have for long been employed by central governments but whose results have not been promising (Norgrove and Hulme, 2006; MTF, 2009). Recognizing that people bordering forests have a sense of ownership, and have co-existed for long, especially forests that are not under protection, is an important aspect of environmental management and conservation (Masese *et al.*, 2011). Such recognition is also a major stepping-stone for community involvement and participation in environmental conservation. However, for communities to fully participate in environmental conservation there is a need for awareness creation to help them change their negative attitudes, if any, towards forests and embrace alternatives to forest resources (Butler and Laurance, 2008). In this regard, knowledge of environmentally friendly practices is necessary to ensure forest conservation. In addition, provision of alternative sources to forest products influences their level of participation in environmental conservation and helps change their negative perceptions and attitudes towards protected areas (Badola, 1998; Appiah *et al.*, 2009).

In Kenya, studies on community attitudes and perceptions to Protected Areas (PAs) and environmental conservation are limited (Ming'ate *et al.*, 2014). Given the level of

environmental degradation being witnessed in many forests and water towers in Kenya, (Government of Kenya (GoK), 2015; Mutiru, 2000; Klopp, 2012), there is a desire to understand connections between community attitudes and perceptions towards forests and the potential for embracing alternatives to forest products. Research has made it visible that the community's attitudes towards forests and other PAs have an influence on forest use and conservation practices (Hares, 2006). With enlightenment on the importance of protecting forests and the environment, communities can be empowered to change their negative attitudes towards PAs and participate fully in their protection (Badola, 1998; Ming'ate *et al.*, 2014).

This study aims to generate knowledge that would be used to promote communities' participation in environmental conservation not only in the MFC but also in other conservation areas in Kenya and the world at large. In addition, the study will assess the need of improving community literacy on environment conservation. People's attitudes towards protected forests and alternatives to forest resources will be examined in order to validate the proposed alternatives and to identify hindrances in accepting them. The underlying assumption in this study is that, reliance of the local community on forest products due to limited alternative livelihoods and social, economic and cultural factors are the only determinants for accepting a proposed alternative.

1.2 Statement of the Problem

In Kenya, with pressure on natural resources and protected areas increasing, regulatory access rights have not been working, as land in protected areas is encroached, degraded lost. Management decisions have often been reactive, with decisions to evict 'encroachers' and other forest-dwellers, irrespective of whether they had legitimate customary rights such as the Okiaks, deemed to be the most appropriate (Barrow *et al.*, 2002; Matiku *et al.*, 2012). The government has in some cases opted not to evict people in favor of co-management, which emphasize community participation and involvement of the private sector in conservation (Barrow *et al.*, 2002). However, there is recognition that property and access rights encourage sustainable forest management, and have a significant part in defining attitudes and perceptions towards forests and other protected areas (Pas). Where property and access rights are clearly spelt out, fair and assured, rights holders are

more likely to be positive and more receptive to conservation because of the benefits conservation offers them. However, where conservation objectives are disconnected from the needs of the rights holders, for instance when their access and extraction of forest products are denied, their incentive to devote time and resources to sustainable management will be minimized.

The local community's gain from protected areas (PAs) can be significant and wide ranging, for example extraction of firewood and other non-wood products such as medicine, honey and game meat, pasture and others (Masese *et al.*, 2011). Other gains are economic, such as tourism and employment, in addition to religious and cultural values (Karanth *et al.*, 2006; He *et al.*, 2008; Sandbrook 2010). Living in the periphery of protected areas also has its share of problems such as damage or loss of crops and livestock and potential injury or loss of people's lives caused by wild animals. As a result of these challenges, people living near PAs may develop positive (Badola, 1998; Mehta and Kellert, 1998) or negative attitudes (Walpole and Leader-Williams, 2002; Spiteri and Nepal, 2008) towards the PAs. An appreciation of these discrepancies and trade-offs and understanding motivations of positive attitudes towards PAs and conservation are important for sustainability (Newmark *et al.*, 1993). Most importantly, people's attitudes towards PAs will determine their participation in the promotion and utilization of alternatives to forest products that relieve pressure on forests.

In spite of the many studies on participatory forest management as key ingredients for devising strategies of sustainable natural resource management (Barrow 1988; Emerton 1996a,b; Emerton and Mogaka, 1996), there are few studies which have examined the significance of community attitudes and perceptions towards forests in natural resources management in Kenya (Ming'ate *et al.*, 2014). Studies conducted earlier have focused on a number of natural resources management measures, including creating development opportunities (Abbot *et al.*, 2001), enhancing stakeholder involvement (Western, 1994; Getz *et al.*, 1999), incorporating partnerships in management (Murphree, 1994), ensuring self-governance (Muller, 2003), allowing access-rights (Fearnside, 1989; Browder, 1992), education and awareness creation (Jacobson and McDuff, 1998), compensating for disfranchisements and other losses (Ferraro and Kiss, 2002), and creating eco-tourism opportunities (Honey, 1999), without considering the significance of attitudes and

perceptions of forest adjacent dwellers on the success or failures of these management approaches in forest conservation.

This study is on PAs and conservation of forests in areas adjoining the Mau Forest Complex. The MFC is one of the major water catchment areas in Kenya. In the past it has faced threats due to excess extraction of forest resources by the surrounding communities, and in some cases, it has been encroached upon and some of it excised (MTF, 2009). The outcomes of these practices have led to a number of impacts including loss of indigenous vegetation and introduction of exotic species, loss of biodiversity and water quality. In order to conserve the forest, the government, international community and local community play various roles. This study examines; community's perception and roles in the conservation of the forest. The study will determine the benefits the respondents derive from the forest and their perception towards the alternatives to forest products.

1.3 Objectives of the Study

The overall objective of this study is to assess community attitudes and perception towards conservation of the Mau Forest, and relate them to alternatives to forest resource use.

The specific objectives of this study were to:

1. Identify the attitudes and perceptions held by local residents towards the MFC.
2. Examine factors that influence attitudes towards the forest and the ability of these factors to predict attitudes.
3. Assess people's attitudes and perceptions towards alternatives to forest resources.
4. Examine the role of people-wildlife conflicts in shaping attitudes towards the forest.

1.4 Research Questions

The study was to answer the questions below:

- i) What attitudes and perceptions are held by local residents towards the Mau Forest?

- ii) Which variables influence the attitudes towards the forest and what is the ability of these variables in predicting attitudes?
- iii) What are the people's attitudes and perceptions towards alternatives to forest resources?
- iv) How are people-wildlife conflicts relating to people's attitudes towards the forest?

1.5 Justification

The study aimed at generating information that would be used for conservation and ensuring sustainable use of Mau Forest Complex (MFC) and similar protected areas (PA) in Kenya by understanding how adjacent communities bordering protected areas interacted with resources. It also provided data on environmental conservation based on the two regions bordering the MFC (Issey and Masese regions). The two regions have been handled separately in the study because of the differences in proximity to the forest, and differences in community organization in the utilization of forest resources. The results of the study will be relevant to various government ministries especially in the formulation of policies that will help Kenya attain the targets of the Sustainable Development Goals (MDGs) and vision 2030. The study will also provide more knowledge on environmental protection and conservation of biological diversity (CBD). The study will recommend ways to reduce forest resource destruction together with directions for further research.

1.6 Theoretical Framework

Protected areas (PAs), accounting for 12% of the world's land area, and are key for the conservation of biodiversity. Because protected area supports a wide range of goods and services that are beneficial to communities, relationships between local residents and PAs in developing countries are often antagonistic, because in most cases PAs are out of reach and people cannot access the resources they need for their livelihoods (West and Brechin, 1991). For effective and lasting conservation of PAs, the concerns of communities must be embedded into management that balances conservation and sustainable development (Struhsaker *et al.* 2005). Many of the existing models for understanding PA–people relationships mainly focus on certain aspects of the relationships. Examples of models include those that describe resource

use of protected areas by communities (De Boer and Baquete, 1998) and people-wildlife conflicts (Parry and Campbell, 1992; Sekhar 1998). Other models have also examined people's attitudes and perceptions towards protected areas (Badola 1998; Kideghesho *et al.* 2007), their management (Lepp and Holland 2006), projects associated with protected areas (Mkanda and Munthali, 1994; Walpole and Goodwin, 2001), and the effect of those projects on attitudes toward protected areas (Infield and Namara, 2001; Sekhar, 2003; Arjunan *et al.* 2006).

Firey's (1960) theory of resource use has been a critical foundation upon which many models examining PA–people relationships are premised. The theory defines people–environment relationships to be composed of ecological, economic, and social elements (Mehta and Heinen 2001). Firey's (1960) theory has been extended by Durbin and Ralambo (1994) to include energy as one of its elements. Other models that have been applied to specific aspects of the PA–people relationship include Zube and Busch (1990) who propose four models for nurturing positive community-PA relationships:

- 1) Allowing communities to participate in managing parks;
- 2) Service provision by park personnel to communities living in adjoining areas of parks;
- 3) Maintenance of traditional land uses rights within the park for communities; and
- 4) Allowing local communities to participate in and benefit from park-related tourism.

An extension by Brechin *et al.* (1991) provides a 'framework of inquiry' into the association between residents and protected areas. This framework has five major focal areas: (1) historical and institutional context; (2) dislocation of communities; (3) use of local resources; (4) protection of natural resources and ecological development; and (5) management of resources for social change. Examples of models for examining PA–people relationship are specific to countries or protected areas. For example, In New Zealand, relationships have been based on lifestyle, recreation, sense of place, interactions park managers and tourism (McCleave *et al.*, 2006).

1.7 Conceptual Framework

One of the most common frameworks for describing PA–people relationships was developed by Allendorf (2010). This framework has made significant contributions to research by framing the relationships between people and PAs that have been applied in many regions. The framework is premised on three major components: 1) people’s physical or tangible relationship with the PA; 2) their attitude toward the PA, which also include their perceptions towards PAs; and 3) the linkage of the PA– people relationship to the broader social, political, and economic context (Figure 1.2). The framework has borrowed a lot from studies in Myanmar with a focus on people’s attitudes and perceptions towards PAs (Allendorf *et al.*, 2006). The physical relationships between people and PAs can be described by their interactions, including positive and negative feedbacks. People’s use PA include harvesting of resources, recreational use, and socio-cultural activities. On the other hand, people can be impacted by PAs, for instance, damage to crops and livestock depredation by

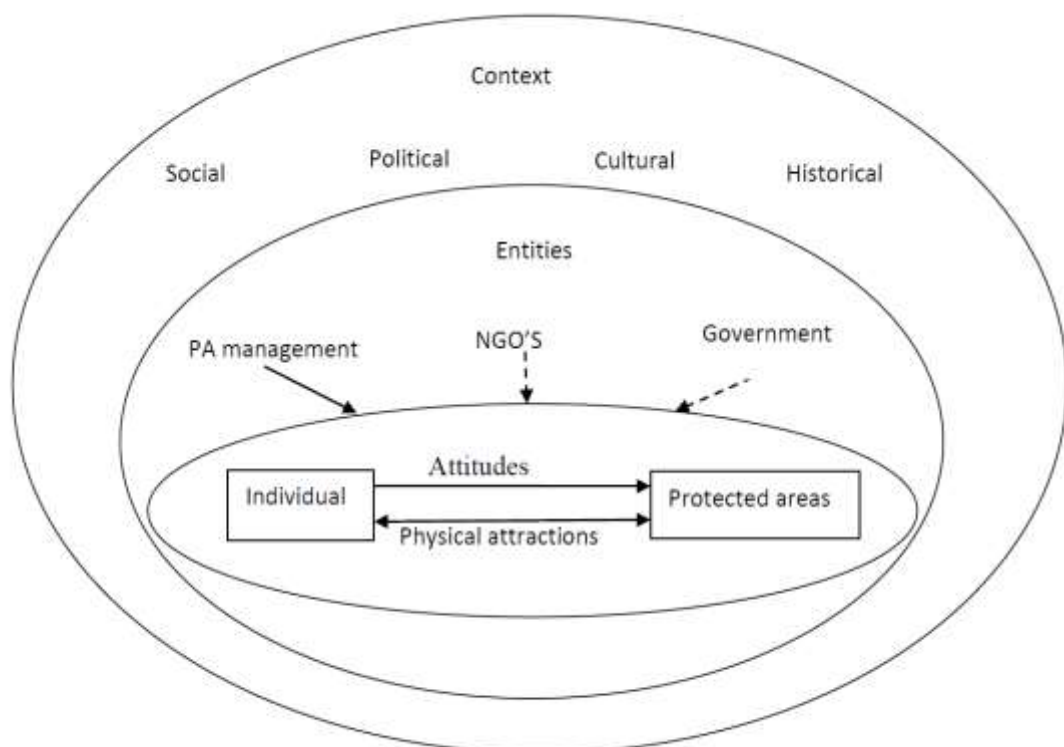


Figure 1.2. Conceptual framework for the protected area–people relationship. - - - = indirect relationship, — = direct relationship (Adopted from Allendorf, 2010).

wildlife. The physical relationships are both qualitative and quantitative. Quantitative relationships include the number of times people enter a PA for different activities,

how much they harvest from PAs and the extent of crop damage or number of livestock killed by wildlife.

1.8 Scope of the study

This study focused on the community attitudes and perceptions towards conservation of forests among two regions (Masese and Issey) in the Mau Forest Complex. Due to differences in knowledge background of the forest, the study focused on adult household members as respondents. It related how the education levels of the residents influence their attitude towards conservation. The study also focused on the use of alternatives to forest resources as a remedy to forest destruction.

1.9 Limitations and assumptions

This study had the following limitations:

1. The study consisted of adult household members from Issey and Masese regions in the Mau Forest Complex as the respondents which therefore cannot be generalised to all the people who live in the periphery of the forests. Sample representation may also have been affected by seasonal variations in the time the respondent is interviewed; morning, noon or afternoon.
2. Presence of children, other family members and non-participating members of a group or team could have influenced the speed with which participants completed the instrument.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The current status of the Mau Forest Complex (MFC) reveals a lot of environmental degradation. This is mainly brought about by the communities who settled in and adjacent to the forest and have, over the years, made it their home and a source of their livelihoods. They harvest forest products for wood fuel, charcoal for selling in surrounding cities and towns, fodder, herbal medicine, food and poles for construction purposes (NEMA, 2010). There are also saw millers and other loggers who harvest trees without licenses. This destruction has potential to affect wildlife since the rivers that originate from the forest have experienced fluctuations in water levels and quality. An example is the Mara River which flows through the Maasai Mara Game Reserve that host the world's famous 'crossing of the wildebeest' that has recently fallen to the lowest level ever (McClain *et al.*, 2014).

Globally, many countries, particularly in Asia, have through the years encouraged community resource management by the residents along the periphery of forests (Nurse *et al.*, 1995). People's relationships with the protected areas can be depicted by the ways they relate with the forest and how the forest impact them (Paletto *et al.*, 2013). The relationships can be measured in terms of the frequency of visits to forests and the activities they carry out in them, what and how much they extract and with the number of encounters with wildlife (Redpath *et al.*, 2013). The forest may be used for several ways that include resource harvesting, recreation, and religious activities. On the other hand, forests have a number of effects on people, such as crop damage by the forest wildlife (Karanth *et al.*, 2012).

2.2 Environmental Education and its Role in Conservation

Environmentally responsible behaviour is a product of people's knowledge (environmental education or literacy) (Figure 1.2). In turn these competencies influence dispositions or attitudes towards conservation. The perceptions people have about conservation are influenced by what they know concerning it. Whereas knowledge can be defined as the factual information and understanding of how

conservation is done and its benefits, perceptions deal with the many thoughts that people have based on their current and past experiences; and these are not necessarily real (Meijer *et al.*, 2015). In this case, what one knows and perceives about the environment influence his or her attitude towards it. According to the concept of planned behaviour, the attitude towards the behavior, subjective norms and perceived behavioural control constitute the attitude component. It is axiomatic from this analogy that a positive attitude towards environmental conservation portend the possibility of adopting environmental conservation.

A number of variables influence acquisition of knowledge and development of attitudes and perceptions. These variables can be grouped into three groups: attributes of an individual, attributes of the surrounding environment, and attributes of the state of knowledge, environmental conservation in this case (Meijer *et al.*, 2015). First, attributes of an individual include socio-economic factors and level of literacy. Second, attributes of the surrounding environment such as climatic conditions, demography, whether the surrounding area is rural or urban socio-cultural practices and political conditions, influence the level of literacy, attitudes and perceptions. Lastly, the nature and practice of conservation also influence knowledge, attitudes and perceptions. For instance, practices that improve household incomes, food production, conserve water and soils, and improve the overall health and well-being of communities will improve people's knowledge and foster positive perceptions and attitudes towards conservation.

2.3 Attitudes towards Environment

People's attitudes and perceptions are important in addressing local resident's needs and expectations (Weladji *et al.*, 2003; Redpath *et al.*, 2013). Allendorf *et al.* (2006) defined attitude as "a human psychological tendency that is expressed by evaluating a particular entity, called an attitude object, with some degree of favour or disfavour." Perceptions on the other hand refer to the relationships established by people between attitude objects and different variables (Lee, 2001; Bujis, 2009). The attitudes and perception of people are defined by what they like or dislike about forests. Community attitudes may be determined by goods and services, management actions (positive and negative), and the prevalence of wildlife-human conflicts in area (Paletto *et al.*, 2012; Karanth *et al.*, 2013)

2.4 People's Attitudes and Perceptions towards Forests

Communities living near the protected areas (PAs) have different attitudes and perceptions regarding the benefits they derive and the problems they encounter while living adjacent to PAs (Karanth *et al.*, 2013). What the community members like or dislike about forests influence their attitude and perceptions towards forest management practices. The degree to which people depend on forest resources and the goods and services they derive from them can cause a change in perception. Comprehending the trade-offs of people living in and around forests or protected areas is important for reconciling conservation objectives and community needs (Terborgh and Peres, 2002; Shahabuddin and Rangarajan, 2007; Bruyere and others 2009; Karanth and DeFries, 2010).

According to Wang *et al.* (2006), most community members appreciate the need for forest conservation. However, this awareness does not necessarily translate into positive attitudes towards conservation (Wang *et al.*, 2006). Depending on various factors, most community members hold a positive attitude towards forest management (Paletto *et al.*, 2012). Some community members hold a positive attitude towards forest conservation practices because they directly relate forests to their livelihoods. Skewed sharing of forest benefits among local people can also influence their perception towards forest protection (Karanth and Nepal, 2012).

Positive attitudes should be nurtured among individuals in communities adjoining protected areas. It is therefore significant to comprehend the interplay of drivers playing a role in defining attitudes towards protected areas. However, studies that examine the role and impact of attitudes and perceptions of forest adjacent dwellers on the success or failures of forest conservation and management in Kenya are very limited (Ming'ate *et al.*, 2014).

2.4.1 Formation of Attitudes

Ways in which attitudes are formed include our new experiences, trying to copy others, and our interactions with people and circumstances (Pickens, 2005). Pickens notes that attitudes guide our decisions, influence our behavior, and determine what we remember. Thus, attitudes take different shapes and can be quantified and changed just as most things that are learned and acquired through experience.

2.4.2 Measurement of Attitudes

When it comes to how to measure attitudes, Thurstone's procedure (Thurstone and Chave, 1929), has been greatly used, especially in organizations studying employees' attitudes towards their work environments. This information has been very useful to managers interested in determining whether their organization is doing all that is necessary to retain and motivate. As an example, Lowe *et al.* (2003) established that employees who rated their work environments as "healthy" were satisfied with their jobs and their morale and commitment were higher. Attitude studies are usually conducted using 5-point Likert-type scale (strongly agree–strongly disagree or never–very often scale) (Pickens, 2005), such as those shown in Table 2.1 below. Other qualitative methods have also been used where open-ended questions are used and respondents freely inject ideas as the interview progresses (Shanahan *et al.*, 1999; Dunlap *et al.*, 2000; Lepp, 2007). A study by Shanahan *et al.* (1999) show that qualitative approaches produce a more comprehensive and nuanced assessment of attitude compared with quantitative methods. However, care should be exercised during design of surveys to make sure that all areas and subjects intended to be studied are captured (Morrel-Samuel, 2002).

Morrel-Samuel (2002) also provided sixteen guidelines to consider when designing attitude surveys. His content included questioning the expressed behaviour rather than capturing feelings, including attributes that can objectively be proven. This is in addition to assessing only variables of behavior that have a proven link to the target of the study. His format emphasized keeping the flow of the survey uninterrupted by sections, page breaks. He also preferred maintaining the same number of items per section, and having questions with a comparable number of words. Morrel-Samuel (2002) also liked capturing respondents' demographics last in employee surveys but first in performance enquiries.

Table 2.1. Example of Likert-type questions used for Attitude Surveys.

	1= strongly disagree 2= disagree 3= neutral 4= agree 5= strongly agree				
	1	2	3	4	5
1. Do you like the forest					
2. Would you be happy if the forest were cleared?					
3. Are you happy living near Mau Forest Complex?					
4. Do you think soil and water conservation projects in your area are helping people?					
5. Do you feel like you are dependent on the forest for any reason?					
6. Are you satisfied by the ownership issues related to the forest?					
7. Do you think people living adjacent to the forests should be more involved in forest management?					
8. Do you think capacity building in forest conservation and management is important?					
9. Is your soil and water conservation work appreciated by the government?					
10. Does your soil and water conservation work bring you a sense of achievement?					

According to Morrel-Samuel (2002) the language used should not use words that have strong associations, and one should change text such that one-third of questions elicit negative answers. Topics should not be merged into one question because this would cause confusion among respondents. In most cases a response scale that entail respondents estimating a frequency is preferred, while avoiding questions that required ranking. Administering the questions was done by making not disclosing details of the respondents and ensuring that these details were kept secret. In large organizations, this was done by making departments the primary unit of analysis rather than individuals, and ensuring that employees spent least time to complete surveys, approximately 20 minutes.

2.4.3 Changing Attitudes

Critical to changing ones' attitude, consideration of the cognitive and emotional components is very important (Pickens, 2005). In order to change a person's attitude

and ultimately behavior, learning is very important. However, changing a person's attitude takes time, strength, and commitment. It is therefore not realistic that a person's attitude can be changed rapidly. Managers need to recognize that attitude change is a long process and should set high prospects for quick change (Moore, 2003). Attitudes are shaped over a person's life through socialization, interactions and experiences (Pickens, 2005). An individual's socialization process comprises acquisition of values and beliefs from as early as childhood as shaped by family, religion, culture and socioeconomic factors. These factors ultimately play a disproportionate role in a person's attitude and related behavior.

2.5 Variables influencing Attitudes towards Protected Areas

In the Mau Forest Complex, expansive areas have been cut out from the forest reserve for human settlement and agriculture over the years (Obati, 2007). This has resulted in significant differences in diversity of plants species and canopy cover as a result of selectively cutting tree species that are of high demand (Beentje, 1991; Bussmann, 1994; Obati, 2007; Obati and Breckling, 2015). This is mostly brought about by high levels of rural poverty and declining land availability in adjoining areas (Emerton, 1996c). Studies conducted elsewhere demonstrate that majority of the people living near protected areas are knowledgeable of the beneficial role of forests (Kobbail, 2011). They therefore display an understanding of their protection to safeguard the provision of forest products (Kobbail, 2011). Among other considerations, community members hold a positive attitude toward forests since they believe that they maintain soil fertility and minimize its susceptibility to wind and water erosion.

A number of studies have been conducted on the socioeconomic and demographic factors that influence attitudes towards conservation areas in developing countries (Fiallo and Jacobson, 1995; Wang *et al.*, 2006). While socioeconomic factors show strong relationships with attitudes, the perceptions that people hold about protected areas are more closely affected by attitudes. According to Allendorf *et al.* (2006), how people perceived national park in Burma was a more powerful predictor of attitudes than socioeconomic variables, which only indirectly affected attitudes. Therefore, it may be that socioeconomic characteristics play a moderating role in shaping people's attitudes through their perceptions.

According to research carried out in other countries, the other variables critical in shaping people's attitudes and perceptions towards forests and alternatives to forest resources include spiritual beliefs in which members regard forests as a place where God dwells and thus they tend to preserve it (Newmark *et al.*, 1993; Badola, 1998). Other factors are driven by utilitarian factors such as employment, tourism, resource extraction, aesthetic beauty, source of rainfall and protection of wild animals from extinction (Newmark *et al.*, 1993; Badola, 1998).

2.6 Attitudes towards Conservation in the Developing World

In some countries, communities living near protected areas have minimal access to the natural resources that they need for their livelihoods. In many developing countries, most people directly rely on proximal natural products for subsistence needs (Mugisha, 2002). This has implied that the only sustainable way of protecting biodiversity is through the creation of protected areas. As a result, these protected areas become under intense pressure from people living near them. In Uganda, a study has shown that all protected areas are contested to varying degrees by local people (Mugisha, 2002). This produces negative feelings and attitudes toward conservation. In addition, Mugisha's (2002) study found that efforts by the government to create awareness and reach out to the people have not succeeded in reducing negative attitudes. The study also showed that people are more concerned about the goods and services they get from protected areas, as opposed to their conservation. In addition to denied access to resources in protected areas, Mugisha's study also found that negative local attitudes were as a result of wild animals raiding and destroying crops, and a mistrust of park officials. Similarly, Hill's (1998) research of a community living close to a forest in Uganda showed that as long as elephants were kept from people's farms, their attitudes toward elephant conservation were positive. By extension, when elephants invade people's farms and destroy crops, attitudes toward elephant conservation suffer.

Studies in other developing countries show that rural people with limited livelihood alternatives view natural resources from a utilitarian point of view (Hill 1998; Gillingham and Lee, 1999; Bauer, 2003). Protecting natural resources for non-consumptive purposes can have negative influences on attitudes toward conservation. Invading farmlands and destroying crops is also a problem across many developing

countries, with clear negative influences on conservation attitudes (Studsrod and Wegge, 1995; Rao *et al.*, 2002). De Boer and Baquete (1998) found that invading farmlands by wild animals was the most important factor determining attitudes towards Maputo Elephant Reserve in Mozambique. Unsurprisingly, when animals raided farms, attitudes dropped, and vice versa. Interestingly, when it was proposed that an electric fence be erected along the reserve boundary, locals did not want it because they saw it a blockade for people not to access the reserve, and not a means of stopping animals from raiding their farms. This demonstrates that when people are excluded from resources, negative attitudes can develop toward conservation (Fiallo and Jacobson, 1995; Schwartzman *et al.*, 2000; Weladji *et al.*, 2003).

There exists a large body of literature highlighting conflicts between people's desire for extraction of natural resource for their use and conservation initiatives. One option that has been proposed as a remedy for such conflicts is allowing communities living near protected areas to participation in conservation (Adams and McShane, 1992; Gurung 1992; Jeanrenaud, 1999; Nepal, 2002). It has been assumed that local participation will bring benefits from conservation into the community. Examples of benefits are sustainable goods and services that go to the community and tourism revenue (Lepp, 2002; Studsrod and Wegge, 1995). Nevertheless, it has been hoped that extending conservation's benefits will create change in living conditions, improve attitudes, and nurture positive conservation behavior (Hulme and Murphee, 2001). This is one of the major drives of conservation efforts led by communities. However, most cases of community-conservation have attained modest success, sometimes with only a reasonable amount of development sometimes and attitudes change, but it has failed to espouse positive behavior towards conservation (Abbot *et al.*, 2001; Kellert *et al.*, 2000; Wilshusen *et al.*, 2002).

2.6.1 Conservation Attitudes and Behaviour

Over time, government-led conservation efforts have not taken local attitudes into consideration (MacKenzie, 1988). Reciprocally, community-based conservation efforts have always catered for government requirements (Hulme and Murphee, 2001; Infield and Namara, 2001). Perceptions and attitudes play a major role in conservation due to their linkages with behavior (Manfredo *et al.*, 2004). Ajzen and Fishbein (1980) confirmed this linkage using the "theory of reasoned action" (TRA).

According to TRA, beliefs influence attitudes and subjective norms, which in turn influence behavior. TRA is important for conservation because there is a likelihood that attitudes in support of conservation will lead to positive behavior. Nevertheless, this theoretical connection is yet to be proven empirically. In a Canadian study, McKenzie-Mohr et al. (1995) missed a significant linkage between attitudes and behavior that is supportive of environment. Similarly, Aipanjiguly and Jacobson (2002) did not find a relationship between attitudes and actions that are in support of conservation. Instead, behavioral intentions were influenced by a threat of punishment or fines from law-enforcement officials. Kaiser and Gutscher (2003) notes that much failures and inconsistent results are as a result of efforts to hypothesize environmental behaviors with measures of attitude. Considering this, Kaiser and Gutscher (2003) found that attitude generally had strong played a significant role when predicting general environmental behavior. Similarly, there exists a positive relationship between attitude toward conservation wildlands and intention to vote for their preservation (Vaske and Donnelly, 1999). However, it was not clear whether the intention to vote for wildland preservation translated into the tangible positive behavior stated.

There is a lot of variability when it comes to establishing relationships between conservation attitudes and behaviors. Infield and Namara's (2001) study showed that gains from conservation, however minimal, can improve local attitudes, although this often does little to change behavior. A meta-analysis demonstrated that knowledge influences behavior (Zelezny, 1999; Aipanjiguly and Jacobson, 2002). Hampshire *et al.* (2004) found that being indigenous or exotic to a community can influence one's view towards conservation behavior. Indigenous people's behavior is regarded more positively than outsiders' behavior, and social exclusion can negatively influence attitudes toward conservation (Paraskevopoulos *et al.*, 2003).

Despite the many studies that have captured the variety factors which influence attitude, the linkage between attitude and conservation behavior has not been clearly demonstrated. This is because anti-conservation activities, such as hunting and poaching of forest trees, are hidden and done in secret Infield and Namara (2001). This makes change in conservation behavior difficult to note among communities. In

addition, change may occur progressively, implying that longitudinal long-term studies are needed to capture it.

2.7 Perceptions

Perception and attitude are strongly related. Perception is defined as the process through which animals interpret and organize sensation to make sense out of their surrounding (Lindsay and Norman, 1977). How an individual interprets a situation or stimuli depends on prior experiences. However, the interpretation or perception could be totally different from reality.

Perception is a four-stage process: stimulation, registration, organization, and interpretation (Pickens, 2005; Figure 2.1). An individual's alertness and recognition of a stimuli is important in the perception process. Sensitivity to the stimuli is highly discriminatory and may depend on a person's existing beliefs, attitude, motivation, and personality (Assael, 1995). According to Pickens (2005), individuals usually

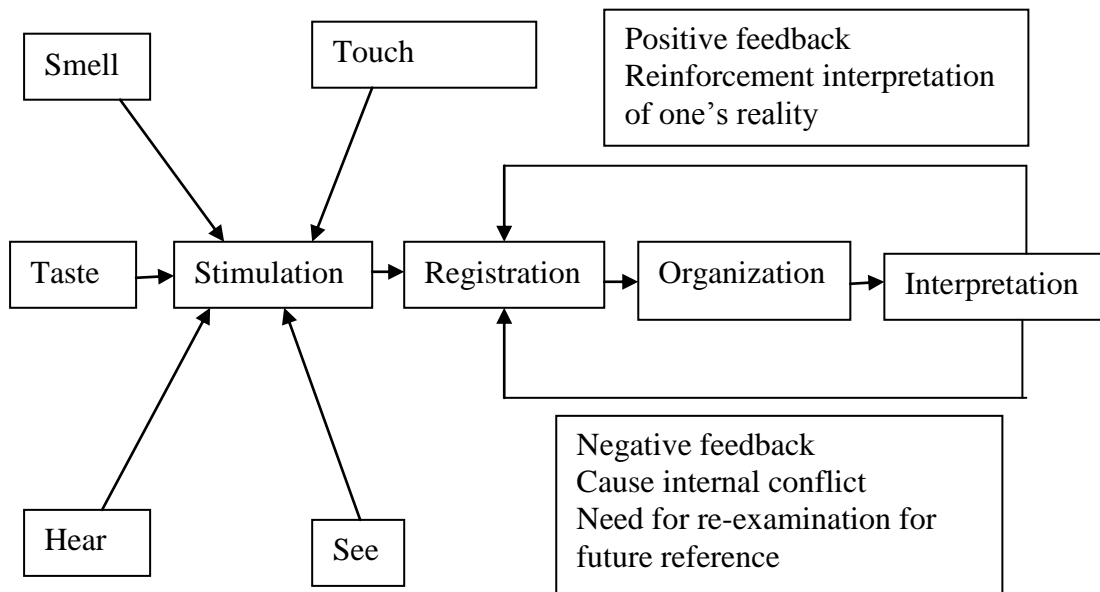


Figure 2.1. Perception Processing System (Pickens, 2005)

choose stimuli that meets their immediate requirements (perceptual vigilance) and may ignore stimuli that may result to psychological anxiety (perceptual defense).

In his filter model, Broadbent (1958) has explained the concept of perceptual vigilance. Broadbent notes that due to limited capacity, a person must process

information selectively and in favor of only that which it believes to be most relevant. However, when external stimuli are not in agreement with a person's beliefs, attitudes, motivation, etc, the perceptual defense forms a blockade that limits such undesired stimuli. This is known as selective perception which takes place when an individual restricts handling external stimuli by selectively interpreting what he or she sees based on beliefs, experience, or attitudes (Sherif and Cantril, 1945).

Broadbent's filter theory has been upgraded over the years. A "Selection for-Action View" notes that filtering is not only as a result of capacity limitations, but is also a product of goal-directed actions (Van der Heijden, 1992). The theory is premised on the fact that any action requires choosing some attributes of the he environment that are relevant to action while discriminating against other aspects that are action irrelevant. It therefore means that when an individual is pursuing an objective, he or she has to skip over details that does not support achievement of the objective. New findings on the brain have also come up with new models that suggest that multiple networks of processing and selective perception arise from the activation of cortical maps and neural networks (Pashler, 1989; Rizzolatti and Craighero, 1998). Despite these complex processing mechanisms, it clear that people are selective in their perceptions and will screen information based on their ability to handle new information, in addition to pre-existing opinions.

Understanding people's perceptions is central to involving communities and understanding their roles in natural resource planning and management. This is because people's knowledge guides in making decisions concerning the management and conservation of forest resources (Paletto *et al.*, 2013). Moreover, understanding people's perceptions and preferences towards PAs is important for making and effecting management policies (Lee 2001; Heer *et al.*, 2003; Edwards *et al.*, 2012). This approach is very important in high elevation uplands the developing countries, where there is often a strong linkage between local communities and natural resources (Jama, 1991; Mugisha, 2002; Lepp, 2007).

2. 8 People's Attitudes towards Alternatives to Forest Resources

In Kenya, governance of forests under the guidelines of the Forests Act of 1942 allowed local communities to access and utilize forest resources without requirement

of a license or payment of a fee because of customary right and practice. Community's attitude towards alternatives to forest resources is determined by many variables which include amount of income, occupation, demographic issues and economic status of the people.

Most community members obtain fodder and firewood from the forest since they consider it to be a cheaper alternative (Obati and Breckling, 2015). Most of them are ignorant about the alternatives to forest resources thus they are dependent on the forest resources entirely for their means of support. Other community members who are aware of the alternatives consider them expensive compared to the resources from the forest thus they become reluctant in changing their attitudes towards the alternatives.

Some of the suggested alternatives to forest resources include bio-digesters in schools and amongst the communities. This way the liquid and solid wastes generated from them can be converted into methane gas as a source of safe energy and bio-fertilizers for own use and the surplus sold. Another alternative is paper and plastics waste can be converted into white charcoals briskets.

2.9 People-Wildlife Conflicts

Human-wildlife conflicts exist across many protected areas. Damage caused by wildlife affects about 90% of households living in the periphery of forests. There is also threat to human safety brought about by the wild animals. Some of the animals that threaten the households in regions bordering the forest include the elephants, wild pigs, leopard, porcupine, rhinoceros and the black bear (Bajracharya *et al.*, 2005; Spiteri and Nepal, 2008).

Research findings have shown increased cases of wildlife-human conflicts, especially to crop damage and loss of livestock (Nepal and Weber, 1993; McLean and Straede, 2003). Most households are unfamiliar with compensation for crop and livestock losses. Those who are aware of the compensation from the wildlife department feel the sum of money provided is not commensurate with the loss hence do not apply for compensation leading to a very few people benefiting from compensation. However,

recently the amount of money awarded for loss of human life in Kenya has been increased to KShs 3 Million, but in many cases, compensations have not been made.

Water scarcity has brought wild animals and people into conflict. Deaths, injuries and compensation claims are at high records in Narok, according to the Kenya Wildlife Service report (KWS, 2016). Traditionally the communities who lived around game reserves and national parks were allowed to graze in the protected areas. This mutual arrangement was a variation of what had been practiced for centuries. As human populations increased the land available remained the same. Land adjudication as per Swynnerton Plan of 1954, which was further embedded into our laws by the enactment of the Land Consolidation Act (cap 283) and Land Adjudication Act cap 284, were designed to marginalize the majority of the people.

No interventionist strategies were in place to ensure that conservation of biodiversity (CBD) is not done at the expense of the communities' interests (Obati and Breckling, 2015). The people had lived side by side with wildlife and co-existed quite comfortably. They hunted only for subsistence. Then the colonial era arrived together with game hunting as a sport, with guns and other weapons of mass destruction. This new phenomenon changed, forever, the way things were done. Roaming free was inhibited. Expansive pieces of land were reserved purely for wildlife conservation but for whom against whom?

2.10 Current Status of the Mau Forests Complex

2.10.1 The Mau Forest User Population

According to KIFCON (1993), the user population of the Mau Forest Complex (MFC) is divided into two main groups: those who live(d) inside the forest ('forest-dwellers') and those who live around the forest ('forest adjacent'). The 'forest-dwellers' have a mixed history of occupation, including both those derived from an ancestral autochthonous hunter-gatherer people - the 'Okiek', and immigrant Kipsigis agropastoralists.

By 1991, majority of forest-dweller households were in the south-eastern part of the south-western MFC, with no resident population either within the Trans-Mara or Western Mau Forest Reserves (KIFCON, 1993). However, it was apparent from

surveys and reports that a long-term solution to the problem of in-forest habitation was going to be necessary and a settlement plan was drawn up (Wily, 1992; KIFCON, 1993, 1994; IUCN, 1996). Because of this, a number of evictions have been carried out over the years and most of the Okieks have been resettled outside the forest (Matiru, 2000; MTF, 2009).

For the forest-adjacent population, distance plays a key role in the extent of forest resource utilization. Forest utilization has been found to drop significantly in areas where people travel more than two kilometers to the forest edge (Davies, 1993). A more discerning definition of the forest-adjacent population can therefore be given as including only those people resident within 2 km of its boundary.

2.10.2 The Agro/Socio-Economy of the Forest-Adjacent Area

2.10.2.1 Land-use and Socio-Economy

The area around the Trans-Mara Forest in Bomet County is represented by well-established and intensive smallholder agriculture with declining farm size, which are depicted by a growing percentage of cash crops (mainly tea and potatoes). Socio-economic surveys carried out by Jama (1991) among three forest-adjacent villages in Bomet County established basic socio-economic data for these areas (Table 2.2).

2.10.2.2 Agro-Economy

Differences in crop production in the various forest-adjacent areas of the MFC generally reflect local soil and climatic conditions. In the three forest-adjacent villages of Bomet County, maize, beans, and potatoes dominate food crops grown. On the other hand, tea is the main cash crop. Mixed farming is common and around 90% of households own at least one cow. Grazing land forms 50% of the total farm area. The native Zebu type is common, constituting around 20% of the total cattle population. However, the majority of cattle (75%) are mixed breed.

The survey by Jama (1991) indicated that production of fodder, was widespread in Bomet County, where the feeding of supplements and a trend towards stall-fed animals was evident. However, only a small number of zero grazing units were established as of 1991 (Jama, 1991). The ownership of sheep and goats was less

common than that of cattle, with only around 40% of forest adjacent households owning at least one; of those that did the mean number owned were 25 per household.

Table 2.2. Socio-economic survey data for three forest-adjacent villages adjoining the Mau Forest Complex (MFC). All figures have been rounded except for mean landholdings. 1 = Kaptenbengwet, 2 = Kirimwok, 3 = Nairoatia. (Source: Jama 1991).

	BOMET (Kipsigis smallholders)		
	Vil 1	Vil 2	Vil 3
Mean household size	14	10	7
Mean landholding (ha)	7.0	3.5	2.5
Percentage own < 5 acres (2.4 ha)	20	45	49
Percentage owning land elsewhere	25	25	17
Percentage landless	2	5	0
Percentage female headed households	6	7	6
Percentage households headed with off-farm job	16	21	17
Percentage grow tea	90	60	34
Percentage grow pyrethrum	0	41	47
Percentage grow vegetables for sale	0	5	21
Percentage grow maize for sale	28	17	13
Percentage own grade dairy stock	0	0	0
Percentage own mixed/ zebu stock	94	92	94
Mean number of cattle owned	11	6	6
Mean number of sheep/ goats owned	5	2	2
Percentage hire in labour	70	40	30

2.10.3 Use of the Mau Forest Natural Resources

Socio-economic survey reports have detailed the use that local people make of the Mau Forest Complex (KIFCON 1991, 1992, 1993). 'Local people' refers to both forest-dwellers and those living outside, but near to, the forest (forest adjacent households). It has been noted that the use made of forest resources by forest-dwellers is higher and more diverse in nature than the use made by people living outside its

boundaries. However, surveys have also shown a significant proportion of adjacent households are also using the forest in various ways. Survey results have highlighted the value of hunting and beekeeping, and have indicated the extensive use of medicinal plants and the wood resource - for fuelwood, polewood and timber (Jama, 1991; Masese *et al.*, 2011).

A survey on the comparative use of Mau Forest resources amongst a sample of eight forest-adjacent communities shows that levels of use on the east and west of the forest are generally comparable (Table 2.3). These surveys have established that those living closest to the forest use its resources more. As well as being a major source of fibre for home ropes and baskets, the forest provides a surprisingly high proportion of forest-adjacent dwellers (FADs) with some plant food (67%), with approximately 16% of households hunting and/or trapping and 25% honey-collecting. Well over a third of households also depend partly upon the forest for fuelwood, poles and timber.

Table 2.3. Comparison of forest use by forest-adjacent communities living on the western and eastern sides of the Mau forest. (Source Jama, 1991).

FOREST USE	Percentage of households on west of the forest (Kericho/ Bomet districts)	Percentage of households on east of the forest (Nakuru district)
Fuelwood (by licence)	29	8
Fuelwood (illegal)	45	37
Burn charcoal	3	6
Collect honey/ make hives	29	21
Hunting/ trapping	18	13
Food (forest plants)	58	76
Medicinal plants	29	16
Graze livestock	40	34
Fibre (sale)	10	10
Fibre (home use)	71	79
Polewood	39	45
As passage	34	47

Although a high proportion of households are involved in certain activities, the intensity of use is often quite low; hunting, for example, tends to be a 'weekend' activity at most and foods and fiber are collected irregularly. These differences are

reflected most clearly when compared with the level of activity of forest-dwellers, most of whom have been evicted from the forest and resettled outside.

A recent survey by Masese et al. (2011) concurs with previous surveys and highlights the importance of the MFC to both forest dwellers and forest adjacent communities. In this survey, majority (94%) of the respondents acknowledged that the MFC is of benefit and use to them. People identified the control of soil erosion, attraction of rainfall and a source of construction materials and wood fuel as the most important uses they make of the forest (Figure 2.2). The forest is also a source of herbal medicine relied upon the Okiek community for the treatment of many diseases. In

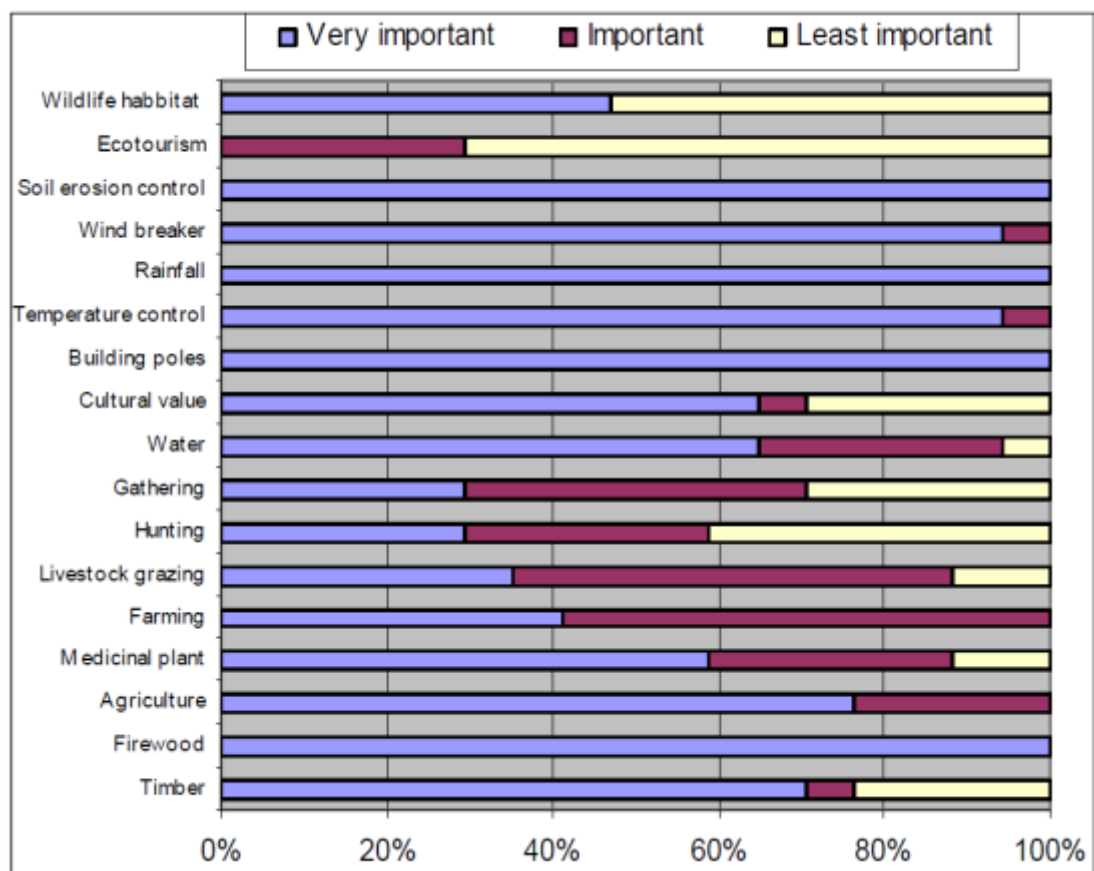


Figure 2.2. Community perspectives on the importance of the Mau Forest. Source: Masese *et al.*, 2011.

addition, communities graze their livestock and cultivate indigenous crops such as millet and pumpkin in the forest. The forest is also a rich source of honey, wild fruits and game meat obtained through hunting.

2.10.4 Land Use Patterns in the Mau Forest Complex

A number of studies that have utilized satellite images have noted changes in land cover over the MFC (www.rcmrd.org). Before 1986, the land use in the area before change was 75% forests, 12% woodlands and 13% farmlands and settlements. By 1989, the land use had changes significantly reducing forest cover and woodlands to 60%, and agricultural land use and settlements increasing to 40% of total land area. Figure 2.3 shows land use changes between 1986 and 2000. The greatest proportion of land area was under agriculture and settlements. Interviews among residents revealed that forest losses were largely as a result of clearance and progressive thinning by people living in the adjoining areas.

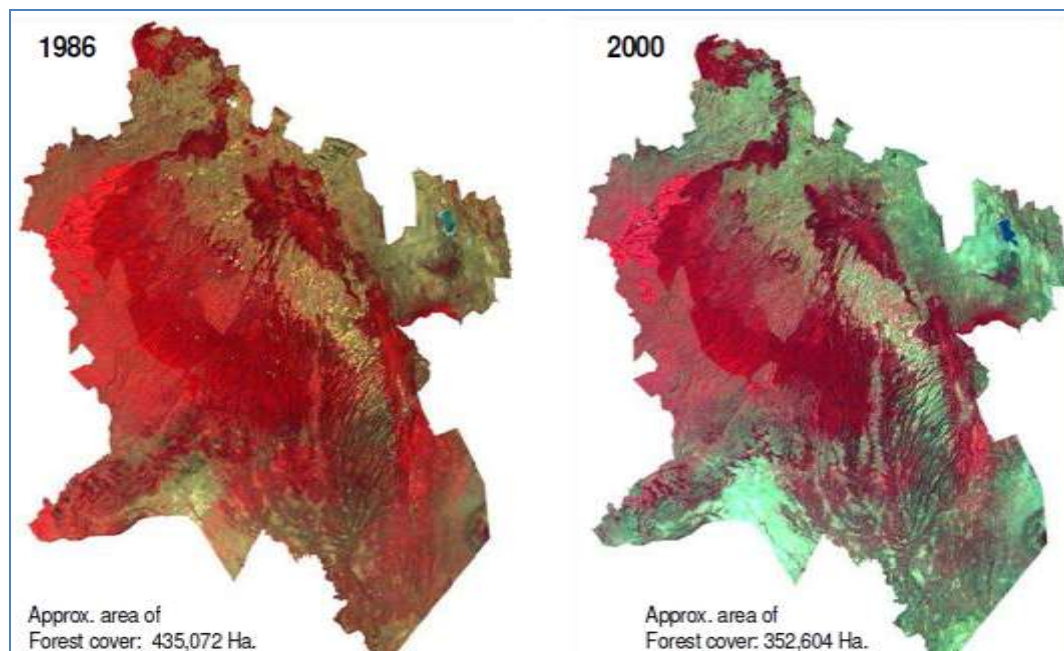


Figure 2.3. Land use change in the Mau complex between 1986 and 2000. Source: Olang' *et al.*, 2009.

Analysis of satellite images between the years 1973 and 2009 revealed forest losses of 2% between 1973 and 1986, 11% between 1973 and 2000, and 30% between 1973 and 2009 in some section of the MFC (<http://kenyafromspace.blogspot.com>). The height of deforestation was between 2000 and 2009, when about 47,000 ha were lost. Similar studies have revealed similar trends for other forest blocks in the MFC (Masese *et al.*, 2011; Mati *et al.*, 2008). The period between the year 2000 and 2009 saw heightened

losses of the forest as a result of human encroachments and settlements in a climate of irregular forest planning and management practices.

2.10.5 Impact of land Use/ Cover Change on the Environment

Over the years, changes in land use and land cover in the MFC and adjoining areas have had significant effects on the terrestrial and aquatic biodiversity, including the quality and quantity of water resources (Mango et al., 2011; Masese et al., 2014; Mutugi and Kiiru, 2015; Masese et al., 2017). An increase in imperviousness as a result of construction and forest clearance has reduced groundwater recharge and increased surface run-off (Melesse et al., 2008). These changes reduce the ability of the ecosystem to clean overland flows and protect wetlands, and increase incidences of soil erosion which have led to the degradation of water sources in the area. Clearance forests and their replacement with subsistence agriculture has also led to increased input of sediments into streams and rivers (Kilonzo *et al.*, 2013; Defersha and Melesse, 2012). Land use changes from forest to other land uses has also affected the hydrology of the river basin by increasing evaporation and overland flows during the rainy seasons. Because of increased run-off and reduced ground water recharge, dry season water levels in streams have significantly reduced and some streams that were once permanent have become seasonal (Mutua and Klik, 2007; Olang *et al.*, 2011; Masese *et al.*, 2011). Reduction in forest cover can also fragment habitats and lead to loss of biodiversity. However, from a macro-scale point of view, loss of forest cover and other land use changes present a complex problem to society because of its linkage to livelihoods. Nevertheless, it is unequivocal that deforestation influences the micro- and macro-climate of an area and affects atmospheric composition and other ecosystem properties and processes.

2.10.6 Strategies for Environmental Conservation in the Mau Forest Complex

Because of the ecological importance of the Mau Forest Complex to the region, there has been increased attention from local and international organizations in their efforts to works towards its conservation and management. In Kenya, most forests and water catchment areas are now under the stewardship of Kenya Forest Service (KFS) and the Kenya Water Towers Agency (KWTA). These two agencies have made significant steps to address the causes of degradation and deforestation that now face

all the major water towers. With the new forest policy of 2005, emphasis has been placed on participatory approach to management of forest resources by all stakeholders, including local communities and the private sector.

It has been recognized that reforestation and restoration of forests and water towers through tree planting is very critical. In this scheme, tree planting initiatives are coordinated by relevant governmental departments, in collaboration with local and international non-governmental organizations.

2.11 Gaps in the Literature

Many PAs are managed by government agencies in developing countries, including Kenya. For this reason, the law in many of these countries now recognizes the need to meet people's needs in conservation by involving them in decision-making. Nevertheless, people's concerns and perceptions are hardly considered during decision making (Pagdee *et al.*, 2006). Growing evidence suggests that communities in the adjoining areas of PAs play an important role to the success of conservation efforts (Agrawal and Gibson, 1999; Ferraro, 2002). Local communities often have the requisite knowledge, information and motivation that are necessary for them to manage and conserve the resources from which they derive their livelihoods (White and Martin, 2002).

Previous studies have focused on co-management as an approach to environmental sustainability (Barrow, 1988; Emerton 1996a, b; Emerton and Mogaka, 1996). Similarly, a number of studies have focused on a wide range of natural resources management approaches, such as providing appropriate development opportunities (Abbot *et al.*, 2001), emphasizing local community participation (Western, 1994; Getz *et al.*, 1999), among others. However, few studies have assessed the role of community attitudes and perceptions towards forests in natural resources management in Kenya (Ming'ate *et al.*, 2014). Knowledge of attitudes and perceptions of forest-adjacent dwellers is needed to determine their role and impact on the success or failures of management approaches used in forest conservation in Kenya.

This study aims to address the above gaps through collecting data on perceptions and attitudes of forest-adjacent communities that can be part of the decision-making

processes through policy and legal frameworks. It seeks to understand the feelings of forest adjacent communities towards protected areas, their conservation initiatives and use and attitudes to forest and non-forest resources. These will ultimately be addressed through legislation that supports sustainable management of protected areas. It is apparent from this review that what makes management and conservation of publicly owned natural resources successful is through fostering sustenance and benefit sharing. While behavior as a variable was not measured directly, many expressions of behavior were captured during the study, and this allowed the researcher to reach important conclusions.

CHAPTER THREE: METHODOLOGY

3.1 Study Area

The Mau Forests Complex (MFC) is one of the five major water towers in Kenya, which is a source of many rivers flowing into Lakes Baringo, Nakuru, Natron and Victoria. This forest is a water catchments area, a habitat for wild animals and birds and an air purifier. The area experiences an Afrotropical montane climate characterized by two rainfall seasons between April and June, and October and November (Jackson and McCarter 1994). The highlands in the Mau Escarpment receive higher amount of rainfall of 2000 mm per annum, while the lowlands receive around 1000 mm. The study was conducted in Bomet County on communities adjoin one of the forest blocks of the MFC (Transmara Forest) which is in Narok County (Figure 3.1).

People who were interviewed were drawn from Masese and Issey regions in Bomet County. This is due to its strategic position whereby the forest is entirely in Narok County but the people adjoin the forest are in Bomet County.

3.2 Research Design

An exploratory survey design was used to identify two regions and communities selected for this study. This design was chosen because few studies have assessed the role of community attitudes and perceptions towards forests in natural resources management in Kenya (Ming'ate *et al.*, 2014). The Issey and Masese communities (Figure 3.2) were selected on the basis of their involvement in forest management and land use practices on their farms that foster the utilization and dependency on alternatives to forest products. The Issey community benefits from a forest station (Masese) in their neighborhoods and most people have planted woodlots on their farms which minimizes their dependency on forest firewood. On the contrary, Issey community lands are mostly bare and most people depend on the forest for firewood. As a result of these two contrasting land use practices, the Issey side of the forest is more degraded than the Masese side (Kilonzo, 2014), and this study aims to determine the role of the two communities in the conservation of the Mau Forest.

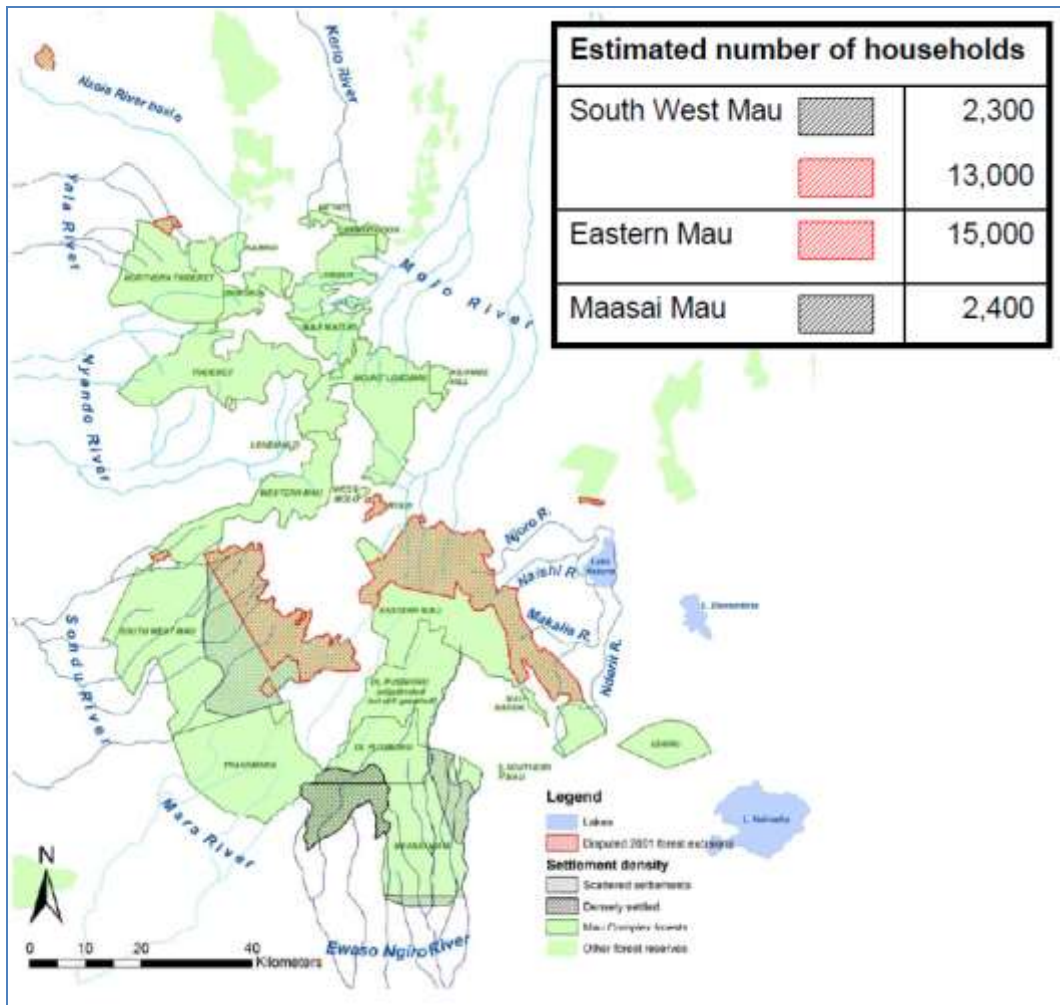


Figure 3.1. Map of the Mau Forests Complex showing the various forest blocks and the number of households in the illegally occupied areas. (Adopted from MTF, 2009)

3.3 Population

The target population was selected from the Masese and Issey communities/ regions (Figure 3.2). It consists of local residents living within 5kms from the boundary of the forest and the leaders of the community forest associations. Masese had a total population of 29,568 people while Issey had a total population of 19,233 people (National Population Census, 2009).

3.3.1 Sample Size

The sample size was arrived at using the equation below by Cochran (1963):

$$n = \frac{z^2 pq}{d^2}$$
$$= \frac{1.96^2 \times 0.15 \times 0.85}{0.05^2}$$

Where:

n = the desired sample size (if the population is greater than 10, 000)

z = the standard normal deviate at the required confidence level

p = the proportion in the target population estimated to have had characteristics being measured (0.15)

q = 1-p

d = the level of statistical significance set at (0.05)

By using the above equation 200 people were sampled from the entire population to be used for the study.

3.4 Data Collection

The data were collected through questionnaires, interviews with community members, literature review and field observations using transect walks. Quantitative and qualitative data were collected using both structured and unstructured questionnaires (Appendix I) that were administered to respondents.

3.4.1 Sampling

Community members living within five kilometers from the edge of the MFC were sampled. Five kilometers was selected because it has been shown that forest use reduces beyond this distance (Jama, 1991). The sample size was 200 respondents. One adult member of a household in each household was randomly selected and interviewed for representation. Those interviewed were the community members and community leaders from both Issey and Masese regions that were purposively chosen. Both sites are located adjacent to the Mau Forest Complex and one thing they have in common is some form of community-based management of natural resources occurring at both areas.

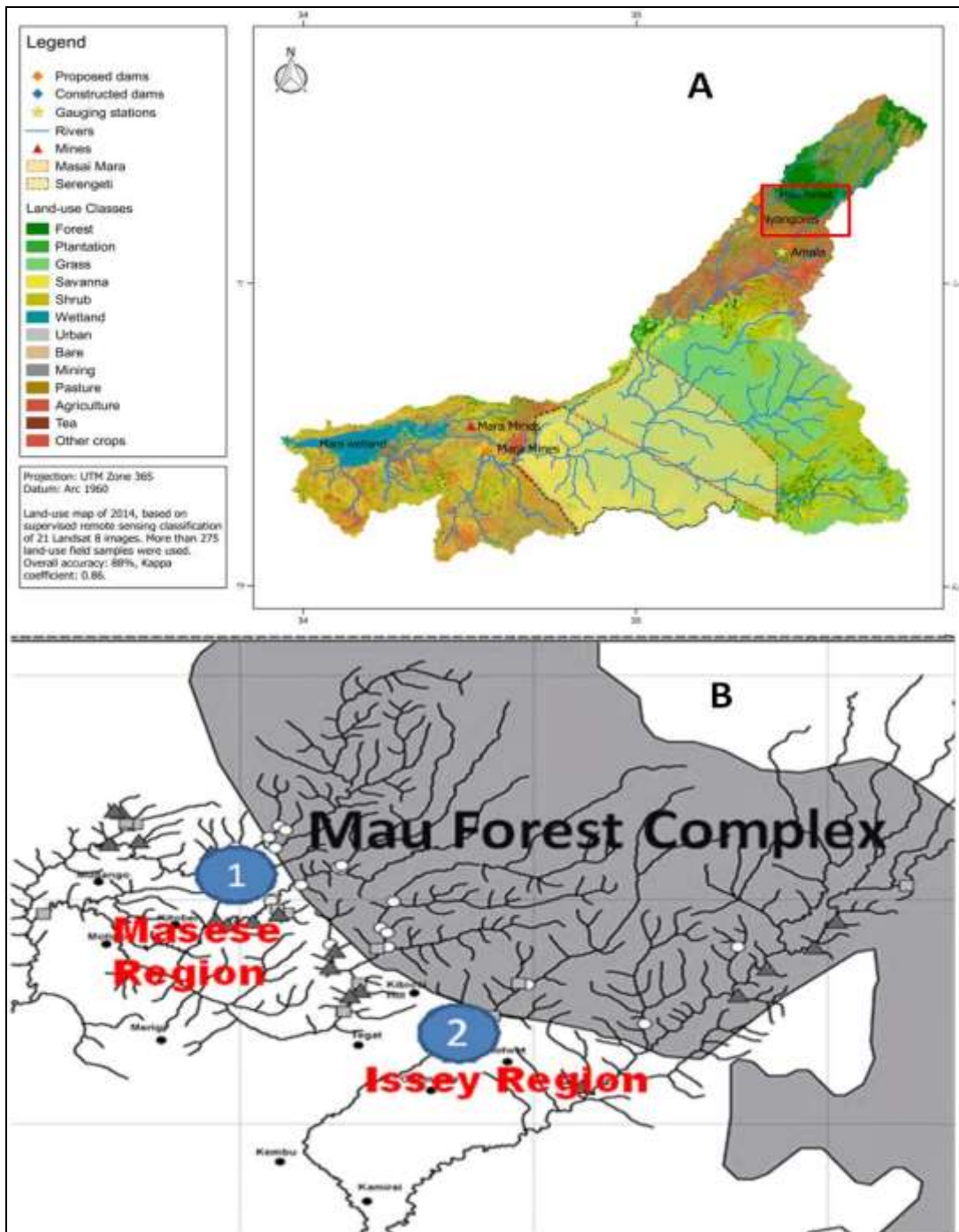


Figure 3.2: Map of the study area showing the position of (A) the Mara River basin and position of the Mau Forest Complex and (B) the two regions adjoining the forest (Masese and Issey) where the study was conducted.

3.4.2 Interviews

Data were collected between July and August 2015. The study used interview schedule for data gathering. The respondents were interviewed with the help of a local assistant who acted as an interpreter in cases where the respondent could not understand the questions in English. Before the interviews, the interpreter was trained on the contents of the questionnaire, and this made it easier for him to understand the concept and the research. Closed and open-ended questions were used to extract relevant information from respondents and also understand their views (Appendix D). The interview questions consisted of both one response and multi-response questions. The questions were divided into five sections. Section A sought the respondent's identification information and family demography; age, sex, marital status, family size and levels of education. Section B sought to understand the livelihoods of household members and household income, Section C was aimed at getting information on household assets, while Section D sought information on community members' attitudes and perceptions towards the Mau Forest, and. Lastly Section E captured the respondents' participation in forest conservation and development projects in their locality. There were also simple follow up interview questions regarding views held by local residents on the Mau Forest Complex. From the questionnaires the Likert type scale was developed to measure attitudes towards forest conservation and alternatives to forest resources. Other data that were collected included; family demographics, level of income, resource use, economic activities, relationships with the forests, forest conservation measures, land use practices (tree planting on farms and soil conservation).

Before conducting the interviews, consent of the participants was sought. If they chose not to participate the next household member was picked. Because most interviews were conducted in the morning hours when people were working on their farms, this helped in asking questions in relation to what was going on in the farms. The questionnaire was administered by being read out to the interviewer. The interview usually lasted for one hour.

Before the interviews, the questionnaire was pre-tested on 30 respondents (15 from each of the two areas) who were not part of the 200 interviewees. Following the pre-testing, a few changes were made to the structure and wording of the questionnaire for

clarity. The final survey was carried out on a total sample of 200 respondents of which 115 and 85 were interviewed in Masese and Issey regions, respectively. In addition to the household interviews, key informant interviews were conducted among Community Forest Association (CFA) leaders in the two regions. A total of two Key Informant Interviews (KIIs) were conducted on the Masese CFA chairman and the Issey CFA chairman.

3.4.3 *Field Observations*

To assess and identify soil and water conservation practices in the two regions, observations were conducted. This was done to add to the information collected through questionnaires. The transect walks were done in the community lands and in the forest adjoining the two regions (Masese and Issey) to identify present and past human activities. This was to provide evidence of notable degradations, if any, on the farms in the region and also assess the status of the forest.

3.5 Data Analysis

The data collected was cleaned. The questionnaires were examined to ensure that they were completely and consistently filled. The questions were then coded and summary tables and figures produced for the various responses. Chi-square was performed to determine the significance differences in responses between the two sites (Issey and Masese). To understand whether people had positive or negative attitudes towards the forest, respondents were evaluated using three questions that needed a 'yes' or 'no' answer: 1) whether they were happy living near the forest, 2) whether they would be happy if the forest was cleared for other uses of the land, and 3) whether they were willing to report negative activities (such as logging, poaching of wild animals etc), if any, in the forest. The responses were then tested against a number of predictors to determine factors influencing positive or negative attitudes towards the forest. These factors/ predictors were; region (Issey or Masese), distance of homestead from the forest, sex of the respondent, level of education, dependence on the forest for resources (such as fodder and firewood), whether a respondent had had an attack or his/ her farm had been invaded by wild animals, and whether they were satisfied that the government (county or national) owns the forest, and not the local community. The analysis was performed by Multinomial Logistic Regression using the Statistical

Package for Social Scientists (SPSS, Statistics for Windows, Version 19.0. IBM SPSS 2010, Inc., Chicago, Illinois) Significant differences for all analyses were determined at $p < 0.05$. The results were presented in tables, charts and graphs. Cross tabulations were performed in SPSS to match the various responses.

3.6 Ethical considerations

To ensure that the study followed guidelines, the following ethical considerations were considered (Bryman and Bell, 2007):

1. Efforts were made to make sure that research participants (both respondents and enumerators/ assistants) were protected from any injury.
2. All research participants' privacy and dignity were protected.
3. Full consent was obtained from respondents prior to the interviews.
4. The data collected from respondents was protected and only used for the purpose of the study, which was clearly explained to respondents. Sufficient level of privacy was accorded to all data collected.
5. Privacy of details of participants in the study was kept throughout the study.
6. Affiliations in any forms, sources of funding, as well as conflicts of interests were declared.
7. Misleading information and bias in reporting were avoided.
8. All sources of information and data that have been used in the study have been correctly referenced and attributed to the right sources.

CHAPTER FOUR: RESULTS AND DISCUSSIONS

4.1 Introduction

This study assessed the role of communities adjoining the MFC on the conservation of forest and watershed resources in the Masese and Issey regions (Plate 4.1), both in the protected area and on their farms. Specifically, the study intended to relate community perception and attitudes towards alternatives to forest resource use. The results are divided into five sections. The first section reports the demographic characteristics of the respondents who reside in two study areas. The second section



Plate 4.1. Part of Masese (upper) and Issey (lower) regions of the study area

includes general issues such as land size, its use and the on-farm income generating activities. The third section deals with on-farm environmental conservation initiatives. The fourth section covers forest ecosystem services and people’s interactions with the forest, and lastly section five covers the community perceptions and attitudes towards the forest.

4.2 Regional Breakdown of Respondents Interviewed

A total of 200 respondents were interviewed from the administrative units adjacent to the MFC. Members in the two regions were from two sub-counties that is Bomet East (135 respondents) and Bomet Central (65 respondents). Masese had 3 locations while Issey had 4 locations (Table 4.1). A total of 115 respondents were surveyed in the Masese region while 85 respondents were surveyed in the Issey region.

Table 4.1: Total number of respondents surveyed per Location in two study regions (Issey and Masese).

Administrative Location	Frequency
Masese Region	
Kiromwok	45
Mugango	37
Ndaraweta	33
Sub-Total	115
Issey Region	
Kipyosit	7
Chemaner	6
Tegat	65
Kimuchul	7
Sub-Total	85
Total Number of Respondents	200

4.3 Demographic Characteristics of Respondents

Men and female respondents interviewed were 86% (n = 172) and 14% (n = 28) respectively (Table 4.2). In most cases, women were unwilling to be interviewed, and hence more men were interviewed. The age of most respondents ranged from 31-50

years, representing greater than 50% of all respondents interviewed. More than half of the respondents (62%) had secondary level of education or above while those with primary level of education accounted for 35% of the respondents. Majority of the respondents (71%) and their spouses, for those who were married, were farmers growing crops and rearing livestock with the majority of them falling in the middle level income category (76%). Table 4.2 below summarizes respondents' demographic characteristics which include the age, marital status, household numbers and occupational level.

Table 4.2: Demographic information and characteristics of respondents in the two regions.

Gender	Issey	Masese	Level of Education	Issey	Masese
Male	106	66	None	6	1
Female	9	19	Lower Primary	4	5
Total	115	85	Primary	37	23
			Secondary	36	24
			Post-Secondary school	22	24
			University	10	8
Age of respondent (Years)			Source of income (respondent)		
	Issey	Masese		Issey	Masese
<20	3	2	Farming (crops & livestock)	91	58
21-30	18	7	Business	13	11
31-40	23	25	Self-employment	5	10
41-50	25	28	Government employee	6	7
51-60	26	16			
>60	20	7			
Marital Status			Source of Income (Spouse)		
	Issey	Masese		Issey	Masese
Married	107	71	No Response	10	13
Single	2	6	Farming (crops & livestock)	94	46
Widowed	6	8	Business	5	4
			Employment	4	5

The sample had a literacy level of 91% (those with a minimum of primary level of education) compared to the national average of 85.1%. The respondents had an average number of 8 household members. The average number of household members in Kenya is approximately 5 (KNBS, 2007). This is more than the national average. Overall, the samples from the two areas were representative and similar.

4.4 Distance of Homesteads from the Forest

Most of the respondents surveyed live within 1 km of the forest (74), and in total 65% of respondents (130) live within a distance of 2 km from the forest.

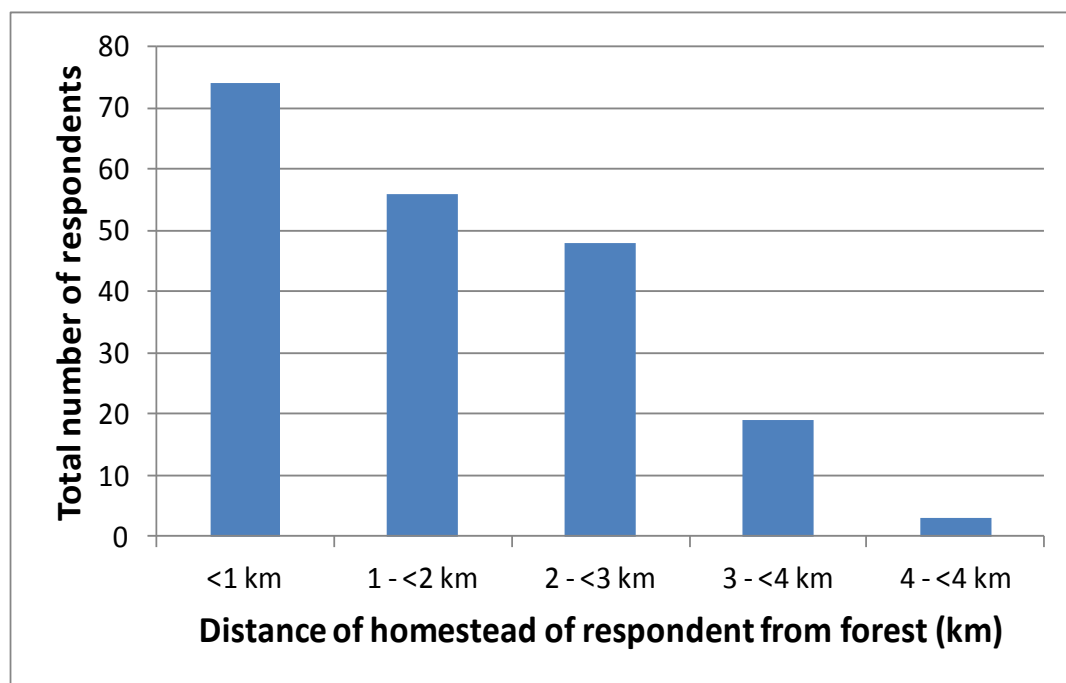


Figure 4.1: Distance of the respondents' homesteads from the forest's borders.

4.5 Land Size and Use

All respondents surveyed owned land. The farm sizes were between < 1 to > 10ha. Majority of the respondents'/ households' farm sizes ranged from 2-5 ha, while a minority had land sizes > 10ha (Figure 4.2). Majority of the households (64%) acquired their land through inheritance (parent to child). The land area under crops (farmlands) and livestock (grazing area) were the main land use (Figure 3) in the study sites (98%). Only 2% of the household land areas were covered with forest. `

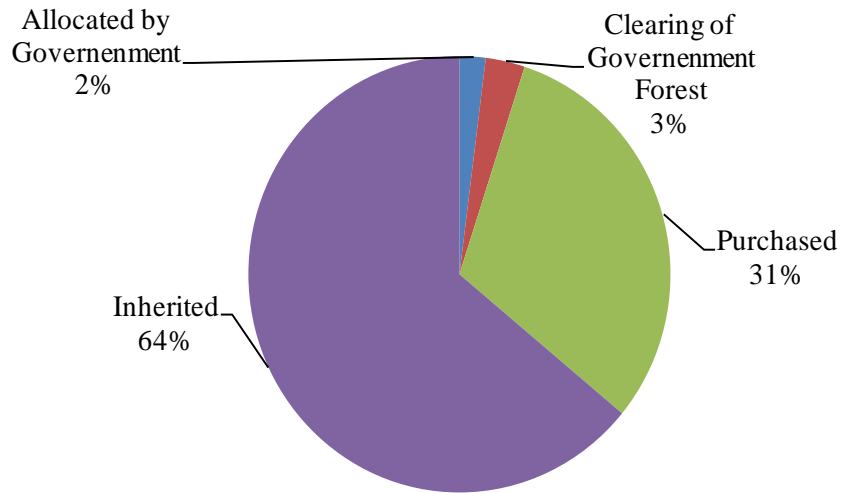


Figure 4.2: Acquisition of land by respondents

Most of the respondents interviewed had lived in the area for more than 20 years (Figure 4.4), some having immigrated from far distant areas such as Kaplong, Kericho and Narok.

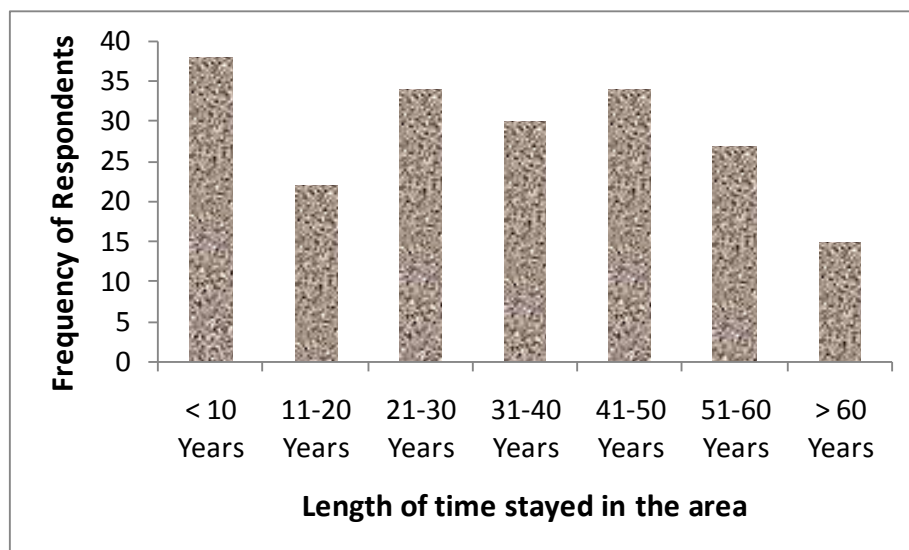


Figure 4.4: Length of time respondents have settled in the area of residence.

Some of the reasons given for immigration into Issey and Masese regions were resettlement (73% of immigrants), grazing (15%) and business (8%) (Figure 4.5). It was notable that those who moved to Issey and Masese regions for resettlements did so because of the harsh conditions in their places of origin, such as droughts and poor soil conditions that were not arable for farming of cash crops such as tea in areas such as Narok and Chepalungu. Most of these immigrants belong to the category that purchased land and resettled in Issey and Masese regions (Figure 4.3).

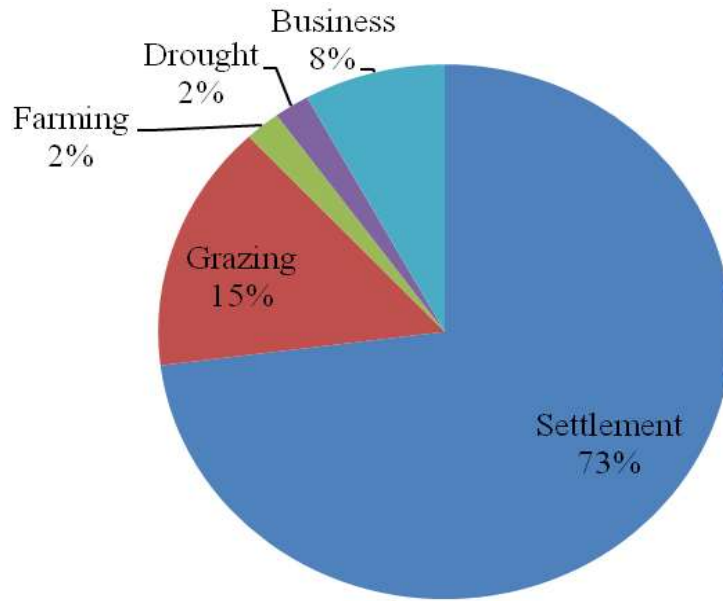


Figure 4.5: Reasons for residents immigrating to Issey and Masese regions from other regions.

4.6 Land Use and Income Generating Activities

Crop farming and grazing represents the bulk of land use in the study areas (Table 4.3). Many of the respondents surveyed had mixed land use types on their farms with 63% of the respondents practicing crop farming and livestock grazing while a minority practiced a single land use activity on their farms. For instance, only 3.5 % of the respondents practiced livestock grazing only while 0.5% (1 respondent) only had a tree plantation on his/ her farm.

Table 4.3: Land use activities in the Issey and Masese Regions.

	Region		Frequency
	Masese	Issey	
Crop farming only	9	4	13
Crop farming and grazing	71	52	123
Crop farming, grazing and tree planting	27	23	50
Crop farming and tree planting	2	0	2
Grazing only	5	5	10
Grazing and tree planting	1	0	1
Tree planting only	0	1	1
Total	115	85	200

Crop farming and livestock rearing (grazing) are very important activities for residents in the two regions, being practiced by 94% and 92%, respectively, of the respondents. Most of the food crops grown by respondents are maize (27%), beans (20%) and potatoes (15%), while tea is the most dominant cash crop grown by 30% of respondents in the two regions (Figure 4.6).

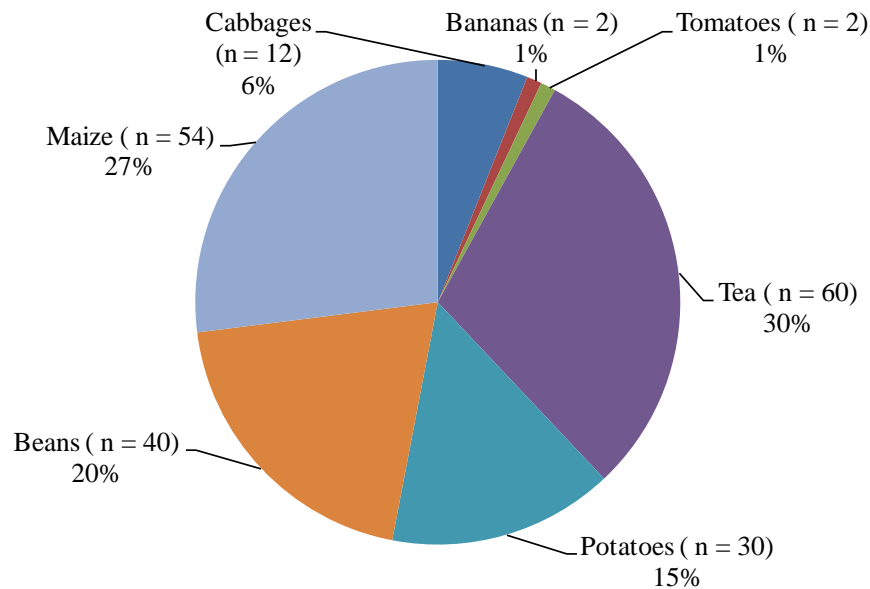


Figure 4.6: Type of crops grown by the respondents.

Most respondents own cattle and chicken (Figure 4.7). Ownership of cattle in this area is driven by both cultural (the Kipsigis in the area are pastoralists) and economic reasons- most people keep cattle as a form of insurance against economic downturns. Most respondents prefer mixed breeds of cattle, sheep and goats, and local breeds of chicken.

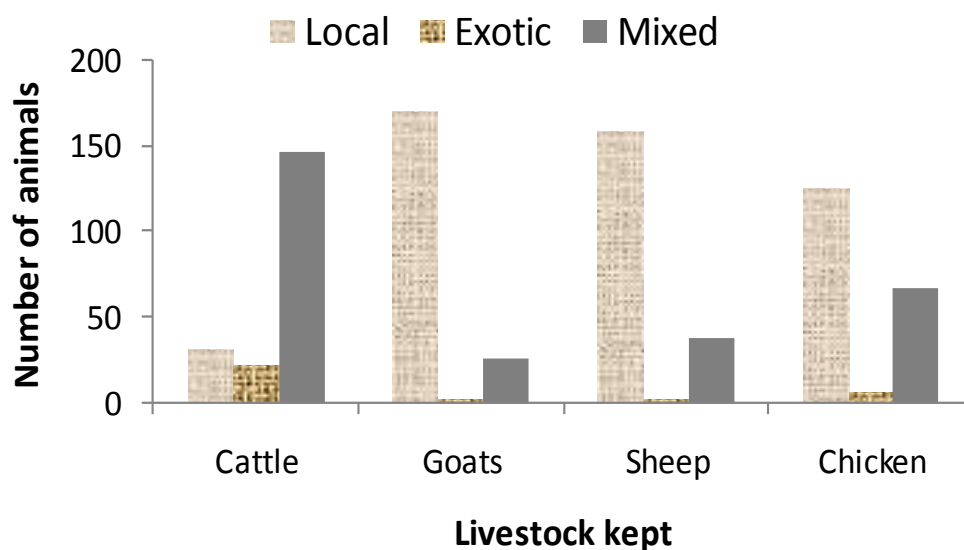


Figure 4.7: Breed of livestock reared by respondents

The two regions, Masese and Issey, are comparable in terms of the number of livestock per household (Table 4.4). However, there are slightly more numbers per household at Issey region compared with Masese region.

Table 4.4: Mean (\pm SD) number of livestock owned by respondents per region.

Region	Masese		Issey	
	Number of respondents	Mean	Number of respondents	Mean
Number of cattle reared	115	3.34 \pm 2.83	85	4.12 \pm 3.52
Number of sheep reared	96	1.30 \pm 2.87	73	1.71 \pm 2.94
Number of goats reared	88	0.81 \pm 3.53	71	2.17 \pm 3.79
Number of chicken reared	107	7.88 \pm 6.94	82	8.24 \pm 6.16
Number of donkeys reared	102	0.29 \pm 0.54	78	0.55 \pm 0.63

During the survey, it was evident that respondents own cattle for both milk and sale, while sheep, goats and chicken are mainly for sale (Figure 4.7). Other reasons for rearing livestock include use as a form of insurance whereby they are sold to cater for any financial obligations that arise such as school fees and medical expenses. Livestock are also reared to provide meat for domestic consumption and manure.

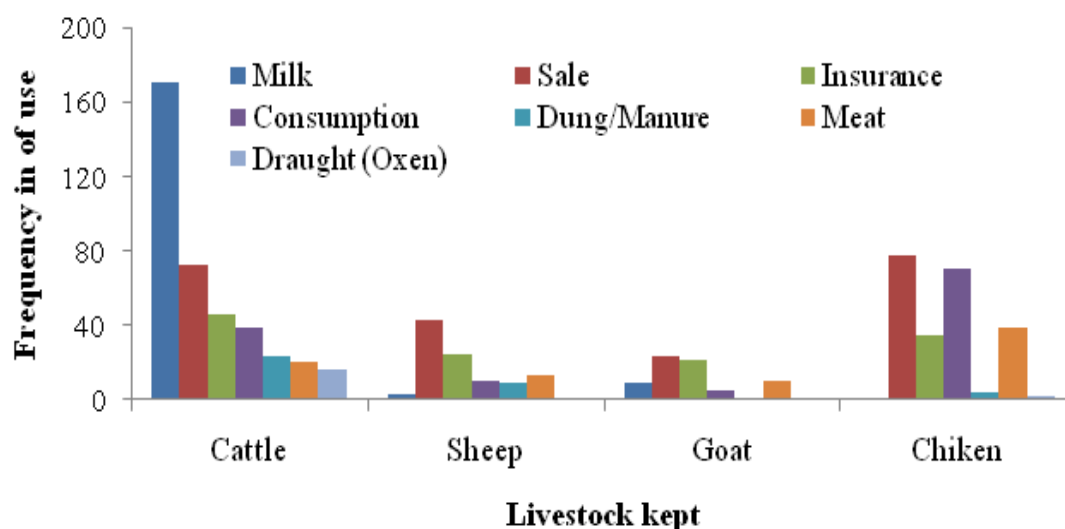


Figure 4.7: Reasons for rearing livestock

4.6.1 Sources of Fodder for Livestock

Although most respondents agreed that they graze their livestock in the forest, they also grow fodder on their farms and have put aside some land for grazing. Generally, more than 80% of the respondents grow fodder on their farms and most (44%) buy fodder when their farms are not able to provide enough for their livestock (Table 4.5). The most common type of fodder that is both grown and bought is Napier grass (Table 4.5).

Table 4.5: Sources of fodder for livestock.

Grow fodder	Frequency	Percentage	Type of fodder grown	Frequency	Percentage
Yes	159	80%	Maize for Silage	32	16%
No	21	11%	Lucerne	11	6%
No response	20	10%	Napier Grass	142	71%
			Calliandra	4	2%
			Boma Rhodes	34	17%
			Kikuyu Grass	15	8%
Buy fodder	Frequency	Percentage	Type of fodder bought	Frequency	Percentage
Yes	87	44%	Maize for Silage	21	11%
No	71	36%	Lucerne	10	5%
No response	42	21%	Napier Grass	36	18%
			Calliandra	5	3%
			Boma Rhodes	27	14%
			Kikuyu Grass	4	2%
			Hay	22	11%

However, the minority (11%) who do not grow fodder on their farms rely on what they harvest from the forest, but also cite that their farms are too small to allow for the cultivation of fodder, in addition to growth of cash and food crops (Figure 4.8).

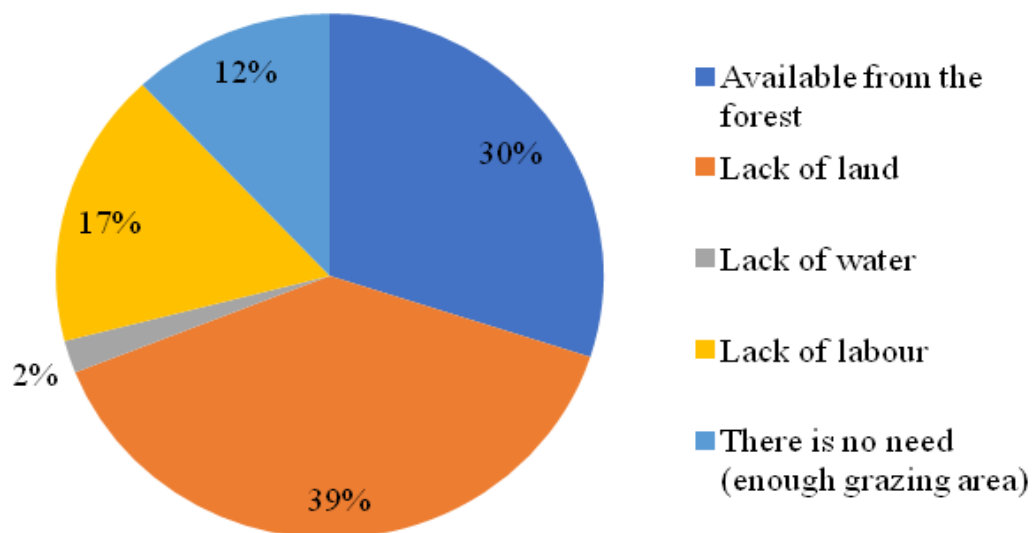


Figure 4.8: Reasons for not growing fodder

4.7 On-farm Land and Environmental Conservation

There were noticeable land and environmental degradation threats on a number of respondents' farms and in the forest. The threats reported included by respondents included overstocking of livestock, poaching of forest trees and reducing crop production. Most of the respondent pointed out that environmental conservation is crucial to them. They listed a number of projects in their areas that are geared towards environmental conservation, either as a means of livelihoods or relieving the pressure on the services provided by the forest. These projects are, bee keeping, tree nursery, forest conservation, water conservation, water projects, soil conservation, poultry project, energy saving jikos, dairy farming, fish keeping, marketing of the farm produce, crop planting and agri-business.

Willingness to participate in environmental conservation was evidenced in the manner in which respondents have utilized part of their farms for tree planting and agro forestry (Figure 4.9).

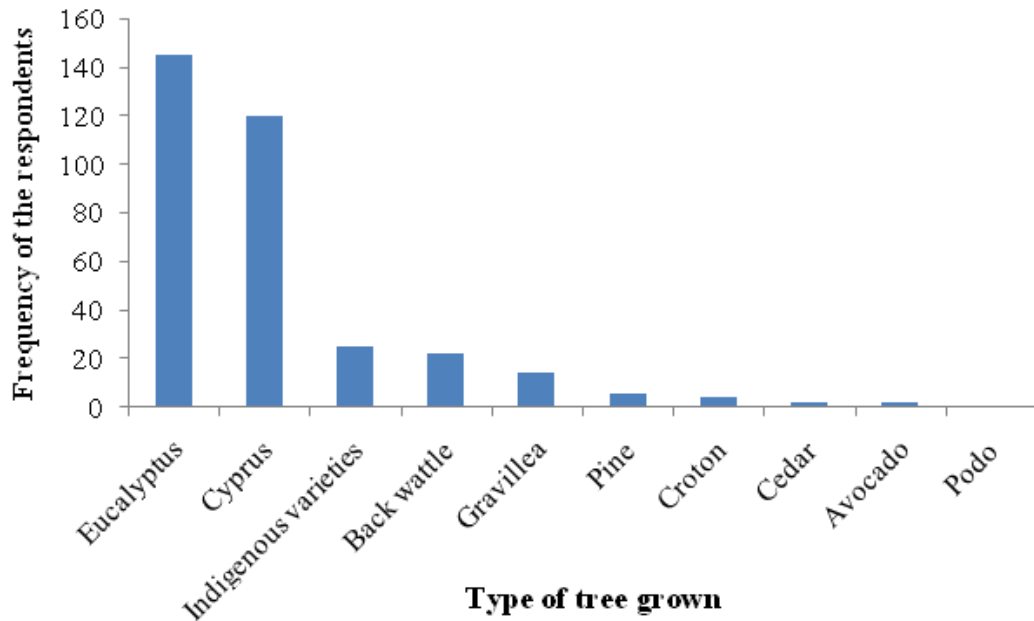


Figure 4.9: Types of trees planted on farms

Respondents grow trees on their farms for a number of reasons (Figure 4.10), some of which include herbal medicine (27% of respondents), firewood (17%), honey production (16%) and fodder for livestock (13%), among other reasons.

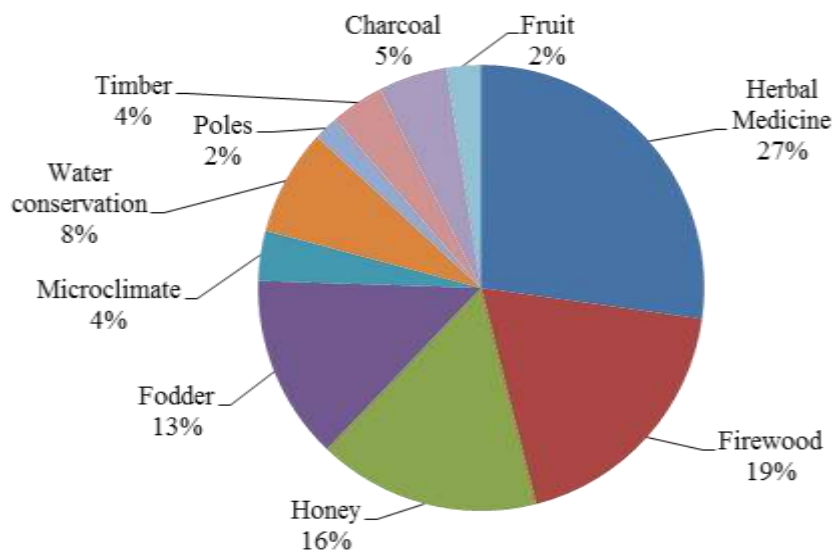


Figure 4.10: Percentage of respondents who receive different benefit from trees grown on their farms

There was evidence of past projects in the study area that were initiated by different institutions for environmental conservation. When asked whether environment conservation projects in the area have been beneficial to residents, respondents listed the following benefits; people get better income after the projects, source of firewood, herbal medicine, pasture, source of income, advance technology, provides training to people, tourist attraction, training people, increase water, improving living standards, more trees have been planted, and enough poles.

In addition to the benefits above, respondents suggested a number of projects and activities that should be carried out in the area to benefit the people, especially the youth. These include tree planting, forest conservation, soil and water conservation, tree nursery, energy saving jikos, dairy farming project, poultry farming, planting fruits, bee keeping, water projects, biogas projects, fish keeping and horticulture.

4.8 Forest Ecosystem Services in the Area

The importance of the MFC to people living around cannot be gain said. When asked about the benefits of the forest, the respondents mentioned the forest to be the source of the following; herbal medicine, firewood, honey harvesting, pasture, timber, poles, air purification, charcoal, water, wild fruits and agri-business. This is in agreement with Jama (1991) who conducted a similar study on forest-adjacent communities in the Mau Forest Complex.

In addition to the benefits above, respondents suggested a number of projects and activities that should be carried out in the area to benefit the people, especially the youth. These include tree planting, forest conservation, soil and water conservation, tree nursery, energy saving jikos, dairy farming project, poultry farming, planting fruits, bee keeping, water projects, biogas projects, fish keeping and horticulture.

To capture the role of the forest as a source of water in the area, the respondents gave sources that are all linked to the presence of the forest in the area (Figure 4.11), such as streams, boreholes and shallow wells which are maintained by the forest through groundwater recharge. When asked whether they like the forest, most of the respondents said yes (89%). This question captures the fact that communities in the adjoining areas of the forest value the ecosystem and its benefits to them.

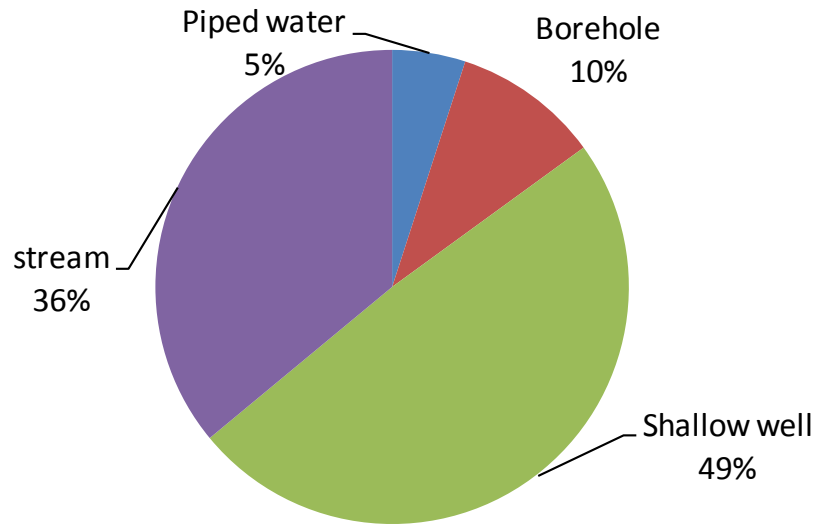


Figure 4.11: Sources of water

4.9 Community Attitudes and Perceptions towards the Forest

The study main findings are that there are positive attitudes towards the forest among the people and the people are doing some form of conservation on their farms, such as tree planting, and soil and water conservation. Majority of the respondents (>95%) were positive about the forest i.e., they like it, even though 69% of the respondents indicated that they have had a bad experience with the forest. Similarly, when asked whether they were happy living near the forest, 87.5% said that they were. These responses indicate that most respondents are able to link the forest with their well-being and that of the environment, in additions to the direct benefits that >90% of the respondents obtain from the forest. Unsurprisingly, it was evident that the closer one lives to the forest, the more dependent one is on forest resources (Figure 4.12). It was also noted that majority of the respondents (61%) obtain forest resources for both subsistence and commercial (selling for income) purposes (Figure 4.13).

Given an opportunity to clear the forest for other uses, more than 85% of the respondents said that they will not be happy if the forest is cleared for other uses. In addition to the forest benefits listed above, additional reasons given for not clearing the forest include; to protect wildlife, protection of the ozone layer, maintenance of the hydrological cycle, to avoid desertification, and to prevent overall degradation for the environment. However, only one reason was given for willingness to clear the forest, and this is to chase away wild animals. The same issue of wild animal also

came up when respondents were asked to identify problems associated with the forest. Other problems associated with the forest include, biting insects, snake bites, diseases, forest fires, hiding place for thieves and cold weather. Other reasons for disliking the forest such as a source of cold weather and diseases may be based on perceptions and scientific evidence. Interestingly, some of these reasons, such as insect and snake bites, fall under people-wildlife conflicts, which is a clear indication that this (people-wildlife conflicts) is a big problem that need to be addressed.

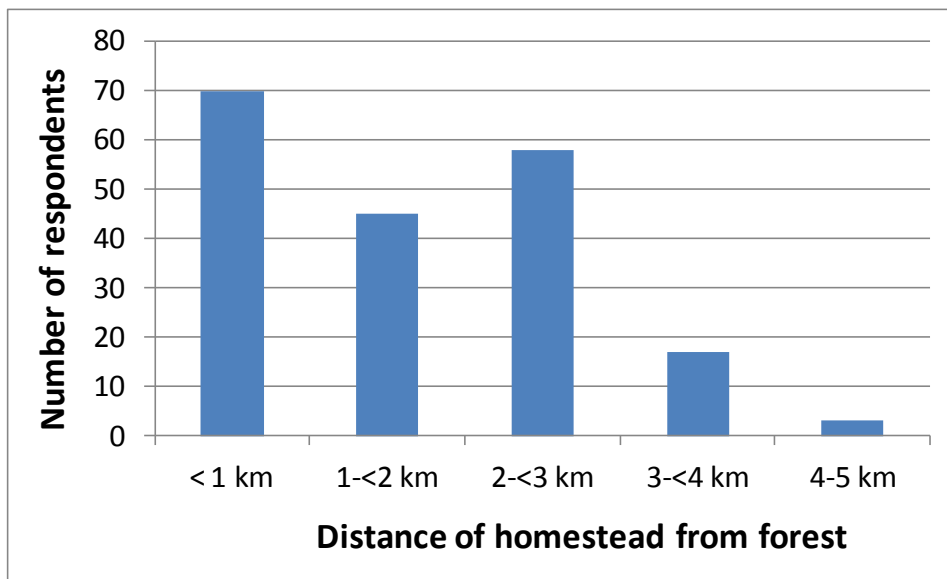


Figure 4.12: Number of respondents who obtain resources from the forest against the distance of the respondent's homestead from the forest.

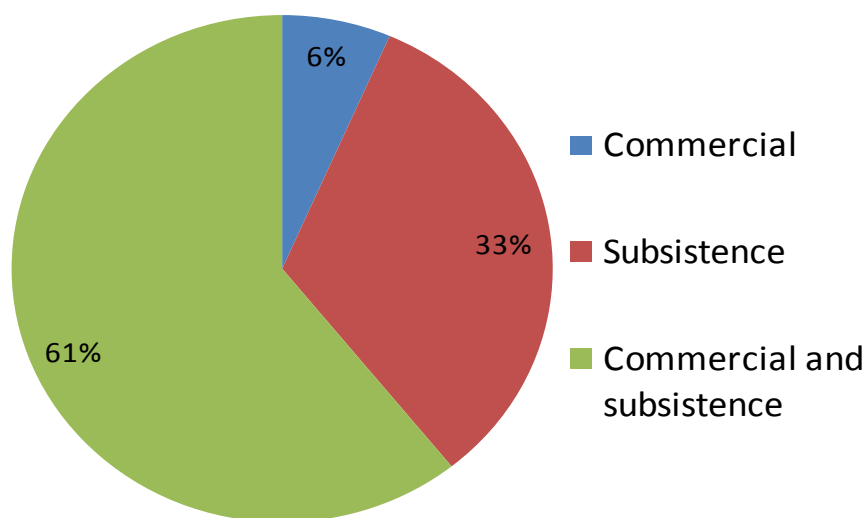


Figure 4.13: Uses of products obtained from the forest

4.9.1 Attitudes towards the forest and their drivers

To understand whether people had positive or negative attitudes towards the forest, respondents were evaluated using three questions that needed a ‘yes’ or ‘no’ answer: 1) whether they were happy living near to the forest, 2) whether they would be happy if the forest was cleared for other uses of the land, and 3) whether they were willing to report negative activities (such as logging, poaching of wild animals etc), if any, in the forest. In all the three models, the “Intercept Only” model was significantly different ($p < 0.05$) from the ‘Full’ model, implying that by including the predictor variables and maximizing the log likelihood of the outcomes seen in the data, the "Final" model improved the "Intercept Only" model.

There were no effects of household size on people’s perceptions and attitude towards the forest (Table 4.6). Families with large household size were expected to be more dependent on the forest for extractive purposes, and this would have shaped their positive perceptions towards the forest, but this was not the case in this study. Similarly, small families were expected not to be reliant on the forest and hence would not care about what happens to the forest, but this was not evident in the study. Overall, people in both Issey and Masese regions have positive perceptions of the forest, irrespective of household size.

Table 4.6: Testing the effect of household size on people’s attitudes towards the forest.

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	17.086 ^a	0.000	0	0.000
Total_2	23.947	6.860	14	0.940

a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

Contrary to household size which did not affect attitudes and perceptions, a number of factors were found to determine whether respondents liked or did not like living near the forest (Table 4.7; Appendix II). For instance, respondents in the Masese Region were happy living near the forest than respondents in the Issey Region. Similarly, the

level of education was a major determinant of whether respondents were happy living near the forest, with those with post-secondary education more happy living near the forest (Table 4.7).

The major attitudes and perceptions from this analysis is that people living near the forest have a positive view of the forest, probably because of the goods (such as firewood, honey, hunting) and services (good air), which they get from the forest. The results also show that people with post-secondary education had a positive view of the forest (Table 4.7), and this is to do with their knowledge of the role forests play as a source of water and other ecosystem services, such as controlling soil erosion and regulating the microclimate of the area. Similar studies from other regions have found that the level of education of people living near protected areas, and their level of dependence on the forest influence their attitudes and perceptions towards the forest (McFarlane & Boxall, 2000; Sah & Heinen, 2001).

Table 4.7: Factors influencing attitude whether respondents are happy living near the forest. The responses provided are for a 'yes' against a 'no' answer.

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	71.954 ^a	.000	0	.
Region	79.184	7.230	1	0.007
Distance from the forest	82.581	10.627	4	0.031
Level of education	82.960	11.006	5	0.050
Bad experience with the forest	84.903	12.950	1	0.000
Ownership of forest by government	82.398	10.444	1	0.001
Dependence on forest resources	72.915	.961	1	0.327

^aThis reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

A number of factors were also found to determine whether respondents would like the forest to be cleared for other uses (Table 4.8, Appendix III). For this attitude test, factors such as region, distance of homestead from the forest and ownership of the forest by the government did not determine or influence whether respondents would like the forest to be cleared for other uses. Again, the level of education was a major factor, while those who had a bad experience with the forest were in favor of it being cleared for other uses.

In addition to the positive attitudes, negative attitudes were also found. For instance, some respondents had a problem with the government ownership of the forest and felt that the local community should own it so that they have unrestricted access and use. As expected, respondents who were not happy that the forest is owned by the government were supportive of it being cleared for other uses, despite their dependence on the forest for products such as medicine, timber and game meat. Similar studies elsewhere have also found that ownership of protected areas significantly shape or influence whether people have positive or negative attitudes towards these areas (Macura *et al.*, 2011; Wei *et al.*, 2018).

Table 4.8: Factors influencing the attitude whether the respondents were happy if the forest was cleared. The responses are for a ‘yes’ against a ‘no’ answer.

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	98.285 ^a	.000	0	.
Region	104.303	6.018	1	0.114
Distance from the forest	105.122	6.836	4	0.145
Level of education	93.452	5.167	5	0.039
Bad experience with the forest	101.493	3.208	1	0.043
Ownership of forest by government	98.517	0.232	1	0.630
Dependence on forest resources	101.589	3.304	1	0.039

^aThis reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

Finally, respondents’ attitudes and perceptions were evaluated based on whether they would report illegal activities in the forest (Table 4.9, Appendix IV). In this regard, only respondents who supported government ownership of the forest and those with university education were willing to report illegal activities in the forest. The key attitude here is that people living around the forest will only participate in its conservation through reporting of illegal activities, which also means that they themselves do not undertake in the illegal activities, if they feel that they own a part of the forest. This attitude also captures the willingness of the people to participate in forest conservation. Community involvement and participation in environmental conservation has been recognized in Kenya and the Forest Act of 2005, recognizes communities living near forests as important in their conservation. This is achieved through the formation of community forest associations (CFAs) around all forests in

Kenya to directly involve communities in conservation, through controlled use and extraction of forest resources (GoK, 2015).

An understanding of people’s perceptions is important in participatory forest planning and management. This is because individuals’ knowledge has the potential to contribute to decision-making during planning for the management and preservation of forest resources (Lewis and Sheppard, 2005; Hickey *et al.*, 2007). Moreover, being aware of people’s perceptions and preferences regarding the forest and its landscapes is important for designing and implementing management policies (Heer *et al.*, 2003; Edwards *et al.*, 2012). This consideration is very important in mountain areas in Kenya because of their high agriculture potential. The mountainous regions in Kenya display a strong linkage between local communities and forests and, therefore, people will be severely affected in case of forest multifunctionality.

Table 4.9: Factors influencing the attitude whether the respondent would report illegal activities in the forest. The responses provided are for a ‘yes’ against a ‘no’ answer.

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	108.754 ^a	0.000	0	.
Region	110.233	1.479	1	0.224
Distance from the forest	114.152	5.398	4	0.249
Level of education	119.377	10.623	5	0.491
Bad experience with the forest	109.216	.462	1	0.497
Ownership of forest by government	121.392	12.638	1	0.000
Dependence on forest resources	110.738	1.984	1	0.159

^aThis reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

This study supports the hypothesis that variables such as level of education, dependency on forest resources, ownership of forest resources and proximity to the forest influence people’ attitudes towards the forest and protected areas in general. Even though a small number of people highlighted positive management activities, such as community projects participation in decision making, they were important correlates of positive attitudes in the study area. Negative management activities such as corruption and engagement in forest extraction by those meant to protect it and being punished for illegally extracting resources, can cause negative attitudes toward

the forest. Findings have shown that the way people perceive management strongly influence their attitudes toward PAs (Akama *et al.*, 1995; Alexander, 2000; Adams and Infield, 2001; McClanahan *et al.*, 2005). It has been shown that people can be more negative about management as compared to protected areas (PAs) themselves (Newmark *et al.* 1993). This is an indication that it is sometimes necessary to improve people's relationships with management, as much as the people-PA relationships. This study captures the broad range of perceptions that communities have towards management and shows that management can play both positive and negative roles in influencing people's attitudes toward PAs.

4.10 People-wildlife Conflicts

To capture the seriousness of the people-wildlife conflict in the study area, 59% (n = 118) of the farms have been invaded by wild animals (Figure 4.14). However, it is notable that the incidences of wildlife invasion of farms decrease with increase in distance from the forest (Table 4.10), suggesting that the forest is a major source of the animals. This supports the hypothesis that people-wildlife conflicts in the area are more rampant in areas near the forest as opposed to distant areas away from the forest. Moreover, people-wildlife conflicts in the area were mentioned to be the greatest problem with the forest and more than half of the respondents interviewed indicated that they have had a negative experience with the forest. Many of these negative experiences revolve around attack by wild animals (snake and insect bites), and the cold weather associated with the forest.

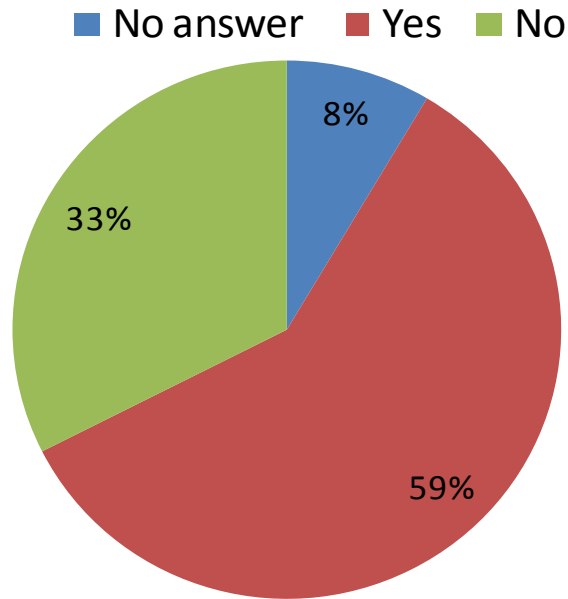


Figure 4.14: Farm invasion by wild animals

The negative forest impacts to the community because of their proximity to the forest were relegated to a small segment of respondents. The two major impacts identified by respondents were wildlife invasion of farms and farm animals. The residents attribute the problem to the protection of the forest which harbors wildlife. In order to solve this problem, it is imperative that managers and other stakeholders with the responsibility to conserve the forest should find a lasting solution. There is already a feeling among community members interviewed that KNP's managers are not doing enough address the problem. Elsewhere, people have similarly attributed protected areas with wildlife attacks, which are a major cause of bad attitudes regarding PAs (Lepp and Holland, 2006). However, if compensated for damages caused by wildlife, residents can have positive attitudes towards PAs (Picard, 2003; Sekhar, 2003; Walpole and Goodwin, 2001; Lepp and Holland, 2006).

Table 4.10: Incidences of farm invasion by wild animals with distance from forest.

Farm invasion by wild animals	Distance of farm from forest				
	< 1 km	1-<2 km	2-<3 km	3-<4km	4-<4 km
Yes	47	34	26	8	3
No	16	9	31	9	0

Respondents listed a number of wild animals that wreak havoc on their farms. Major among these are the elephants (mentioned by more than half of the respondents), mongoose (11%) and porcupine (7%) (Table 4.11). It was clear that some of the wild animal attacks and invasions occur seasonally, especially during crop harvesting time and in the rainy season, while some are frequent and continuous (Figure 4.15).

Table 4.11: Types of wild animals invading settlements.

Types of wild animal	Frequency	Percentage (%)
Hare	10	5
Monkey	6	3
Porcupine	14	7
Antelope	10	5
Hyena	12	6
Leopard	6	3
Mongoose	22	11
Squirrel	10	5
Spiny anteater	2	1
Elephant	108	54

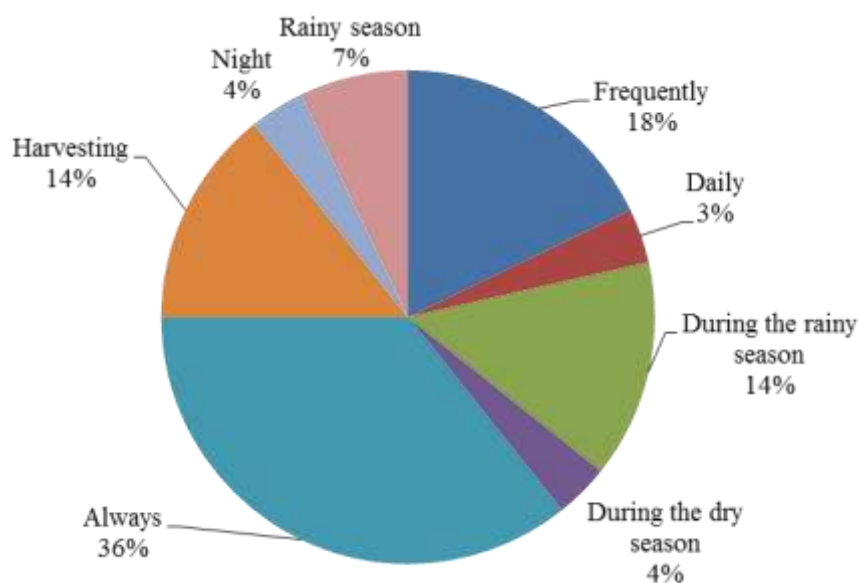


Figure 4.15: Time when wild animals invade farms

Because of the seriousness and frequency of people-wildlife conflicts in the area, people have taken a number of steps and initiatives to manage and minimize the number of invasions. These include killing the intruding animal, trapping them, chasing them away and reporting to the relevant authorities (mainly the chief and Kenya Wildlife Service (KWS), for action (Figure 4.16). notably, some of these actions, such as trapping and killing, are illegal.

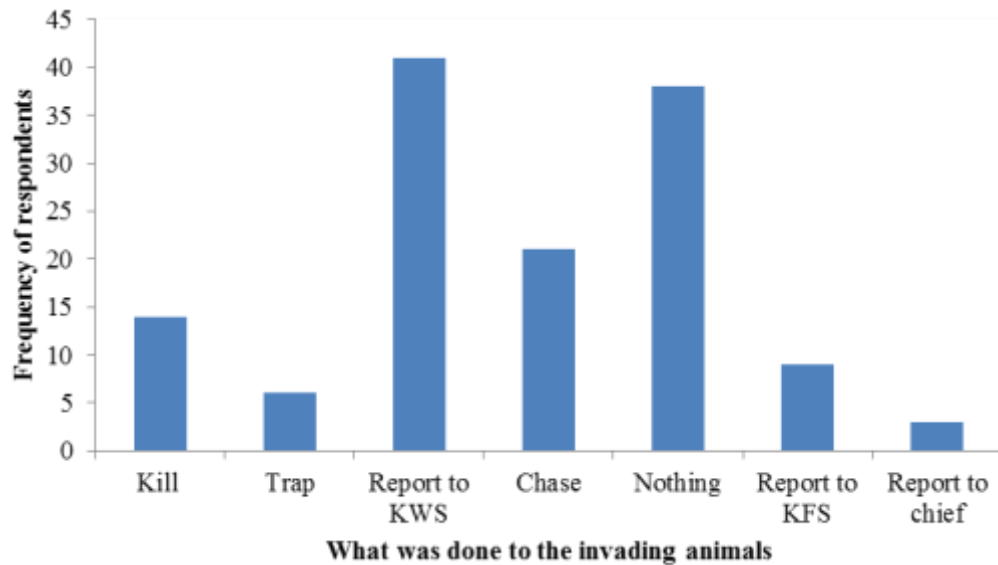
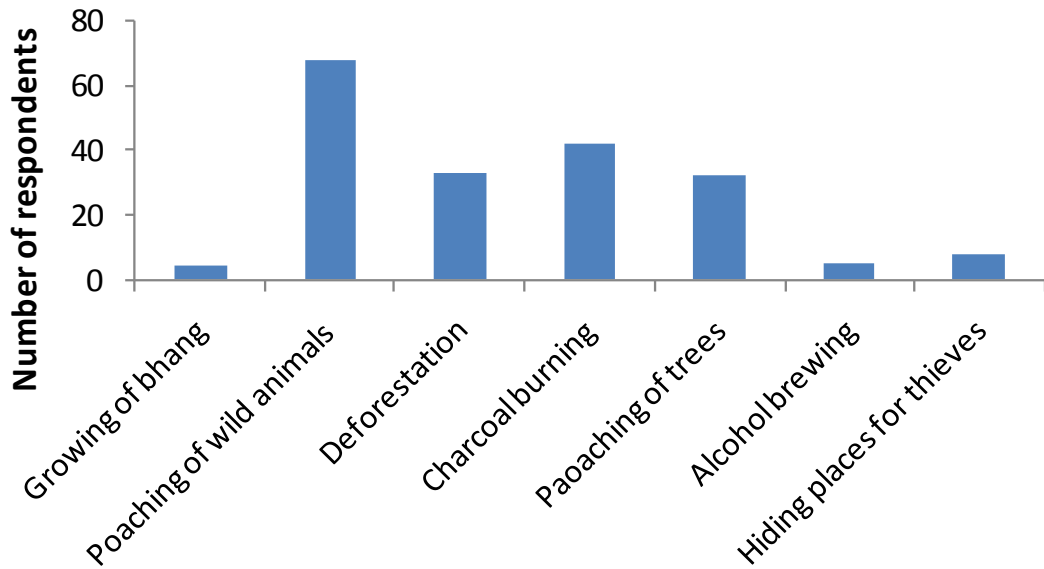


Figure 4.16: Actions taken by respondents upon farm invasion by wild animals.

4.11 Illegal Activities in the Forest

The interviews revealed that there are illegal activities in the forest as mentioned by more than half (57%) of the respondents. The most mentioned activities are poaching of wildlife, deforestation (which entails poaching of trees for timber and poles) and burning of charcoal (Figure 4.17). Despite the prevalence of these activities, only half of the respondents said that they report them to authorities, mainly the Chief, community area forest associations (CFA) leaders, Kenya Forest Service (KFS) rangers and area water resources user association (WRUA) leaders. Complacency on part of the community members in terms of reporting the illegal activities indicates that either the authorities or community members are complicit in the illegalities.



Illegal activities in the forest

Figure 4.17: Illegal activities being carried out in the forest.

4.12 Attitudes towards Alternatives to Forest Products

Given the high importance of the forest to people living on its periphery, the use of alternatives to forest resources will be a major step towards relieving the pressure on the forest, and ultimately its recovery in the wake of past degradation as a result of clearing and overexploitation. The most important forest products/ resources for the people in the study area are firewood and grazing of livestock. The main reasons given by respondents for using wood fuel are because it is cheap and accessible, and lack of an alternative source of energy (Figure 4.18).

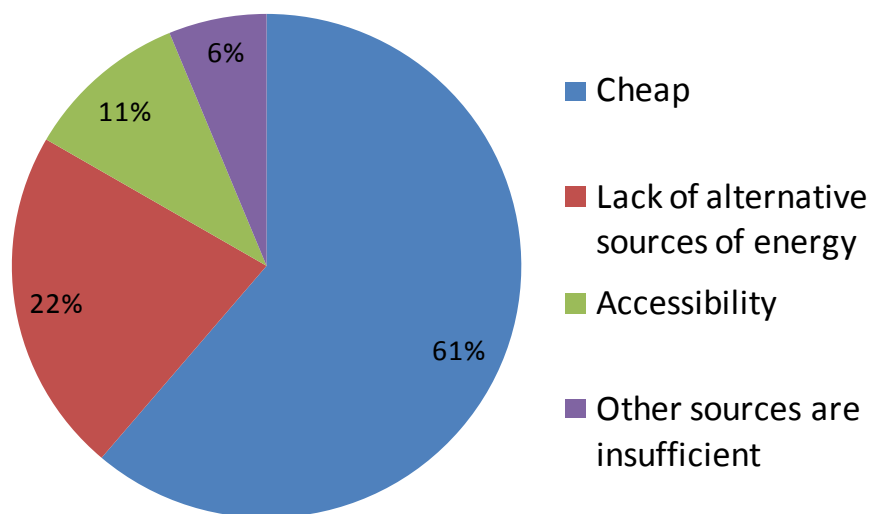


Figure 4.18: Reasons for overreliance of wood fuel as a source of energy.

However, respondents displayed knowledge of the existence of other alternatives to fuel wood as a source of energy (Figure 4.19), despite their low uptake in the study area. This implies that with the right support by government (such as subsidies on petroleum-based energy sources such as cooking gas and kerosene), people in the area can increase their use and relief the forest and trees as sources of firewood.

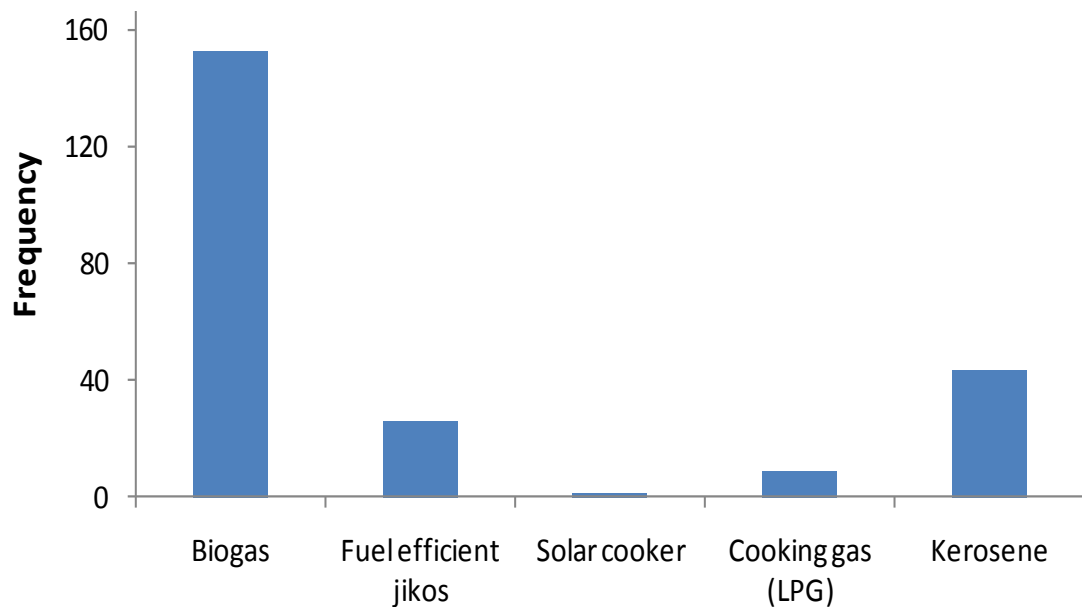


Figure 4.19: Alternatives to wood fuel as a source of energy.

The interview revealed that the main barriers to use of alternatives to firewood as a source of energy for cooking and heating are lack of information and materials and lack of enough quantities that can meet demand (Table 4.12). Biogas and dung cakes were the least known to respondents while price and insufficiency were the reason given for not using kerosene. Encouragingly, most respondents (43%) have grown fuel wood on their farms to provide additional source during the times of scarcity (Figure 4.20). To capture the importance of fuel wood in the lives of the community, some go as far as stealing from neighbours to meet demand during scarcity. Other ways to cope with lack of fuel wood is through buying and using other alternatives, although the later alternative, which is the most viable in terms of relieving the forest, is only done by few people (19%).

Table 4.12: Frequency of reasons given by respondents for not using alternatives to fuel wood as a source of energy (%).

Reasons for not using alternatives to fuel wood	Alternatives to fuel wood (% respondents)			
	Biogas	Fuel efficient stoves	Kerosene	Dung cakes
Not available	18	7	3.5	8.5
Insufficient	4	14	22	15.5
Can't afford	23	32	35	3
Not aware of it	37.5	41	39.5	73
Lack of materials to set-up	17.5	6	-	-

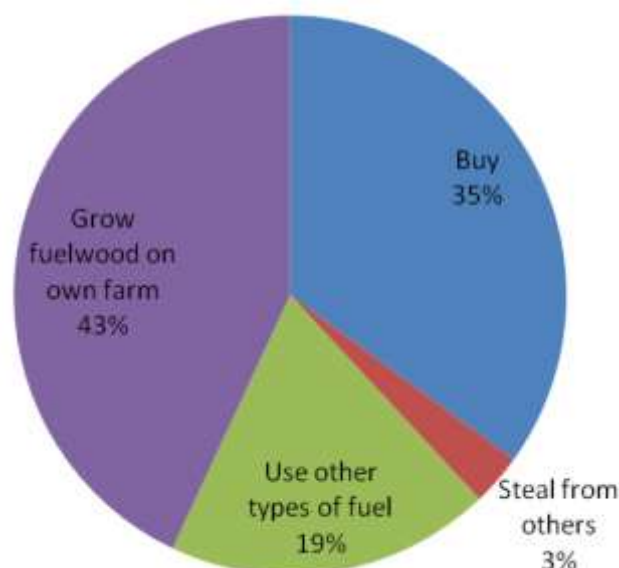


Figure 4.20: Reasons for not using alternatives to wood fuel as a source of energy.

Throughout the data collection period, residents were quick to identify many alternatives to the use of fuel wood as a source of energy for heating and cooking. However, there is low uptake of the alternative sources of energy such as biogas, dung cakes and cooking gas (LPG) (Table 6.8). Many said that either the alternatives are expensive or inadequate if they don't have the requisite skills to adopt them. This is surprising considering that some of the alternatives are available in the area in enough quantities to meet household demands. For instance, the many livestock in the area can be a good source of biogas and dung cakes. It was also quite intriguing to note that some households rely so much on the forest for firewood and yet they can plant

trees on their farms to meet the same demands. One explanation for the lack of uptake of alternatives to fuel wood as an alternative could be attitudes is residents' belief that most of the alternatives are expensive or some need special skills in one to adopt them. Another explanation could be that residents are content about the forest as a source of fuel wood and belief that the resource will never be exhausted. Despite the low use of other alternatives to fuel wood, people had a generally positive attitude towards them.

4.13 Perceptions and Attitudes towards Forest Ownership

Most of the respondents (81.5%) interviewed are satisfied with the current regime of forest ownership whereby the government owns the forest but the community benefits through community forest associations. Reasons for favoring government ownership of the forest include; the fact that the government has in place rules that protect the forest, the government provides enough security and lets the community to benefit, the government protects both the forest and the wildlife in it, and finally the government has the mandate and resources to prevent conflict in the community.

However, some respondents gave a number of reasons why they are not satisfied with government ownership of the forest, and these include the fact that the community should be given chance to participate in forest conservation. They also felt that the forest is public property and so should be owned jointly with the community. Other reasons given include rampant corruption among government officers, illegal cutting trees by government officers, and harassment of community members by government officers when harvesting forest resources.

However, there were dissenting voices among calls for community involvement in forest management, and the reason was that given powers, the people will take advantage and destroy the forest. When asked to give their opinions on whether there was need for capacity building on forest conservation. All the respondents showed eagerness to be trained and to change their land use practices to more sustainable ones. The reasons for the training, among others, include advancing people's knowledge on forest management, and equipping them with knowledge and skills on forest protection.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

This study shows that existing attitudes towards protected areas are strongly predicted by people's knowledge of the importance of the protected areas in conserving nature and preserving their functionality, including the production of goods and services depended upon by communities. This is also dependent on people's interest in environmental issues. The findings presented here are in agreement with the hypothesis that communities living in the adjoining area of the MFC have positive attitudes and perceptions towards the forest. The positive attitudes to the forest among majority of the residents can be supported by the plethora of benefits that residents derive from the forest, both directly and indirectly.

The findings of this study also agree with studies elsewhere which have found that residents living around protected areas (PAs) usually have good perceptions and attitudes, notwithstanding the challenges presented by living near protected areas (Allendorf *et al.*, 2006). The large number of respondents who mentioned conservation benefits and the linkage between these benefits and positive attitudes among respondents indicate that these positive perceptions play a key role in people's relationships with forests and other PAs. The only discrepancy was among farmers bordering the MFC who were plagued by crop raiding by wildlife. This is a big issue in the area, and lack of or limited response from forest managers has fostered feelings of hopelessness concerning the matter. There were anecdotes where farmers have lost their entire harvest to wildlife. In some cases, livestock have been attacked, maimed or eaten by hyenas and other wild animals. However, there are guidelines for compensation of loss of property (mainly livestock and crops) to wild animals, which can mitigate bad attitudes towards protected areas (Lepp & Holland, 2006)

With these considerations, the continued injection of new ideas through education is needed. Indeed, residents were of the view that trainings should be conducted in the area on all issues related to forest conservation and management of farms for sustainability. They also felt that these trainings will translate into success into success environmental management and forest protection. Nevertheless, there is much more for them to learn. This is illustrated by the widely circulated myths about the

forest a source of ogres and evil spirits. However, there are positive stories about the forest which should be capitalized upon to improve people's perceptions about the forest. This raises an important question: to what extent does a lack of knowledge contribute towards negative attitudes about the forest among the people. As the study demonstrates, forest benefits can secure its acceptance among the people. Consequently, people's ability to take advantage of these benefits will play a major role in fostering pro-conservation attitudes towards the forest and other PAs. As captured in the revised Forest Act 2005, community participation in forest management and conservation through community forest associations (CFAs) holds the key for the safety of the MFC and other forest in Kenya.

5.2. Conclusions

With respect to the first objective of identifying the attitudes and perceptions held by local residents towards the MFC, the findings of this study show that residents' attitudes towards the Mau Forest are largely positive, and are connected with the benefits that the community derives from the forest. The forest provides people with opportunities for earning income, and helps improve environmental conditions through regulation of the area's microclimate.

With respect to identifying factors that influence attitudes towards the forest and the ability of these factors to predict attitudes, this study identified level of education, forest ownership, distance of homestead from the forest and dependence on forest resources as the major drivers of respondents' attitudes towards the forest. Generally, people were receptive to alternatives to forest resources, although most people are dependent on the forest. This study shows that due to their proximity, the relationship between people and protected areas is mainly driven by ownership rights or direct benefits deriving from the protected area.

Lastly, the role of people-wildlife conflicts in shaping attitudes towards the forest was assessed and came out as one of the factors influencing attitudes and perceptions about the forest. For instance, respondents who reported to have had a bad experience with the forest (most including animal attacks and insect and snake bites), supported the idea of clearing the forest for other uses.

5.3. Recommendations

Based on the conclusions, the following recommendations were given:

1. Given the many benefits that people around the Mau Forest Complex derive from the forest, there is a need for increased utilization of alternatives to forest resources. These include alternative sources of energy e.g. stoves and energy saving jikos, improving farming practices to improve food security e.g vegetable farming and poultry farming and provision of medical facilities to avoid harvesting of forest plants for herbal medicine.
2. Given that the distance from the forest influence people's dependency, attitudes and perceptions towards the forest, and the people-wildlife conflicts, any interventions in the study area should concentrate on people living close to the forest. In this case people living up to 5 km from the forest should be given priority.
3. People in the adjoining areas of the forest should be compensated for the damage to property or loss of lives cause by wildlife. Although some members were compensated but the majority were not compensated yet they were within the compensation policy. In addition, the feasibility of an insurance premium should be considered to safeguard people's animals and crops. This would create further incentives for forest managers to work with famers on minimizing risk.

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APPENDICES

1.9 Appendix I: Questionnaire

Hello, my name is **Hyline Nyatichi Nyangweso**, a student at Kenyatta University conducting a survey on community roles in the conservation of the Mau Forest Complex. This questionnaire is to be administered to individual household heads in communities adjoining the Mau Forest Complex who have been identified as strategic for conservation and sustainable utilization of the forest. The interviews are intended to generate information on a range of issues that capture the perception and role of communities in forest resource conservation in Kenya. The survey will provide primary information that will be used to address the needs of the community and wise use strategies that will safeguard the future sustainability of the forest in Kenya. It will also give directions for further research. Your responses will be treated with utmost confidentiality.

A. Interviewee's identification information

A.1. Interview date	
A.2. Name of respondent	
A.3. County	
A.4. Sub-county	
A5. Location	
A.6. Distance of homestead from the forest	(1) < 1 km (2) 1 km - < 2 km (3) 2 km - <3 km (4) 3 km - < 4 km (5) 4 km - < 5km

Household characteristics

A.7. Number of household members			
A.8	A.9	A.10	A.11
Sex	Age (yrs)	Marital status	Level of education
Male		Married	None and nursery
Female		Single	Primary
		Widowed	Secondary
			Tertiary education

Household income

Total household income per year	High level income
	Middle level income
	Low level income

Household assets

Asset (Land)	Size	Uses	Types of trees planted
		Grazing Farming Fallow Trees	
Livestock	Number	Breed	Uses
			Where do the animals graze?
Cattle			

Goats				
Chicken				
Donkeys				

C1b. do you grow fodder or buy for your livestock and what are the reasons for not growing fodder

Do you grow fodder	Type of fodder grown	Do you buy fodder	Type of fodder bought	Reason for not growing fodder
Yes				
No				

C2. How long have you lived in this land?

a) Where did you come from (if moved)

b) What are the reasons for moving to this place?

i) Resettlement

ii) Business

iii) Grazing

c) How was this land acquired?

i) Inherited

ii) Purchased

iii) Allocated by the government

iv) Acquired from the forest (bush clearing)

C3. Where do you get the following items from?

Item	Source Own farm Forest Market
Fuel wood	
Poles and timber	

Item	Source Stream and the river Shallow well
Water	

C4a. Has your farm been invaded by wild animals?

1. Yes
2. No

C4b. if your answer in C4a above is yes then fill the table below

What kind of animals	When	What action did you take?

D. Community attitudes and perceptions towards the forest

D1a. What benefits and /or problems do you associate with the forest?

Benefits	Problems

D1b. Do you like the forest?

1. Yes
2. No

Give a reason for your answer in D1b above

D2a. Would you be happy if the forest were cleared?

1. Yes
2. No

Give reasons for your answer in D2a above

D3a. Do you get any resources from the Mau forest?

1. Yes
2. No

D3b. If your answer in D3a above is yes, fill in the table below

Resource	Who harvests	How frequent Daily Weekly Monthly Occasionally	Use Commercial Subsistence Both

D3c. If one of the resources you get from the forest is fuel wood, why do you use it and how do you cope with it when it is not available?

Reason for using wood as fuel	How do you cope when wood fuel is not available from the forest
Cheap	Buy from the market
Lack of alternative sources of fuel e.g. LPG/ kerosene	Steal from other people's woodlots
Inaccessibility to LPG/ kerosene in the rural areas	Use other types of fuel e.g. LPG/ kerosene, biogas
Other sources are not sufficient	Grow fuel food
	Don't know

D3d. What other sources of fuel are available for your use and what are your reasons for not using them

Other sources of fuel	Biogas	Fuel efficient stoves	Kerosene	Dung
1. Biogas	1. Not available	1. Not available	1. Not available	1. Not available
2. Fuel efficient stoves	2. Insufficient	2. Insufficient	2. Insufficient	2. Insufficient
3. Solar cooker	3. Can't afford	3. Can't afford	3. Can't afford	3. Can't afford
4. Cooking gas (LPG)	4. Not aware of it	4. Not aware of it	4. Not aware of it	4. Not aware of it
5. Kerosene	5. Lack of materials to set up biogas	5. Lack of materials to set up fuel efficient stoves		
6. Dung cakes				

D4a. Do you feel like you are dependent on the forest for any reason?

1. Yes
2. No

D4b. Give reasons for your answer in D4a. Above

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D5a. In your own opinion who owns the forest?

1. Community
2. Government
3. Tea estate

D5b. Are you satisfied by the ownership issues related to the forest?

1. Yes
2. No

D5c. Give reasons for you answer above

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D6a. Have you had any experience that has made you have positive or negative thoughts about the forest?

1. Yes
2. No

D6b. Are there any songs, myths and folklore in the community related to the forest that have been passed down from one generation to another?

1. Yes
2. No

If yes in D6b above, give a brief description

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D6c. Evaluating people’s attitudes to forest conservation and protected areas

1= strongly disagree 2= disagree 3= neutral 4= agree 5= strongly agree					
	1	2	3	4	5
1. Do you like the forest					
2. Would you be happy if the forest were cleared?					
3. Are you happy living near Mau Forest Complex?					
4. Do you feel like you are dependent on the forest for any reason?					
5. Are you satisfied by the ownership issues related to the forest?					

E. Participation in Forest Conservation and Development Projects

E1a. Are you aware of any projects that aim to help people living adjacent to the forest?

1. Yes
2. No

E1b. If you answer in E1a. Above is yes then fill the table below

Name of project	Activities	Have you participated in any of these projects?	In what ways have you benefited?
	Forest conservation	Yes	Tree planting
	Soil conservation	No	Training
	Tree planting		Better income
	Marketing of farm produce		Group work
	Water conservation		More food
	Energy saving jikos		Technological advancement

E1c. If you answer in E1a above is no, would you like to participate in these projects if available in future?

1. Yes
2. No

E1d. If your answer in E1c above is yes, list the projects that you would like to participate in?

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E2a. Do you think these projects are helping people?

1. Yes
2. No

E2b. Give reasons for your answer in E2a above.

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E3. Suggest projects that you would like to be carried out in your area

- 1.
- 2.
- 3.
- 4.

E4. Are you happy living near Mau Forest Complex?

1. Yes
2. No

E5a. Do you think people living adjacent to the forests should be more involved in forest management?

1. Yes
2. No

E5b. Give reasons for your answer in E5a above

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E6a. In your own opinion are there illegal activities being carried out in the forest?

1. Yes
2. No

E6b. If your answer in E6b above is yes fill in the table below

Illegal activity	Was the incident reported? Yes No	To who was the incident reported? Chief/ assistant chief CFA KFS Forest scouts Village elder	What action was taken? Stopping the activity Apprehending the culprit Nothing	Who took the action? Chief/ assistant chief CFA KFS

E7a. Do you think capacity building in forest conservation and management is important?

1. Yes
2. No

E7b. Give reasons for your answer in E7a above.

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Any comments

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1.10. Appendix II: Factors influencing attitude – Are you happy living near the forest.

Are you Happy Living Near the Forest ^a		Regression coefficient	Std. Error	Wald	df	Sig.
Yes	Intercept	30.938	1.518	415.662	1	0.000
	Region= Issey	-1.875	.765	6.014	1	0.014
	Region= Masese	0 ^b	.	.	0	.
	Distance= 0-<1 km	-13.026	1.278	103.855	1	0.000
	Distance= 1-<2 km	-15.429	1.143	182.365	1	0.000
	Distance= 2-<3 km	-15.281	1.059	208.391	1	0.000
	Distance= 3-<4 km	-14.568	0.000	.	1	.
	Distance= 4-5 km	0 ^b	.	.	0	.
	Education= None	2.793	1.802	2.403	1	0.121
	Education= Lower primary	1.267	1.424	0.791	1	0.374
	Education= Upper primary	3.073	1.050	8.567	1	0.003
	Education= Secondary	2.599	0.944	2.870	1	0.030
	Education= Post Secondary	2.938	1.048	3.422	1	0.024
	Education= University	0 ^b	.	.	0	.
	Has had bad experience with forest= Yes	2.222	0.671	10.953	1	0.001
	Has had bad experience with forest= No	0 ^b	.	.	0	.
	Happy with government ownership= Yes	-18.672	0.000	.	1	.
	Happy with government ownership= No	0 ^b	.	.	0	.
Dependent on forest resources =Yes	1.191	1.205	0.977	1	0.323	
Dependent on forest resources =No	0 ^b	.	.	0	.	
<p><i>The reference category is: No._a</i> <i>This parameter is set to zero because it is redundant._b</i></p>						

1.11. Appendix III: Factors influencing attitude – Are you happy if forest is cleared.

Happy if Forest is Cleared ^a		Regression coefficient	Std. Error	Wald	df	Sig.
Yes	Intercept	2.729	1.736	2.471	1	0.116
	Region= Issey	1.300	0.572	5.160	1	0.023
	Region= Masese	0 ^b	.	.	0	.
	Distance= 0-<1 km	-2.799	1.512	3.425	1	0.064
	Distance= 1-<2 km	-2.774	1.529	3.289	1	0.070
	Distance= 2-<3 km	-2.703	1.511	3.202	1	0.074
	Distance= 3-<4 km	-22.601	0.000	.	1	.
	Distance= 4-5 km	0 ^b	.	.	0	.
	Education= None	-1.092	1.337	0.667	1	0.414
	Education= Lower primary	-1.267	1.413	0.804	1	0.370
	Education= Upper primary	-1.424	0.881	2.611	1	0.016
	Education= Secondary	-.795	0.845	0.884	1	0.047
	Education= Post Secondary	-.177	0.880	0.040	1	0.041
	Education= University	0 ^b	.	.	0	.
	Has had bad experience with forest= Yes	-.862	0.479	3.244	1	0.042
	Has had bad experience with forest= No	0 ^b	.	.	0	.
	Happy with government ownership= Yes	.282	0.595	0.225	1	0.635
	Happy with government ownership= No	0 ^b	.	.	0	.
Dependent on forest resources =Yes	-1.591	0.870	3.345	1	0.067	
Dependent on forest resources =No	0 ^b	.	.	0	.	

The reference category is: No.^a

This parameter is set to zero because it is redundant.^b

1.12. Appendix IV: Factors influencing attitude – Are you reporting illegal activities in the forest.

Reporting of illegal activities ^a		Regression coefficient	Std. Error	Wald	df	Sig.
Yes	Intercept	19.583	1.526	164.739	1	0.000
	Region= Issey	-0.470	0.390	1.452	1	0.228
	Region= Masese	0 ^b	.	.	0	.
	Distance= 0-<1 km	-15.885	0.647	603.647	1	0.396
	Distance= 1-<2 km	-16.005	0.666	576.945	1	0.139
	Distance= 2-<3 km	-15.122	0.668	511.823	1	0.212
	Distance= 3-<4 km	-16.307	0.000	.	1	.
	Distance= 4-5 km	0 ^b	.	.	0	.
	Education= None	18.536	3950.354	.000	1	0.996
	Education= Lower primary	1.701	1.265	1.809	1	0.179
	Education= Upper primary	0.712	0.705	1.021	1	0.312
	Education= Secondary	0.224	0.699	0.103	1	0.749
	Education= Post Secondary	0.985	0.770	1.636	1	0.201
	Education= University	0 ^b	.	.	0	.
	Has had bad experience with forest= Yes	0.270	0.397	0.464	1	0.496
	Has had bad experience with forest= No	0 ^b	.	.	0	.
	Happy with government ownership= Yes	-2.142	0.768	7.791	1	0.005
	Happy with government ownership= No	0 ^b	.	.	0	.
Dependent on forest resources =Yes	-1.450	1.156	1.572	1	0.210	
Dependent on forest resources =No	0 ^b	.	.	0	.	
<p><i>The reference category is: No.^a</i> <i>This parameter is set to zero because it is redundant.^b</i></p>						