

**INFLUENCE OF DISTANCE ON FOREST UTILIZATION AND
PARTICIPATION OF LOCAL COMMUNITIES IN
CONSERVATION OF SOUTH WEST MAU FOREST, KENYA**

BY

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DECLARATION

Declaration by the Candidate

This thesis is my original work and has not been presented for a degree in any other University. No part of this thesis may be reproduced without written permission of the author and/or University of Eldoret.

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DEDICATION

I dedicate this work to my wife Debora Chepngeno, my sons Emmanuel, Abraham and Chepkemoi.

ABSTRACT

Intensity of use of forest and involvement of neighboring communities in conservation is not uniform. It is suspected that they reduce as one is located away from forest edge. This study looked at how individual's distance from forest edge influences their access to forest resources and their participation in conservation. The purpose of the study was to determine: i) how forest utilization varies with distance from forest edge ii) how distance of an individual's location from South West Mau forest border influence CFA membership iii) participation of local community members in conservation along distance gradient. A total of 360 households were interviewed along six transects of six kilometers across the study area. First ten households within every kilometer of each transect were sampled. Sampling was conducted to accommodate equal number of males and females as well as youth and old. For each respondent, the number of forest uses, CFA membership and participation index were determined. The results indicated that forest utilization, CFA membership, and participation in conservation decrease as one is located further away from forest. All forest uses studied showed a decreasing trend on increasing distance. Among the forest uses tested firewood, pasture, initiation, praying, and marriage indicated significant variation with distance. However, Honey, seeds/seedlings and herbal medicine were not significantly different along distance. The overall participation index (PI) is 0.6 indicating that the locals occasionally participate in conservation activities. At distance 1, 2 and 3 kilometers from forest edge the members often participate in conservation with PI of 0.7 and 0.8. However, after five kilometers they rarely participate in conservation. Forest utilization, CFA membership and participation of locals in forest conservation planning are influenced by distance in which an individual is located from the forest edge. Conservation planning and management of forests needs to involve community members who are close to the forest as much as possible especially within three kilometers distance from the forest.

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CHAPTER ONE

INTRODUCTION

This chapter gives background information, problem statement, objectives, hypotheses, theoretical frame work, conceptual frame work, justification, definition of terms and the study area.

1.1 Background Information

Between 1990 and 2015, global forest area declined by 3 percent (FAO, 2015). Most of this loss occurs in the tropics. Though extensive, the world's forests have shrunk by about 40 percent since agriculture began 15,000 years ago (FAO, 2006). Three quarters of this loss occurred in the last two centuries as land was cleared to make way for farms and to meet demand for wood. Natural forest loss between 1990 and 2015 was higher, declining by 6%, from 3,961 million hectares to 3,721 million hectares (FAO, 2015). The composition and quality of many forests have also changed over the years.

Africa has 15 percent of the world's forests. However the continent has lost 64 million hectares of forest between 1990 and 2005, the greatest decline of any continent (FAO, 2006). In forestry as in many other aspects, Africa is a continent of diversity. It includes countries with some of the world's richest forests. Others are poor in valuable species while others severely lack forest cover.

In Kenya, gazetted forests cover a total area of 1.4 million hectares, representing about 1.7% of total land area (MENR, 2007). This does not meet the internationally

recommended minimum of 10% of country forest cover. Though most of Kenya's forests have been decimated by degradation among other factors, the Mau Complex forests cover has been the most affected and has receded drastically over time (KIFCON, 1991). The forest is under increasing threat from irregular and ill planned settlements, encroachments and illegal forest resource exploitation. Over the last decades, approximately 25% of Mau forest has been lost to excisions and encroachment. As a montane forest, the Mau Complex is one of the five "water towers" of Kenya, with Mt. Kenya, the Aberdare Range, Mt. Elgon, and the Cherengani Hills forming the upper catchments of all (but one) main rivers west of the Rift Valley. It feeds major lakes, three of which are cross boundary. Mau forest is the largest water catchment area in Kenya (KIFCON, 1991). The water from Mau forests serves more than eight million people inhabiting several locations in Kenya and Northern Tanzania (FAO, 2006). In addition the Mau Complex provides continuous river flow and favorable micro-climate conditions which are essential to crop production, as well as many products including medicinal plants, firewood and grazing.

The forest is the home of the Ogiek Community, who from time immemorial has inhabited Mau forest. Until 1950's they had been subsisting on sustainable hunting of wild game and gathering of wild fruits (Willy, 2002). As a result of change of laws, policies and the rapid spread of western religion and education, the Ogiek community has lost their cultures, traditions and territories. They now find themselves practicing small scale agriculture and livestock keeping. The Mau forest is also vital for the pastoral local communities, who graze their animals there during the dry seasons.

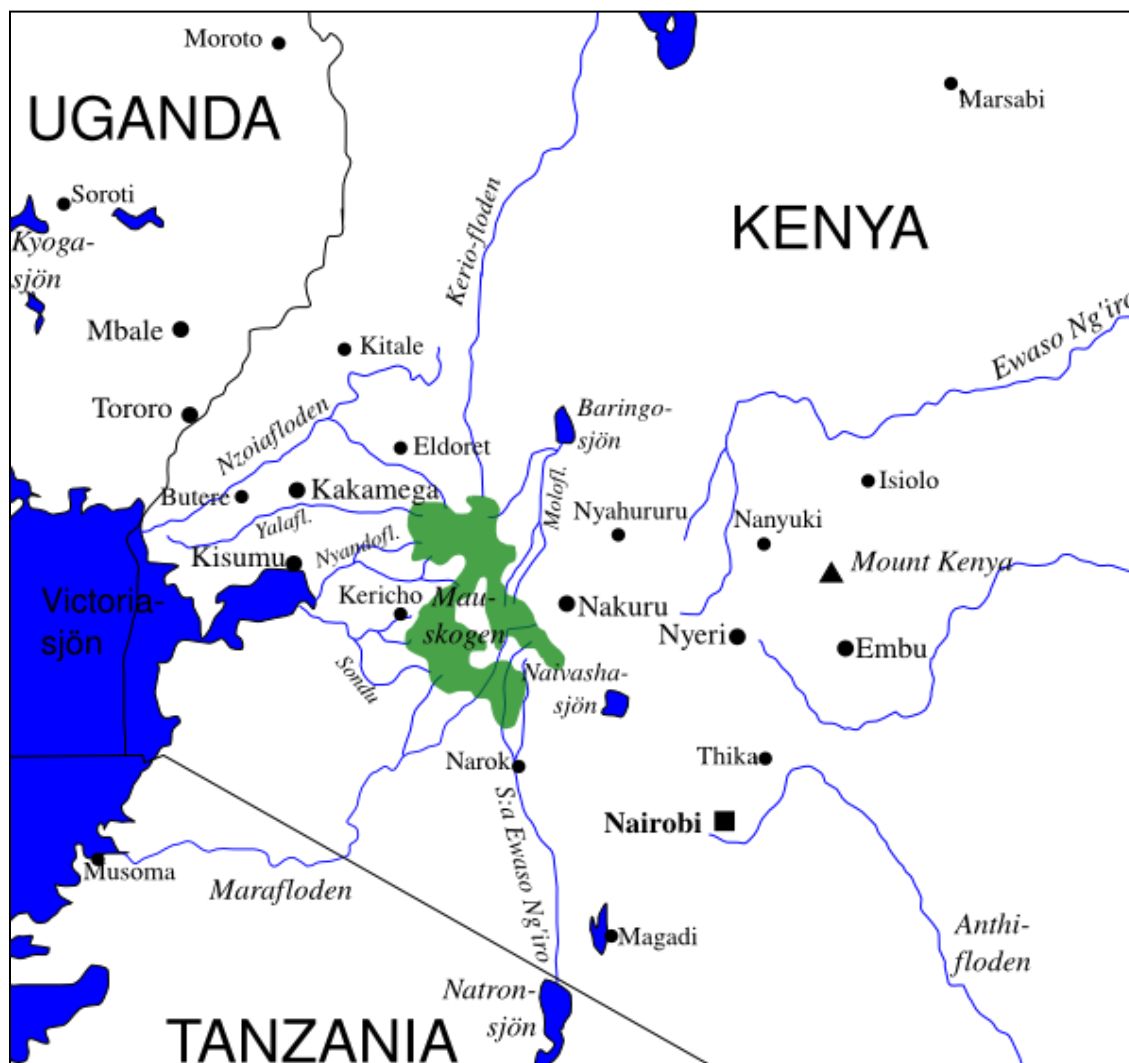


Figure 1.1: Kenya's Five Water Towers

Source: https://en.wikipedia.org/wiki/Mau_Forest#/media/: Accessed 16th June 2015 at 9:27 am

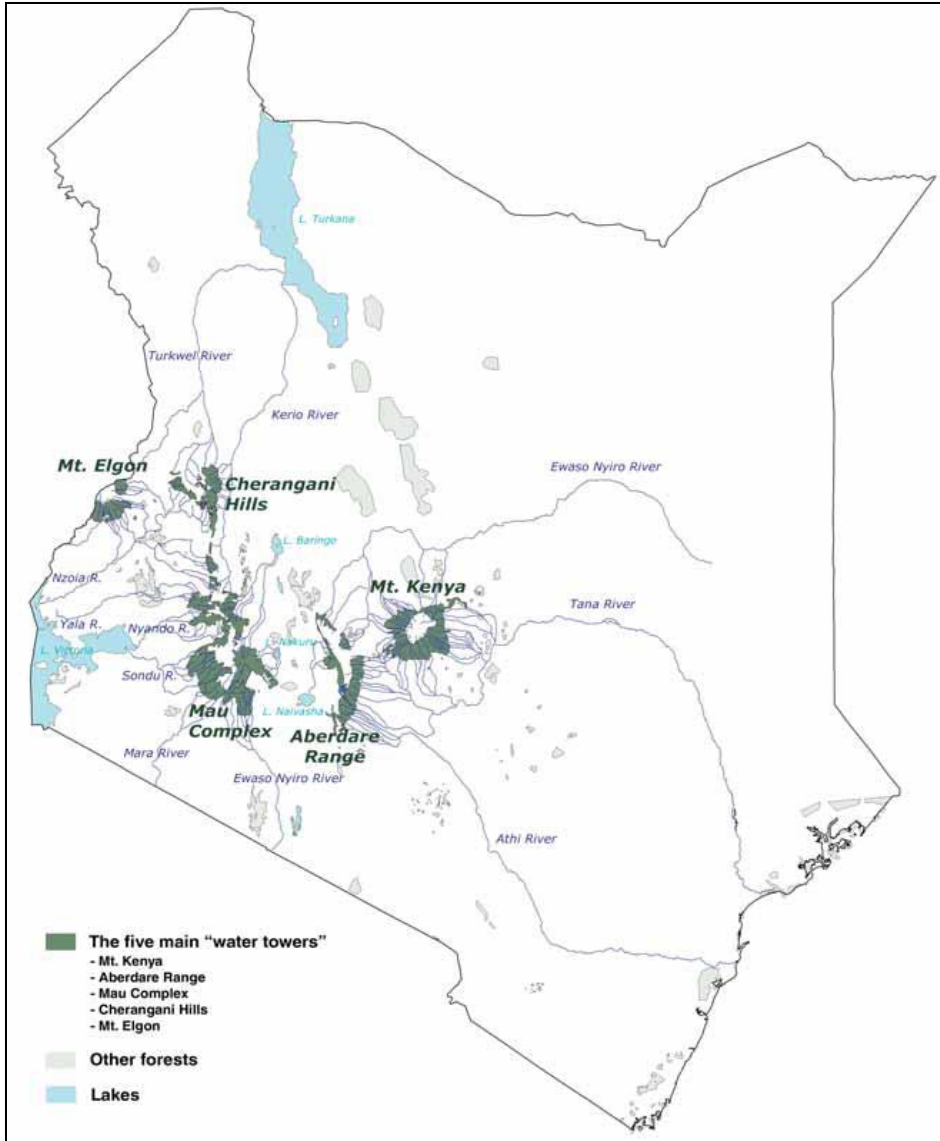


Figure1. 2: Mau Forest Drainage

Source: <http://upload.wikimedia.org/wikipedia/commons>: Accessed 16th June 2015 at 9:27 am

A healthy planet needs healthy forests (FAO, 2006). Thriving forests regulate the water cycle and stabilize soils. Forests also help moderate climate by soaking up and storing carbon dioxide. In addition to these ecosystem services, forests provide habitat for diverse flora and fauna, offer cultural, spiritual, and recreational opportunities, and provide a variety of food, medicines, and wood. Kenya's Forest Act 2005 also outlines

the same on the importance of the forests. The economy of Kenya is based on its natural resources (MENR, 2007). Both the livelihoods of the people and the national income and wealth are substantially dependent upon the natural resource base.

Conservation of these resources is vital because of their contribution to the livelihoods of communities living adjacent to the forest by providing them with various ecosystem goods and services. Some of the products obtained from the forests by adjacent communities include fuel wood, food in form of wild fruits and vegetables, medicinal herbs, wood for carving, and other small cottage industries. Other forest products accessed from the forests include dyes for adding value to handicrafts, honey, timber, poles, and posts, among others. Cultural services include use of forests as venues for traditional ceremonies such as circumcision and religious purposes (Geller *et al*, 2007).

The challenge for forestry is to sustainably manage forest resources to provide rural livelihoods, environmental services and forests and tree products (FAO, 1998). Management interventions have been instituted in almost all countries to stop decline in forest resources and increase to a required levels of 10% in every country. Participatory management is increasingly recognized as an effective strategy to help meet this challenge.

Conservation and management of natural resources have to actively involve all relevant stakeholders and particularly the local communities for success (Wandago and Nahama,

2007). The inclusion of communities in the management of state-owned forest resources has become increasingly common over the past 25 years.

Schreckenber *et al*, (2006) indicated that majority of the countries in Africa and Asia are promoting participation of rural communities in the management and utilization of natural forests and woodlands through some form of Participatory Forest Management (PFM). Participatory Forest Management is the local involvement of stakeholders in management of a forest, which may be dry woodlands, tropical forests, mangrove, or plantations, for the mutual benefit of both the species of flora and fauna and the community.

In Kenya, it is a legal requirement according to the Forest Act (2005) that communities form Community Forest Associations (CFAs), before entering into a forest management agreement with Kenya Forest Service (KFS) under the PFM process (Ludeki *et al*, 2006). In Kenya the formation of CFAs started in 1997, and currently there are over 40 forests where communities participate in forest management.

Participatory Forest Management (PFM) is being adopted widely in many developing countries as an alternative method of managing forestry resources (Willy, 2002). PFM is increasingly being used as an approach through which to achieve the sustainability of threatened forests and conservation of biodiversity. This is done through a process of inclusion, equity, and democratization of governance of the forest resources (Amanor, 2003). PFM is a multi-stakeholder approach where the private sector, institutions, and

communities are involved in management of forests and sharing of benefits that accrue from such management processes (CFA).

Kenya's government has recognized the critical role played by forest-adjacent communities in ensuring that tree cover in the country increases to the recommended 10% (MENR, 2007). The new Forests Act (2005) encourages local communities to participate in the management of forest resources adjacent to them. Arising from this new policy and law, new institutions have emerged to implement the process of involving local communities in the management of forest resources. The institutions aimed at co-managing of forest resources with central and local government institutions such as the Kenya Forest Service (KFS) and the Counties. In order for the local communities to enter into such co-management arrangements, they are expected to form and register community forest association.

Studies from Barrow *et al*, 2001, Matiku, 2012 and Muller, 2003 have been undertaken to identify factors that influence CFA members', level of participation in PFM and determinants of access to forest products in forests. Such information is crucial for sustained participation of CFA members and other community members in PFM. Numerous benefits are expected to accrue to individuals from participating in community forest associations through increased access to forest products such as fuel wood, herbal medicine, honey, tree seedlings, thatch grass and fodder. With these benefits, it would be expected that communities would fast embrace the system and participate effectively. However, the progress has been slow and, in some cases, CFAs have been formed only to

collapse after a short while (Ongugo *et al*, 2007). But it is also important to note that, decentralization of forest management may not necessarily yield desirable environmental outcomes as has been revealed by evaluation studies elsewhere in the World (Matiku and Ogot, 2011). The policies do not put into consideration interaction of the local communities with the forest resources and the location of an individual who participate in forest conservation planning thus, it is critical and urgent to understand what drives individual to participate in community forest associations and the interaction of local community with the adjacent forests for better environmental outcomes in Kenya.

1.2 Statement of the Problem

Policies and conservation plans have been developed to save the forests in Kenya. However, encroachment and degradation still continue. Forest planning as well has incorporated participation but little has been achieved in forest conservation.

Public interest is diverse, changing and contradictory (Catanese, 1984). There is rarely, if ever, a unity of public interest in issues with which planners deal. This means that changes and revisions should eagerly be sought rather than avoiding them. It is clear that people tend to become involved in planning mainly when there are some specific and tangible interests for them and their groups.

Forest adjacent communities are highly dependent on forest resources for their livelihoods (FAO, 1998). Forests and other natural resources are foundation for most indigenous peoples' livelihoods, social organization, identities and cultural survival,

which are based on a strong and deeply rooted historic relationship with their ancestral land and natural resources.

World Bank (2008) stated that community control and management over natural resources is often limited by continual government intervention and government's insistence on complex management plans. In fact these programs are least concerned with social actors beyond the forestry departments and their technicians. The programs regarded people only as part of the problem rather than as part of the solutions. Thus it has led to inadequate participation in planning and management of forests in Kenya. Forest planning management involves multiple stakeholder interests (FAO, 1998). In most countries balancing competing interests and objectives is and will remain a constant challenge in forest management.

The distance between the forest and the location of an individual affects access to the forest resources (Hegde and Enters, 2000 and Guthiga, 2008). Distance to the forest edge as a significant contributor to the use of forest products indicate that households that extract forest products come from far and wide. This study therefore looks into forest utilization and the interaction levels of primary stakeholders, their membership in CFAs for their participation in conservation planning in South West Mau forest in regard to their relative distance from the forest. If care is not taken, individuals with lower interaction may get engaged in conservation strategies more than those who are closer to the forest with higher interaction hence stirring conflict. If such crucial groups and their

interests are ignored, they'll seek extra-legal ways of acquiring forest resources hence perpetuating degradation of the forest.

1.3 Objectives

General objective of the study is to find out how distance influence forest utilization and participation of primary stakeholders at South West Mau forest for sustainable conservation and management of the forest.

Specific Objectives:

- i) To determine how forest utilization varies with distance from South West Mau forest edge.
- ii) To determine how distance from forest edge influence CFA membership on local community members neighboring South West Mau forest.
- iii) To determine how distance influence participation of local community members in conservation of South West Mau forest.

1.4 Research Hypotheses

H₀: Distance travelled by local community members to reach South West Mau forest has no significant influence on its utilization

H₀: The local community members interact uniformly with the forest from distance of 1 km through 6 km from forest edge

H₀: There is no significant difference in CFA membership among community members from distance 1 km to 6 km away from South West Mau forest

H₀: All community members from distance 1 km to 6 km participate equally in South West Mau forest.

1.5 Scope of the Study

This research was conducted across 26 kilometre distance at Konoin Sub-county, adjacent area to South West Mau forest (Fig. 1.5). It was focused on local community members within 6 kilometres from the forest edge. Eight forest uses were subjected to study with distance being a major factor influencing the ability of the locals to access the resources. The forest uses were firewood, pasture, praying sites, marriage plants, initiation sites and plants, honey, seeds/seedlings and herbal medicine. Both CFA and non CFA members were captured in the study. Their participation in forest conservation was taken within a given range, that is, never (do not participate), rarely participate, occasionally, often, or always.

1.6 Theoretical Frame Work

The study was based on distance decay model. Distance decay is a geographical model which describes the effect of distance on cultural or spatial interactions. The distance decay effect states that the interaction between two locales declines as the distance between them increases (Rodrigue *et al.* 2009). The theory is based upon the concept of the friction of distance where distance itself hinders interaction between places. The farther two places are apart, the greater the hindrance (Marsh *et al.*, 2008). Once the distance is outside of the two locales' activity space, their interactions begin to decrease. Tobler's (1970), first law of geography, gave an informal statement that "All things are related, but near things are more related than far things".

Distance decay is graphically represented by a curving line that swoops concavely downward as distance along the x-axis increases. Distance decay can be mathematically represented by the expression $I=1/d^2$, where:

I is interaction and

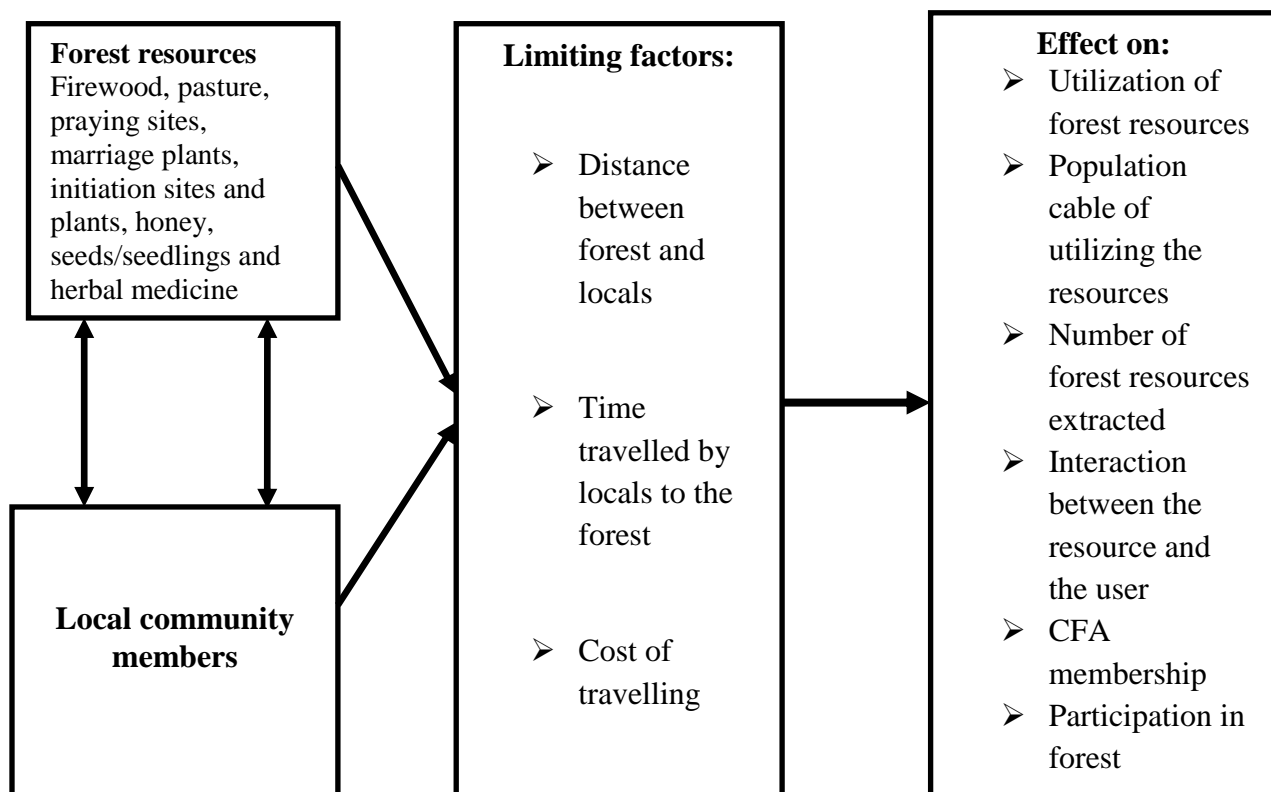
d is distance, among other forms.

The model was derived from gravity model. Gravity models are used in various social sciences to predict and describe certain behaviors that mimic gravitational interaction as described in Isaac Newton's law of gravity. Generally, the social science models contain some elements of mass and distance, which leads them to the metaphor of physical gravity. The gravity model illustrates the macroscopic relationships between places such as homes and workplaces. It has long been posited that the interaction between two locations declines with increasing distance, time, and cost between them, but is positively associated with the amount of activity at each location (Isard *et al.*, 1975).

The gravity model has been corroborated many times as a basic underlying aggregate relationship. The gravity model of migration is a model in urban geography derived from Newton's law of gravity, and used to predict the degree of interaction between two places (Rodrigue *et al.* 2009). Newton's law states that: Any two bodies attract one another with a force that is proportional to the product of their masses and inversely proportional to the square of the distance between them. When used geographically, the words 'bodies' and 'masses' are replaced by 'locations' and 'importance' respectively, where importance can be measured in terms of population numbers, gross domestic product, or other appropriate variables.

1.7 Conceptual Framework

The study was based on distance decay model where the distance between the user (local community member) and the resource (forest) affects the interaction of the two. This distance between them has effect on time travelled to reach forest resource and cost of travelling. The model postulates that an activity (use of forest resource) decreases with an increasing distance.



Interacting entities

Independent variable/Intervening factor

Dependent variables

Figure 1.3: Conceptual Framework

Distance of individual's location from forest influence forest utilization in terms of population who access forest resources and the number of resources used, interaction CFA membership and their participation in conservation planning of the forest.

Transferability of forest products depends on geographic distance, economic distance and time distance. The cost to overcome must not be higher than the benefits of related interaction, even if there is complementarily and no alternative opportunity.

Transferability is related to volume, value and variety of goods, to be transported.

Population utilizing the forest, the number of forest products extracted, interaction and participation decline with increase in distance from the forest.

1.8 Justification

The problems associated with natural resource management are essentially specific to localities; hence solutions must be sought through co-operation with local participants (Sharma, 1992). Despite difficulties encountered in partnerships, collaborative arrangements are gaining ground quickly because they can help resolve conflicts, fostering learning during implementation, enhance management of forest resources and support livelihoods and cultures of local communities (World Bank, 2008). Participation in planning assist in bringing everybody involved on board and many institutional barriers are avoided (WCED, 1987). Informed consultation with and participation of indigenous people are essential for ownership and hence success of forest- based activities. Participation increases the likelihood of active engagement by affected communities and community ownership of project activities (WCED, 1987). It also enables people to make informed decision on plans that will affect them as well as being informed on who should be involved in conservation planning of the forest. This will

help in saving the water towers in the country in which Mau forest is the major one of the five water towers hence reduction of water crisis, biodiversity loss and carbon emission. Distance decay in forest utilization and interaction between community members with forests is important to match with participation in conservation through CFA membership so as to avoid conflict over forest resources.

1.9 Definition of Terms

Community as defined by Western and Wright (1994) is social entity bound by a common cultural identity living within a defined spatial boundary and having a common economic interest in the resources of an area. D'Arcy (1989) stated that community, community group or local people refer to all people who live in a specified area. These are made up of insiders and outsiders. Insider in this case are those who are part of the community, are privy to community information and hold the community perspective while outsiders are those who come into the community from time to time but are not considered community members although with consent, they can represent the interest of the community such as immigrants and conservation actors like civil society organization. Outsiders have access to different information or power and can mediate conflicts within a community.

Community Forest Association (CFA) according to Forest and Conservation Act (2016) means a group of local persons who have registered as an association or other organization established to engage in forest management and conservation.

Community Participation is seen and evaluated in terms of "granting individual or groups of a 'voice' in planning and decision making and service delivery (D'Arcy, 1989)

Frequency of Use: the number of times an individual accesses the forest to source the forest product or service.

Forest Stakeholder refers to a person or group with an interest in forest and tree resources (Western and Wright, 1994). They are those with rights to claims on and/or bear responsibilities on forest and woodland areas, trees forest and woodland goods and services. According to World Bank (2009), they are those affected by the outcome either negatively or positively or those who can affect the outcome of a proposed interventions including borrowers (elected officials and local government officials), directly affected groups (poor and disadvantaged) and indirectly affected groups such as Non-Governmental Organizations, private sector and support agencies like World Bank.

Participation is voluntary contribution by people in projects and involvement of people in self-determined change (D'Arcy, 1989). It is the involvement of people's development of themselves, their lives and their environment. Holmes (2007) stated that participation is a process through which stakeholders influence and share control over development initiative decisions and resources which affect them. Participation can take different forms ranging from information sharing and consultation method to mechanisms for collaboration and empowerment that give stakeholders more influence and control. Participation in a community is the spirit of togetherness, solidarity and coherence which encourages taking part in an activity (Mlengi, 1991).

Participatory Forest Management (PFM): Warah (2008) defines it as an arrangement where key stakeholders enter into mutually enforceable agreements that define their

respective roles, responsibilities, benefits, and authority in the management of defined forest resources.

Participatory Planning is an urban planning paradigm that emphasizes involving the entire community in the strategic and management processes of urban planning; or, community-level planning processes, urban or rural (Lefevre *et al*, 2000). It is often considered as part of community development. Participatory planning aims to harmonize views among all of its participants as well as prevent conflict between opposing parties. In addition, marginalized groups have an opportunity to participate in the planning process (McTague and Jakubowski, 2013)

Planning is enunciation, establishing, weighing, and reconciling different views held within a society about how it should be organized, how its resources should be deployed and how far the individual may be restrained, constrained or coerced in the interest of others (Beathley, 1995). He also stated that it is the process of facilitating decision making to carry out land development with the consideration given to the natural environment, social, political, economic and governance factors and provides a holistic framework to achieve sustainable outcomes.

Primary Stakeholders are key stakeholders inscribed as forest communities, forest-adjacent communities, lessees and concessionaires (FAO, 2007). These are in direct contact with the forests almost on a daily basis in terms of management and use practices.

1.10 Study Area

This section describes the location, geology, climate, vegetation and fauna of the study area.

1.10.1 Location and Area

Mau Forest is a forest complex in the Rift Valley of Kenya. It is the largest indigenous montane forest in East Africa (Willy, 2002). The Mau Forest complex has an area of 273,300 hectares (675,000 acres) currently. Initially it was approximated to be 320,000ha before excision of 40, 000ha (Kerfoot, 1984). It lies between altitude of 2,000 m and 2,600 m above the sea level, on the Western slope of the Mau Escarpment, and is situated approximately 250 km from Nairobi. It borders Kericho to the West, Nakuru to the North and Narok to the South. It comprises South West Mau, East Mau, Transmara, Mau Narok, Maasai Mau, Western Mau and Southern Mau. These seven forest blocks merge to form the larger Mau forest Complex. It lies between latitudes of $35^{\circ}15'$ E & 35° and longitudes of $0^{\circ}19'$ S & $0^{\circ}50'$ (Jackson and McCater, 1994).

Kenya's Mau forest complex

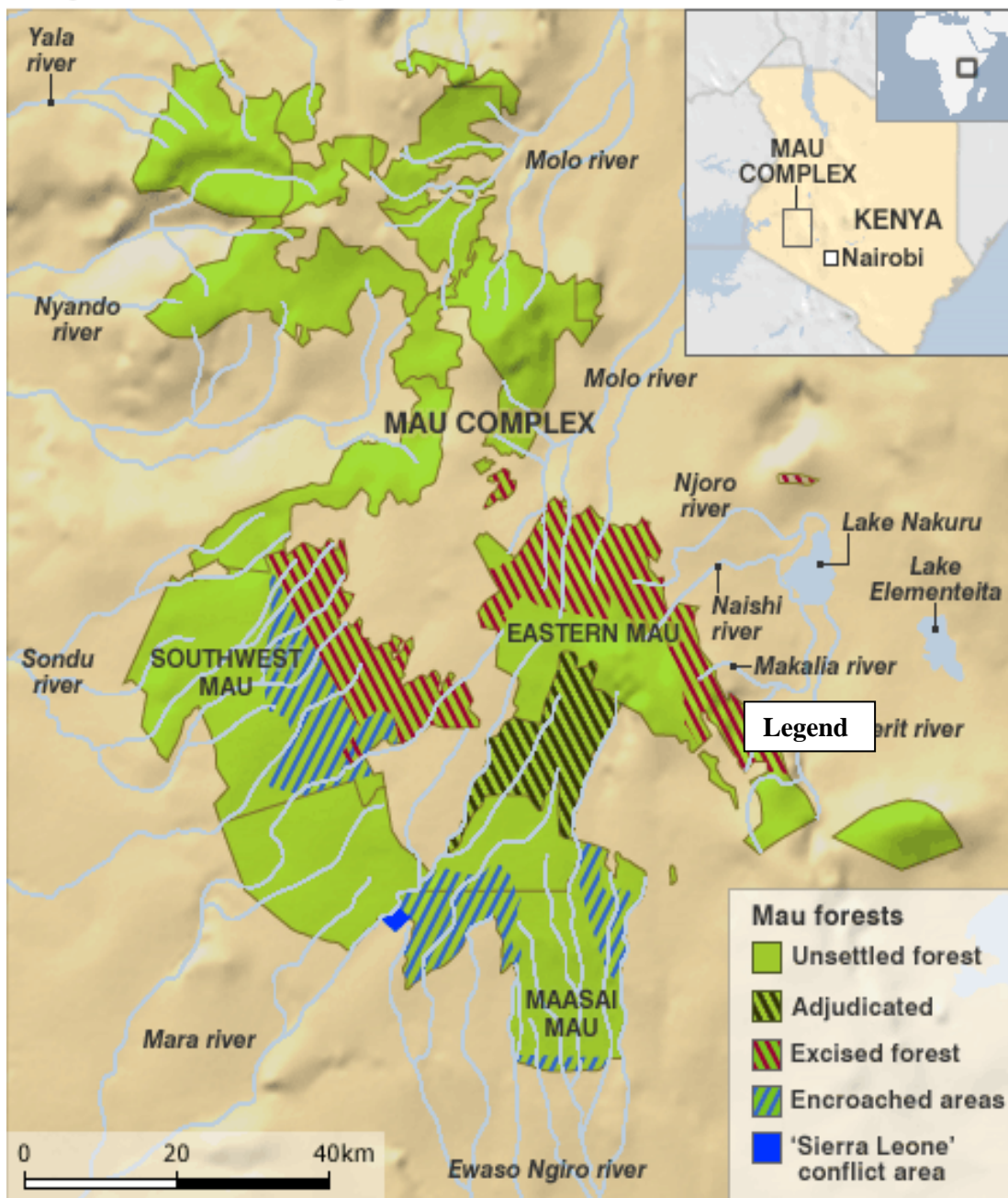


Figure 1.4: Mau Forest complex

Source: <http://www.birdlife.org/datazone/sites/index.html?action=SitHTMDetails>. Accessed 26th

December 2010 at 8:34 pm

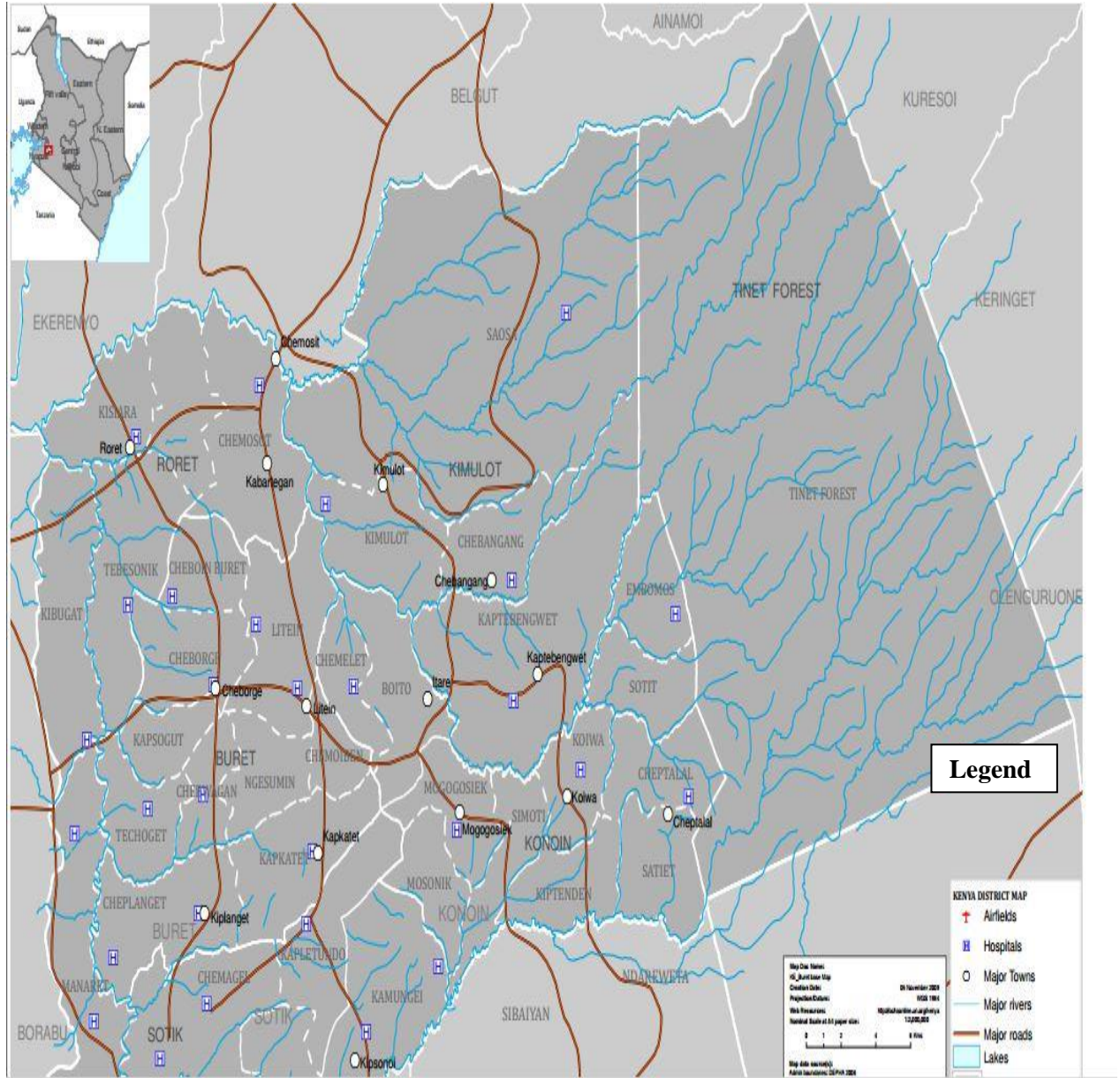


Figure 1.5: South West Mau forest and its adjacent surrounding across the study area.

Source: https://images.search.bureti+distrit/images/view;_ylt=AwrB8p.ipVBZU3YA2no2nIIQ
 accessed on 7th June 2015 at 12.09 pm

1.10.2 Geology and Soils

The forest has deep and fertile volcanic soils (Willy, 2002). It is significantly more friable than welded tuffs and coarse conglomerates. Soils of almost the entire region are mollic andosols, derived from tertiary volcanic material, with inclusions of cambisols on the steepest slopes and humic nitosols in the extreme North (KIFCON, 1991). They are well drained, deep, friable sandy clay loams or clays with thick humic topsoil. Generally these andosols have a high agricultural potential since they have high water holding capacity, well drained, fine texture and fertile (KIFCON, 1991).

1.10.3 Climate

Rainfall in South West Mau is among the highest in Kenya. Annual precipitation ranges from 1,000 mm in the east, with a seasonal regime, to 2,000 mm in the west, where it is more-or-less continuous around the year (KIFCON, 1991). Numerous streams drain the forests west of the scarp crest, forming part of the Sondu and Mara river systems, which flow into Lake Victoria, and the Southern Ewaso Ngiro system, which flows into Lake Natron. The Eastern Mau is the main watershed for Lake Nakuru, through the Njoro, Makalia and Enderit rivers. The surrounding areas are intensively farmed, with high human population densities on the western side of the forest as on the east.

1.10.4 Vegetation

Vegetation patterns are complex, but there is a broad altitudinal zonation from west to east, lower montane forest below 2,300 m giving way to thickets of bamboo, *Arundinaria alpina* mixed with forest and grassland, and finally to montane sclerophyllous forest near the escarpment crest (Jackson and McCater, 1994).

The lower montane forest has best condition in the South-western Mau Nature Reserve, where characteristic trees include *Aningeria adolfi-friedericii* and *Strombosia scheffleri*. Elsewhere, this zone has been heavily and destructively logged, most recently for plywood from *Polyscias kikuyuensis*. Logged-over areas are dominated by pioneer species such as *Tabernaemontana stapfiana*, *Syzygium guineense* and *Neoboutonia macrocalyx*, while pockets of less-disturbed forest hold *Olea capensis*, *Prunus africana*, *Albizia gummifera* and *Podocarpus latifolius*. Substantial parts of the high *Juniperus-Podocarpus.Olea* forest have been encroached and cleared, although some sections remain in good condition. Large areas of both the Eastern and Western Mau have been converted to plantation forest.

1.10.5 Fauna

Five mammal species of international conservation concern are found in South West Mau forest. These include: Ungulate; Bongo and yellow-backed duiker, and two carnivores, Golden cat and the leopard, and elephants. Also found here are giant forest hog, the potto, the spot-necked otter and stripped hyena. The forest is one of the richest truly montane avifauna with a total of 173 bird species of which 47 are forest specialists (Wass, 1995)

CHAPTER TWO

LITERATURE REVIEW

This chapter review literature on forest conservation actors, participatory planning, participatory forest management and forest legal and policy frame work.

2.1 Forest Conservation Actors

According to Nurse and Edwards (1993), people living in and around forest areas can be grouped into three categories:

- a) Indigenous people who have lived in the area for generations
- b) People who have moved more or less recently into the area (settlers) and
- c) Non-residents groups who enter periodically and extract selected resources.

Emerton (1993) recognized four major groups of forest stakeholders namely: users, governments, development agents and private groups. Users are seen as forest adjacent community .This represents the most complex group as they are the ones most affected by resource management decisions. They also rarely form a homogenous group because of the diverse range of interests and characteristics that may exist among them.

Local non-government organizations have an important role to play in helping organize local people including indigenous populations to plan and manage forests. Increased efforts to promote local participation are needed to achieve forest conservation and development goals.

Attfield (1999) categorized biodiversity conservation stakeholders into six groups as indicated in Figure 2.1.

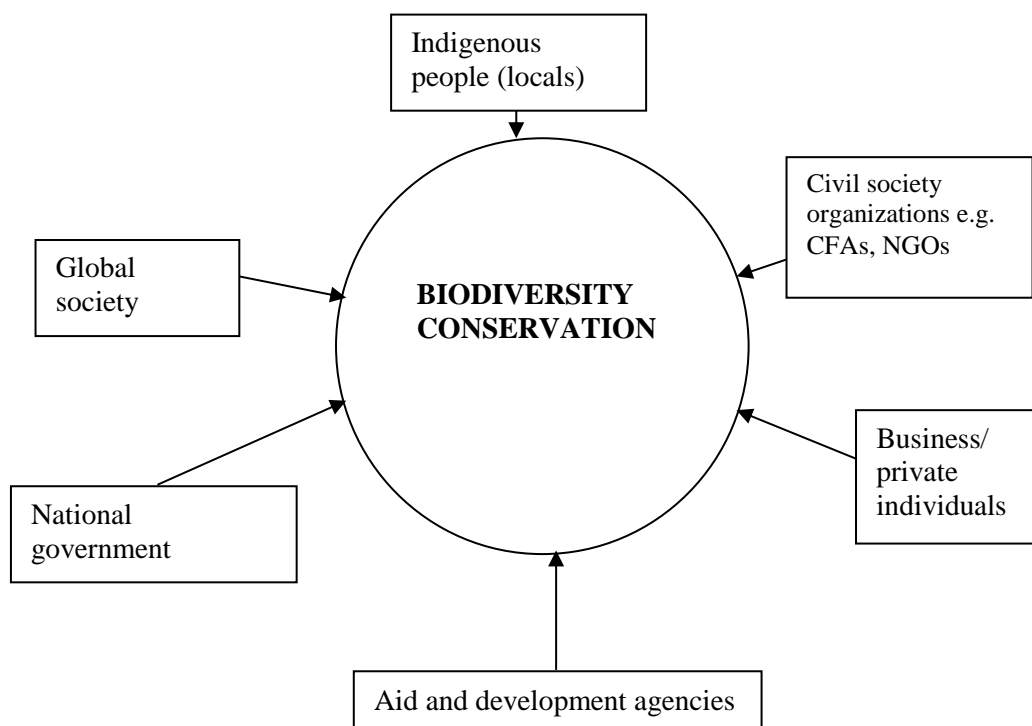


Figure 2.1: Biodiversity conservation stakeholder (Source: Attfield, 1999)

2.2 Participatory Planning

Participation by a wide variety of community stakeholders in the planning process is essential (World Bank, 2009). Identifying stakeholders allows planners to know whom to invite to planning meetings. It is important to incorporate all stakeholders when developing a management plan for the forest or water resources so that everybody's needs are identified and met. If all forest user groups are not accommodated by the management plan then the plan will ultimately be flawed. It is also important to recognize the relationship the stakeholders have with the forest/natural resource and the willingness

of communities to become involved in a participatory management system or if they are involved, the degree to which they have committed resources.

In popular planning, community organizations attempt to determine the direction of planning in a small part of a local authority area (Brindley *et al*, 1989). Successful popular planning depends on the willingness of the authority to concede some of its powers and therefore on the degree of local control which community can acquire. Popular planning is of course deliberately anti-corporatist, aiming at bringing together a wide range of local interests in an open discussion of planning issues.

Popular planning intends to produce direct benefits for a local community in a sense of securing the kinds of development which local people expressly desire. In principle popular plan should respond to the needs of all groups in the local community (Brindley *et al*, 1989). Operating through a variety of community organizations, popular planning creates local needs and consulting the community. This produces a range of consultative groups and working parties as demanded by various stages in planning process. The main limiting factor in popular planning is community control of resources, particularly at the implementation stage. Government should retain control over implementation to ensure that it is done as planned (Brindley *et al*, 1989).

Planning decisions are distributional, political and involve conflict of interests. The profession has reluctantly but gradually begun to accept that in many instances, conflicts of interests over planning issues are resolved through some form of bargaining process (Bruton and Nicholson, 1987). Haeley (1983) supported the same by saying

“Development plans may be of popular importance in areas where there is conflict of interests over land and where planning authorities seek to implement policies which restrict the opportunities for some of these interests through a regulatory-negotiative approach”. Winning is achieved by distributional bargaining, mutual accommodation and the avoidance of mutually damaging behavior.

Statutory requirements for public participation are simply that the local planning authority should give adequate publicity in planning in the area to the matters proposed to be included in the plans, give those interested an adequate opportunity to make representations and make them aware of the opportunity (Brindley *et al*, 1989). The commonly held belief is that participation in planning process is required if implementation is to be successful (Catanese, 1984). This belief is based upon a presumption of consensus as the basis for implementation. That consensus is achieved by expressing one’s views and acquiring information necessary for developing viewpoints. Thus through participation in planning process it is assumed that people will be supportive of political decisions for fulfillment of plans. The idea of citizen participation in planning has been long standing and intrinsic part of the history of planning.

2.3 Participatory Forest Management

History of forest reserves is one of struggle between competing stakeholder groups (Barrow *et al*, 2001). Current realities are shaped by socio-political forces of great magnitude and impact. Now with an increased focus on participation and decentralization in contemporary Africa, rural people and communities are able to better negotiate for their rights to and responsibilities for forest resources both within and outside reserved

forest areas. There is likely to be an increased array of partnerships between communities, between communities and districts, as well as a range of partnerships with private sector interests. Collaborative and community based forest management taking place now recognizes that communities had real rights to forests and were in many instances responsible forest managers.

Many developing countries have authoritarian regimes that place structural and political restraints on participation. However, more often participation would be feasible within existing limits (Suda, 1992). The breakdown of customary land rights in much of Africa goes on at rapid pace, yet little noticed by social scientists among others. Experience indicates that many of the problems of land degradation, soil erosion, overgrazing and deforestation are traceable to forms of land tenure, ownership and use which require drastic changes despite political and other difficulties.

According to FAO (1998) conflicts over the appropriation, management and use of forest resources can pose significant constraints to sustainable forest management. Often there are long-standing conflicts between governments, their agencies, the private sector and local communities, as well as among and within communities, over forest resources and their use and control. With the emergence of trends such as globalization and the liberalization of economies, forest resources on which rural and forest dwelling communities depend on are coming under increasing pressure from a growing number of actors, often considerably more powerful than the communities. Policies along with the

laws and regulations enacted to implement them, can mitigate conflicts, create new conflicts or exacerbate existing ones.

Collaboration and co-operation between all actors involved in forest management are essential for sustainable forest management (Phiri, 2009). Power disparity between actors is a major constraint to genuine participation in conflict management fora and equitable outcome of conflict over forest resources. Without effective mechanisms and strategies to ensure local-level participation in forest policy dialogue, development and implementation, there cannot be long-term commitment to survival of forest resources. It is therefore important to minimize power disparities and inequalities through supporting communities in building strategies alliances, coalitions, federations, networks and community based organizations.

Strengthening the local communities and building into their knowledge and experience represents an important step in participation (Sharma, 1992). Active participation of rural communities is still to be promoted, as well as building their capacities in appraisal, evaluation, planning and implementation in order to better deal with conflicts. It is also crucial to integrate the issue in policy sector and in the scientific, methodological and instrumental orientations. Still to be encouraged is the development of institutional capabilities through participatory approaches, the exchange of experience, and continuous training.

It is important for planners to recognize what is good and useful in both systems and create policy and legal framework that gives effect to those values (Willy and Mbaya, 2001). The competition for resources between and within communities, coupled with competing resource demands of individuals and communities, results in conflict as each seeks to satisfy its needs from resource base. Success seems more likely where the interventions seek to bring about joint managements of forest land, building on the mutual benefit to be obtained from greater access to forest products by local people and reduce protection costs for the forestry department (Sharma, 1992). Management of forests for sustainable use requires the involvement of local people. To ensure sustainable development, forestry projections must get local people involved at the designed stages as well as during implementation.

Forests are unlikely to be managed sustainably without direct involvement of the people whose economic and social well-being depends on these resources. Participatory approaches hold great potentials in conservation of forests (Sharma, 1992). Local participatory strategies must begin with adequate social research and preparation to identify target groups and existing incentive structures. Then it is important to define the project activities appropriate for different social units, and to match technological know-how with local interest, capacities and ecological expertise. Participatory schemes should be based on mutual monitoring and self-enforcing rules and should distribute project benefits among local people. Clearly a more comprehensive understanding of local social and political groups is needed to design better forestation schemes.

It is more practical and cost-effective to enhance the abilities of indigenous people to protect forest resources than to create agencies to enforce involuntary resettlements. Indigenous groups that have traditionally lived in or near a forest may have strong customary rights to the land and products. If governments respect these needs, these people may, in turn, cooperate with sustainable management schemes. Forestry projects that affect indigenous people must identify local needs and develop strategies to meet them (Sharma, 1992). Improving tenure security and providing income opportunities through sustainable use of forest resources are measures that should be built into forest project designs.

Poverty alleviation strategies in the forestry sector have emphasized local participation to make forest management more responsive to local needs and to increase benefits flowing to forest users (World Bank, 2008). Cleary and Phillippi (1993) noted that many forest projects failed without the collaboration which improved environmental outcomes. Increased local participation inevitably has implications for project design and implementation, because it involves groups much lower down the administrative hierarchy than usually has been the case (World Bank, 2008), a number of natural resource management schemes work at the sub-district and even sub-village levels when there are well defined user-groups in which people eventually make day-to-day decisions about natural resource management.

From a management and user perspective, essentially all forests, however, remote and seemingly physically unoccupied, have traditional owners and users (World Bank, 2008). The assumption should not be a need to impose outside management over “unmanaged” or vacant lands but a need to carefully assess traditional systems, owners and users of forests. Community based forest management is not the use of communities to achieve the objectives of outsiders, no matter how laudable their objectives may be. It should focus on empowerment of communities to use and manage forests to achieve their objectives.

The interests, values, capacities and dependency on forest resources of indigenous people’s communities vary (World Bank, 2008). Levels of cultural homogeneity; social cohesion, social inclusion, familiarity with and management skills in cash economy, ability to defend interest in forests and forest management practices may vary. All these differences lead to different priorities regarding forest management that have to be negotiated and addressed in project design and implementation.

Barrow *et al* (2001) went further to state that collaborative management and community based forestry is helping to restore community rights to and responsibility for forest resources at a time when it is virtual that forests have both local and immediate value of the people as well as longer term national values relating to catchments, watershed and biodiversity functions. These conditions have been given added focus by a variety of recent policy and practice changes including decentralization, the use of participatory processes, formalized collaborative management agreements, community based forest

management and an increased emphasis on certification and sustainable forest management.

The identity of stakeholders and the nature of their interest vary in time and space (Barrow *et al*, 2001). In any one place, the relative rights of access to resources by various stakeholder groups and their relative roles and responsibilities are not static. Different stakeholders within a community may have different interests in the same resources, for instance, women value certain species for its firewood, medicine, and fruits while men may see the same trees as potential cash earner from sales of posts (Barrow *et al*, 2001).

Government authorities both conservation and local governments may remain unconvinced of the desirability of allowing true partnership with communities. Many still view rural communities as technically unable and politically unprepared to play a serious role in forest management. Holding power over forests can no longer be acceptable given these realities. Collaborative and community based forest management are the way forward if trees and forest are to continue to have real meaning for local people. Community and resource use rights should no longer be summarily denied with good reason (Barrow *et al*, 2001). What is required is mutual understanding and respect for the knowledge and management systems that local people and technical authorities have and build on that to create or re-create a more sustainable forest management where local people are major part of the solutions and not continuing problem.

2.4 Forest Legal and Policy Frame Work

Reactions to the increased need for participation and of democratization, government policies encourage decentralization (Barrow *et al*, 2001). Thus there has been real devolution of real powers to local authorities and increasingly to local level. This has created an enabling framework and positive pressure for responsible community involvement. In recent years coinciding with the mainstreaming of participatory approaches, there has been a policy shift to advocate that local resource users and their institutions play a much more active role in the protection and management of natural resources.

State control has largely been unsuccessful, costly and financially unsustainable requiring more decentralized approaches to natural resource management. Community involvement in natural resource and forestry management over the last 20-30 years has received considerable policy, development and research attention in most countries and the move to local peoples has seen the emergence of ‘community-based’ initiatives for natural resource management. Changing policies and practices of post-colonial governments have continued to shape these stakeholder relations (Barrow *et al*, 2001).

2. 4.1 Kenya’s Forest Policy No. 9 of 2005, Forest Act

Forest policy seeks to address the threats to Kenya’s forests by increasing the area under forest cover to 10%, an acceptable level by international standards. Accordingly, it requires the government to facilitate the formation of ‘community forest associations’ (CFAs) to manage community forests, by bestowing to local people user rights over forest resources. Security of tenure is expected to encourage investment in better-farming

practices, by individual farmers and collectives. Additionally, the policy aims to achieve sustainable management of natural and riparian forests within farmlands, through application of soil and water conservation technologies. The 2005 Forest Act, provides for public consultation and broader community participation in the formulation of forest management plans.

The Forest Act of 2005 provides institutional and regulatory procedures necessary for reorienting forest management from a command-and-control strategy to a pro-community and stewardship-oriented strategy through:

- Identification and adoption of specific mechanisms for the implementation of stewardship policy mandates, including community participation through community forest associations, mechanisms for joint forest and concessions over state forests;
- Delegation of direct authority, and imposition of responsibilities on forest officials and individuals and entities operating within the forest sector;
- Empowering implementation, oversight and enforcement of stewardship contracts;
- Multi-year joint management agreements that allow different combinations of user rights or bundles and,
- Financial incentives through retention of income from forest resources at local level to finance community projects.

CHAPTER THREE

MATERIALS AND METHODS

This chapter deals with the source of data, data collected, target population, sampling frame and analysis of data.

3.1 Data Source

Primary and secondary data were necessary in this study. Secondary sources were employed to gather sufficient information to make a basis and guide to the study. The materials used included text books, journals, internet published and unpublished documents. This was vital in gathering information on forest uses, forest policy, influence of distance in forest utilization and community participation. Land cover maps of Konoin sub-county and Mau forest were used as a guide in the study. Primary data was obtained by the use of structured questionnaire (Appendix I). The questionnaire was designed to capture data on distance of the respondents' location from the forest, age, gender, CFA membership, forest uses acquired, and participation index.

3.2 Data Collected

For the purpose of achieving objective one, different forest uses were subjected into study. These included: firewood, herbal medicine, seeds/seedlings, honey, pasture/fodder, praying sites, plants for marriage and initiation ceremonies. At every sampling point, data on number of forest uses (Supply) and the populations (Demand Volume) that utilize the uses were collected. This was useful in determining interaction between locals and forest. The number of times an individual gets into the forest per week was recorded.

Objective two was realized by sourcing data on the population of local community members at different distance who are CFA members and non-CFA members. This was stratified to have population of both gender and age (old and youth).

Data on participation was collected at X_1 , X_2 , X_3 , X_4 , X_5 and X_6 distances by recording individual's participation index within the given range scale of 0.2 to 1.0 when administering questionnaire.

3.3 Target Population of the Study

Meffe and Carroll, 1990, asserted that forest-adjacent communities within a distance of 5Km from forest border exert an impact on the forest and this impact decreases with distance. They further stated that the impact is less significant beyond a distance of 10Km from the forest border. This study focused on the local community members within 6Km distance from the border of South West Mau forest in Konoin sub-county. Up to 10th household within every kilometer at each transect of six kilometers from the forest edge were sampled. These made a total of 60 households in each transect and thus a total of 360 households for all the six transects.

3.4 Sampling Frame

The study area was divided into distinct zones of one kilometer distance each, that is, X_1 , X_2 , X_3 , X_4 , X_5 , and X_6 . The zones were $0 < X_1 \leq 1$ km, $1 < X_2 \leq 2$ km, $2 < X_3 \leq 3$ km, $3 < X_4 \leq 4$ km, $4 < X_5 \leq 5$ km and $5 < X_6 \leq 6$ km distances from the forest edge. Six transects across these zones were established at interval of 4.5 kilometers (Figure 3.1). The first ten households in every strata along transects were sampled. Structured questionnaires were administered using personal interview approach. The questions were read and interpreted to the interviewees as data was being recorded. However, the literate respondents were given

questionnaire to answer. Male and female respondents were alternated. The questionnaires were also equally administered to both old and youth. At every household where youth were available a chance was granted until five of them were interviewed and the other five household old respondents were picked. Footpaths and /or roads transect was used to identify sampling units.

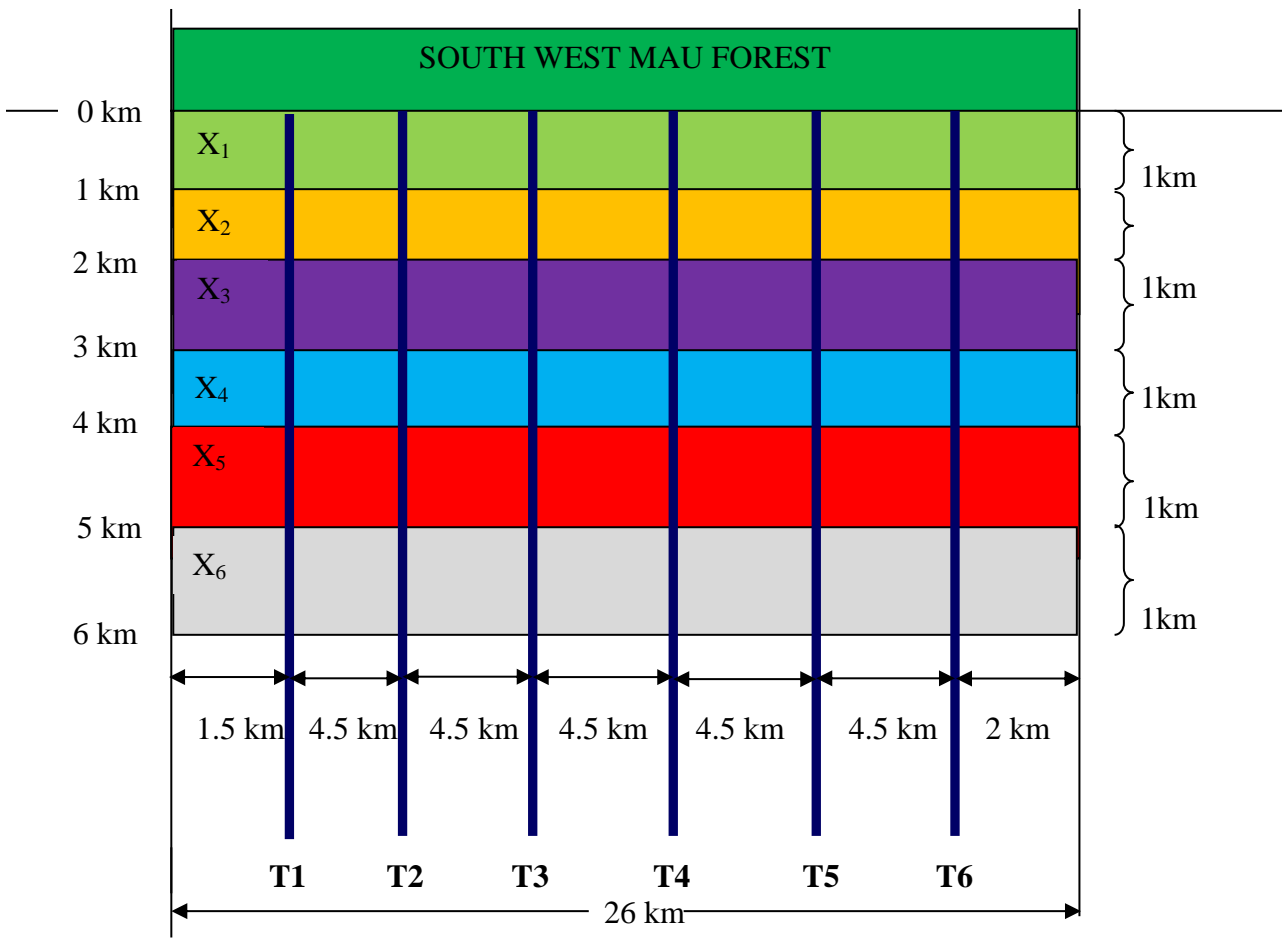


Figure 3.1: Arrangement of Transects and Strata on the Study Area

3.5 Data Analysis

Data for objective one and two, mean population, frequency and graphical representation of the respondents were done to show the trends on utilization of different forest uses and CFA membership as distance increase. ANOVA was also used to determine whether the forest uses show any significant differences in forest uses, CFA membership a long distance gradient.

Interaction model equation was used to determine the interaction level of community members with the forest at different distance from forest edge to 6km away from the forest. This was done using the formula:

$$I_{ij} = (P_i * F_j) / D^2_{ij}$$

Where:

I is interaction between locales i (individual's location) and j (forest)

P is population at i acquiring forest resources and

F is forest uses obtained at j, and

D is distance between i and j.

Participation Index (PI) was used to measure local community involvement in forest resource management and planning. This is based on five-point scale (always= 1.0, often= 0.8, occasionally= 0.6, rarely=0.4, and never= 0.2). The values of the index were kept within 0 and 1 for convenience and easy interpretation. The participation index for various stages on forest management was obtained by using the formula below (developed by Kamnap, 2003):

$$PI = [(fa * 1) + (fo * 0.8) + (fc * 0.6) + (fr * 0.4) + (fn * 0.2)] / N$$

Where:

PI = Participatory index for forest management stage

fa = frequency of respondent always participating in a particular management stage,

fo = frequency of respondent often participating in a particular management stage,

fc = frequency of respondent occasionally participating in a particular management stage,

fr = frequency of respondent rarely participating in a particular management stage,

fn = frequency of respondent never participating in a particular management stage and

N = Total number of respondents for each stakeholder category.

The value of PI can be interpreted on a scale of 0 to 1, where zero means primary stakeholder has no chance of participating and 1 means always participating. Increase in values from 0-1 implies increase in participation level of the stakeholder group with respect to the specific forest resources management stage.

CHAPTER FOUR

RESULTS

This chapter gives the findings on the influence of distance on forest utilization, CFA membership and participation of local communities in conservation.

4.1 Forest Utilization

The research found that the location of an individual from the forest edge has great effect on utilization of forest resources. As a member of the local community gets further away from the forest the lesser is its ability to get access to forest resources and services (Figure 4.1). Those who are closer to the forest easily access to forest products and services than those who are far away from the forest.

The results shows that mean population of respondents utilizing the forest resources in almost all forest uses investigated did decrease as their location become further away from the forest (Figure 4.1 and Table 4.2). Collection of seeds/seedlings from the forest has the highest mean population while lowest mean population use praying sites in the forest (Table 4.1). Extraction of firewood and pasture show a drastic decrease with an increase in distance away from the forest and both are zero at 6 km. However, it is somehow different in extraction of honey, herbal medicine and seeds/seedlings, that is, vary from 8.0 to 5.0 for both honey and seedlings while herbal medicine ranges from average of 8.0 to 3.0. They tend to show a slight decrease with an increase in distance (Figure 4.1). There are highest means in use of firewood and pasture from residence closer to the forest, that is, within one kilometer distance whereas honey, herbal medicine and seeds/seedlings score higher means as compared to others after five kilometer

distance (Figure 4.1). Cultural values, that is, use of forest and its resources for initiation, praying and marriage are generally lower as compared to other uses (Figure 4.1 and Table 4.2).

Use of forest on firewood and pasture indicate higher F values of 60.805 and 50.80 respectively (Table 4.1). This suggests that there is higher variation in their uses with changes in distance.

Table 4.1: Analysis of Variance on Forest Uses from South West Mau Forest Edge at Konoin Sub-County, Bomet County

Forest use	Mean	STD	DF	F	P-values
Honey * distance	6.0833	1.29560	35	8.790	0.0578NS
Seeds * distance	6.3333	1.21890	35	7.765	0.0640NS
Firewood * distance	3.6111	3.04516	35	60.805	0.0000*
Pasture * distance	3.8056	2.76529	35	50.800	0.0000*
Initiation * distance	1.8611	1.62398	35	21.016	0.0267*
Praying * distance	1.5833	1.05221	35	10.034	0.0063*
Marriage plants * distance	1.8889	1.42984	35	12.667	0.0011*
Herbal * distance	5.9444	1.80388	35	7.946	0.0612NS

***significant difference at $p < 0.05$**

NS- No Significant mean variation

There are significant differences in firewood, pasture, initiation, praying, and marriage with changes in distance (Table 4.1). Pasture and firewood extraction indicate high significance ($P=0.000$, $F=50.800$ and 60.805 respectively). However, herbal ($F=7.949$), seeds ($F=7.765$), and honey ($F=8.790$) did show no significant variation in their extraction from the forest from 1 kilometer distance to 6 kilometers away from the forest.

Table 4.2: Mean Populations of Various Forest Users at Different Distance

Distance	Honey	Seeds/seedlings	Firewood	Pasture	Initiation	Praying	Marriage	Herbal
1 km	8.0	7.5	7.8	7.3	4.0	3.0	4.0	8.0
2 km	6.5	7.3	6.3	6.5	3.5	1.8	2.7	7.0
3 km	5.8	6.5	4.2	4.3	1.7	1.8	1.8	6.1
4 km	5.7	6.2	2.8	3.0	1.2	1.5	1.3	5.7
5 km	4.8	5.5	0.5	1.7	0.3	1.0	1.0	5.0
6 km	5.5	5.0	0.0	0.0	0.5	0.3	0.5	3.8

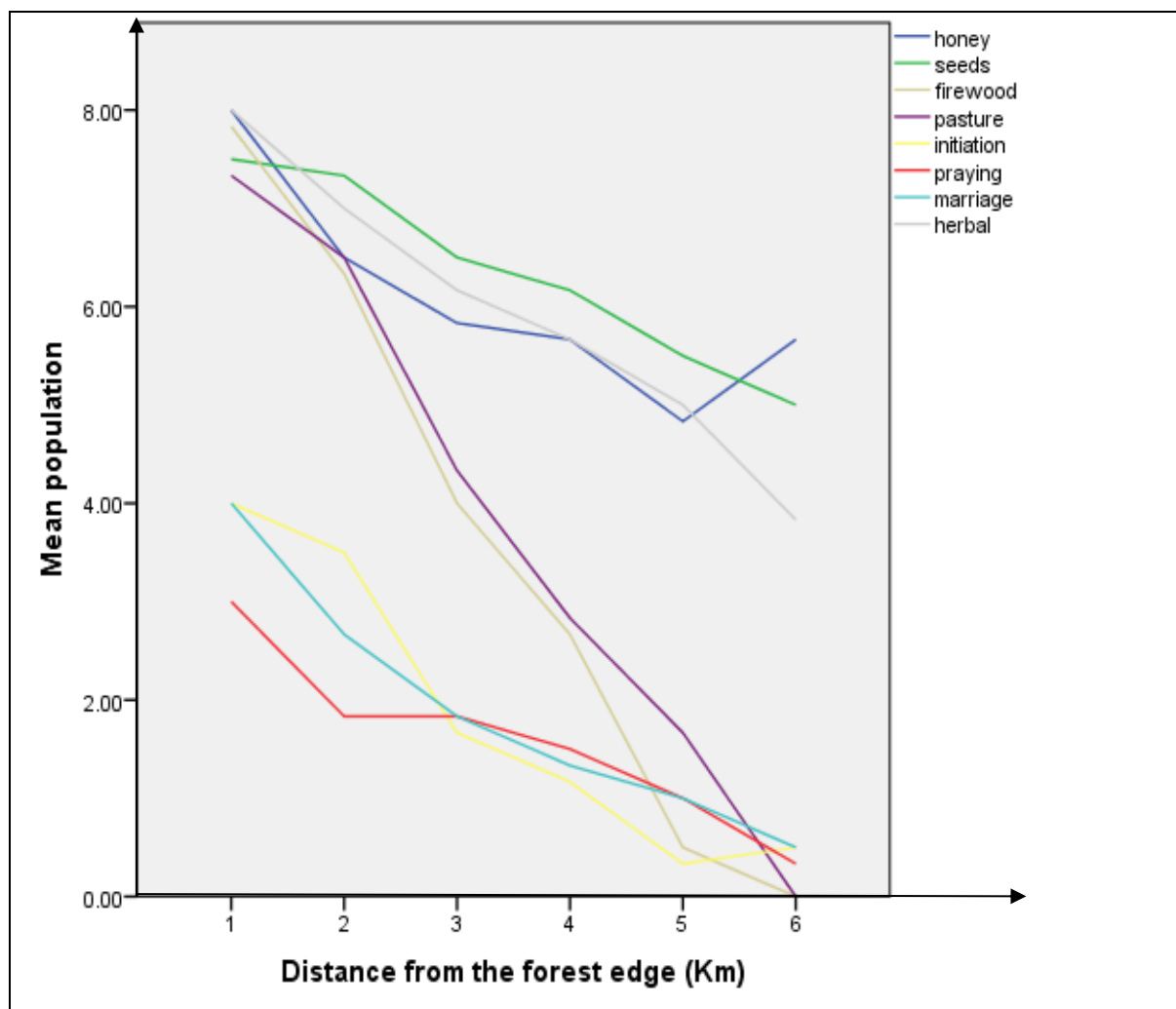


Figure 4.1: Mean Populations Accessing Different Forest Products and Services at Different Distances from Forest Edge

The frequency of visit to the forest is highest for the community members within 1 km distance and this decrease as one is located away from the forest (Figure 4.2). Increase with distance result in decrease in the number of times a member gets into the forest per week. People within 1 and 2 kilometer distances from the forest edge indicate highest and almost similar percentage of frequency visit per week while those at 5 and 6 kilometers indicate equal and minimal frequency of visit per week.

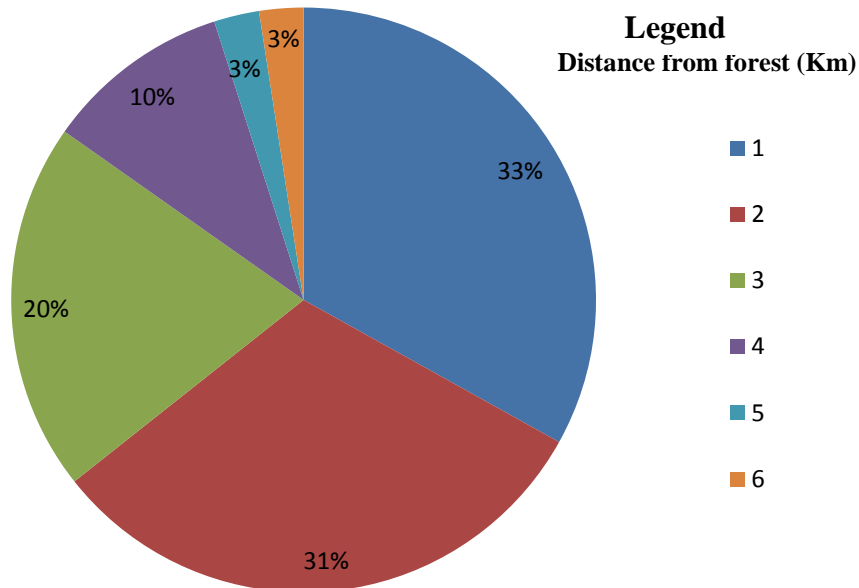


Figure 4.2: Frequency of Visit to the Forest per Week.

Interaction between community members and the forest varies with the distance from forest edge. The results show that interaction is inversely proportional to distance (Figure 4.3). There is closer association with members of the community within a close proximity to the forest but this decline as distance from the forest increases. The interaction of forest adjacent people within a kilometer distance is highest while those who are within five to six kilometers away from the forest show minimal interaction. The shorter the distance travelled by the members to the forest the higher the interaction and the converse is true.

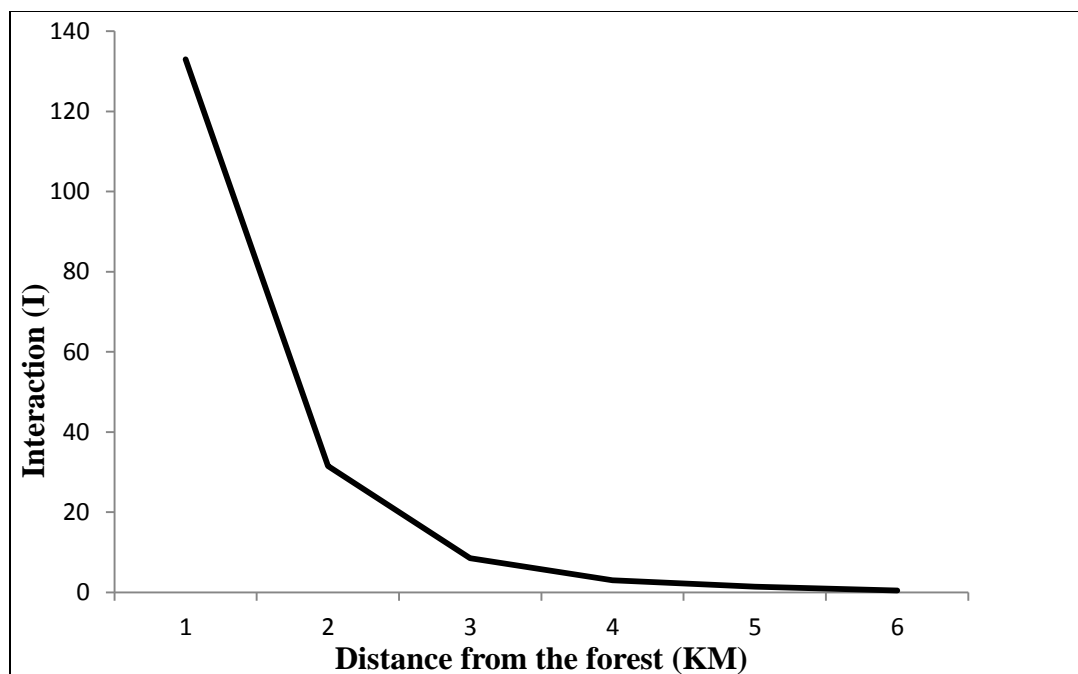
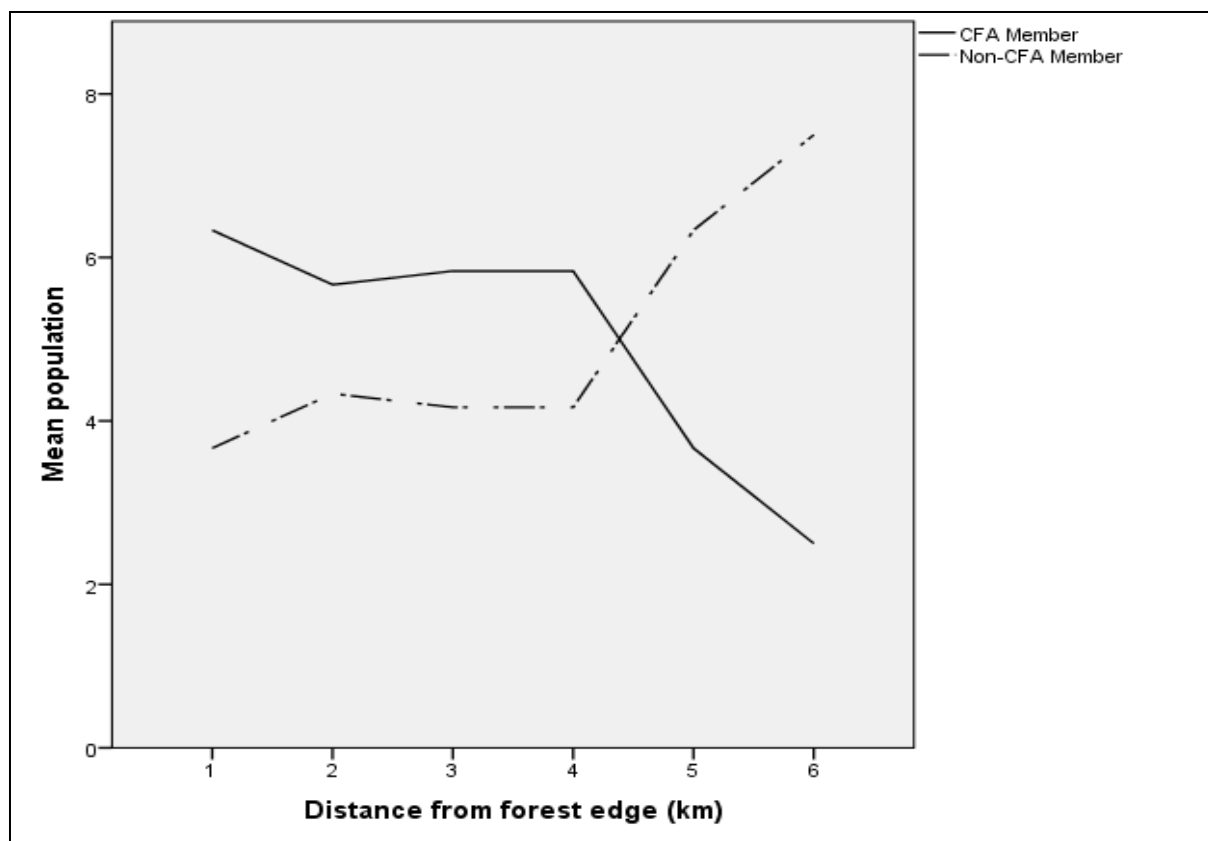


Figure 4.3: Interaction between the Locals and the Forest at Different Distances away from the Forest Edge.

4.3 Influence of Distance on CFA Membership

There is generally a higher population of CFA members in local community who are close to the forest while as distance increase the CFA members decrease (Figure 4.4). Within a distance of one kilometer away from the forest edge there is highest mean of 64% then decline to 23% of the population sampled. However, there is a slightly higher means within distances three and four kilometers as compared to two kilometers. After four kilometers the mean population who are CFA members decreases with the lowest means at six kilometers. The non-CFA membership shows a direct proportionality with distance.



**Figure 4.4: CFA Members and Non-CFA Members from Forest Edge to Six
Kilometres away**

Table 4.3: Analysis of Variance on CFA Membership a long Distance Gradient

	Mean	STD	DF	F	P-value
CFA	4.72	2.927	35	9.053	0.0380*

***Significant at $P < 0.05$**

There is a significant difference in CFA membership in the local community adjacent to the forest (Table 4.3). There is significantly higher population of local community members registered to CFA at a closer range than those who are far from the forest (Table 4.3 and Figure 4.4).

There is generally a higher population of local community members who are old than youth who have registered as CFA members (Figure 4.5). The mean population of both old and youth who register as CFA members decreases with an increase in distance from forest edge. At distances 1 km, 2 km, 3 km, and 4 km, the means of old are higher than those of the youth. However, beyond 5 km the means of youth who register in CFA is higher than that of the old members.

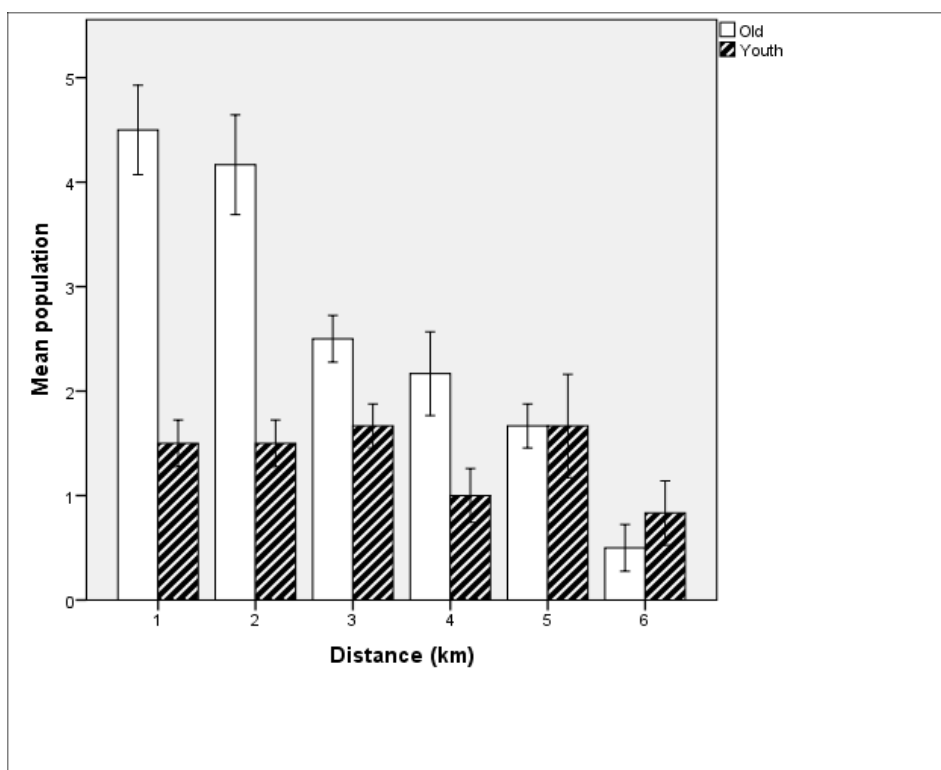


Figure 4.5: CFA Membership among the Old and Youth

Table 4.4: Analysis of Variance on CFA Membership among Youth and Old

Age	Mean	DF	F	P-values
Old	3.361	35	19.326	0.000*
Youth	0.8611	35	1.384	0.258 NS

***Significant at $P < 0.05$**

NS- Not Significant

There is a significant difference in membership to CFA for the old while youth population shows no significance difference (Table 4.4). CFA members among the old significantly vary with larger population within three kilometers than those beyond four kilometers. The mean populations of youth who register as CFA members is generally low and insignificantly vary with distance (Table 4.4).

4.3 Participation of Local Community in Conservation

The results for participation as indicated in Table 4.5 shows that community participation index (PI) averaged at 0.6, which indicate that they occasionally participate in forest planning and management. The findings indicate that participation of the local community members declines further away from the forest. Within the first 3 kilometers from the forest, the local community members often get involved in conservation and management of the forest with PI of 0.7 and 0.8. Locals at distances 4 and 5 kilometers are occasionally involved in conservation planning of the forest while those at 6 kilometers distance are rarely involved.

Table 4.5: Participation Index of Local Community Members at Different Distances from Forest Edge

<u>Distance from Forest Edge (Km)</u>	<u>Participation Index (PI)</u>
1	0.7
2	0.7
3	0.8
4	0.6
5	0.5
6	0.3
Average PI	0.60

CHAPTER FIVE

DISCUSSION

This chapter discusses forest utilization, interaction, CFA membership and participation of local communities.

5.1 Forest Utilization and Interaction

Forest utilization decreases with an increase in distance from the forest edge. As one is located further away from the forest then his/her ability to acquire forest resource and services is declines. Distance between the forest and the location of an individual do influence the interaction of the two. People located at close proximity have higher interaction than those who are far away from the forest. Holmes 2007, also noted that the further the communities from the forest resource, the less they interact with the resources. Those with a closer distance easily get access to the forest resources.

The finding is in line with previous studies by Suda (1992), Allhasan (2010) and Emerton (1993), who found out that the forest-adjacent communities within 5 km buffer zone depend on the forest for their livelihoods. This could be attributed by the short distance covered to travel to the forest hence short time taken to reach the forest. Those who are located far away have a long distance to travel for them to get into the forest thereby increasing time taken. Those at a distance of 4, 5, and 6 kilometers could have to incur extra cost of transportation of forest resources like pasture ad fire wood. These people could opt for other means of acquiring the same within their farms or at a close range.

Considering the many farm activities they are engaged in, most of those who are further away from the forest rather spent their time undertaking them. Conversely their counterparts within a close proximity to the forest easily get to the forest especially in the afternoon hours to fetch firewood and pasture among other resources. The bulky nature of pasture and firewood makes it difficult for community members who are far to acquire the two from the forest. Some of the members take their animals upon payment of chargeable fee. This is easily done by those within close proximity to the forest since animals will have to travel short distance to reach the grazing field. Movement of livestock for a longer distance lowers their production and increase incidence of contracting diseases. Traversing such distances in search of pasture deter the farmers who are far thus seeks alternative forage source.

The extraction of honey, herbal medicine and seeds/seedlings indicated higher means as compared to other uses at 5 and 6 kilometers away from the forest. This is because they are not as bulky as firewood and pasture. Also their extraction and utilization is long term. Their frequency of extraction and use is low. Cultural practices, that is, marriage plants, initiation practices and praying share similar features with the above three uses. Utilization and extraction of these uses could be or are seasonal hence their frequency of use being low. This may be an explanation as to why people at far distances still could obtain them from the forest. These forest activities, that is, honey production, herbal medicine and cultural uses, are occasionally obtained from the forest. The community members could also have alternative sources for instance planting of tree species of such purposes within their farms hence reducing their interest in getting into the forest.

With the emergence of the new technologies like hospitals, electricity and use of gasoline for cooking, people still use the forest as a cheap option in fulfilling the need of treatment medicine and power/energy. Herbal medicine for instance is still used especially on young children. This has made the locals utilize forests to acquire such resources. However, the cultural practices, that is, marriage, initiation and religious practices have been reduced by modern ways of doing them. Religious practices in the forests have been impacted negatively with the emergence of new religious way of worshipping where churches are being used and for this therefore the religious practices done in the forest is very low except for the few old members of the community who grew up witnessing them being done in the forest.

The same is applicable for marriage and initiation practices which are low since churches and hospitals have replaced them. Extraction of plant materials used in marriage practices have also been lowered because many have opted for government institutions that carry out the practice. The adoption of health policies and use of health facilities have replaced the use of forest by local community members in carrying out initiation practices. However, there are few who still extract some few materials needed in carrying out the practices in traditional way. Furthermore, new Christian way of initiation does not require traditional practices thus the forest sites and materials used during initiation are not required. Few individuals, mostly the old still value the forest materials in traditional marriage and initiation. This therefore lowered the population that still use of forest on it

5.2 Influence of Distance on CFA Membership

The number of CFA members participating in forest conservation varied. Distance in which an individual is located from the forest influence them negatively in joining CFA. This is because one of the main reasons for participating in CFA is to gain access to the forest for extraction of specific forest products. As a result, those who live far from the forest have no motivation to join it. Those who are far may not have a wide range of uses on the forest as opposed to those who live close to it. They therefore have no incentive to join CFA. With large number of products and services to be obtained from the forest, majority of individuals within close proximity have incentive to join CFA.

Community forest association (CFA) membership encourages more participation in forest conservation than non-CFA membership. Dolisca *et al.* (2006) noted the same in Haiti, where his results indicated that respondents' membership to local groups were positive towards social, environmental, and economic participation inside Forêt des Pins Reserve. This implies that joining CFA enhanced the community members' access to forest products, implying that PFM conferred high access to CFA members than non-CFA members. This was attributed to the information acquired through various forms of community meetings concerning when to collect and where to collect firewood from the forest. There were a greater percentage of CFA members participating in each forest conservation activity as compared to the non-CFA members. This has an implication that for more participation of community members in forest conservation activities, the government through KFS should mobilize the community members to join CFA in the forests.

Old individuals are more attached to the forest than the youth. This makes them join CFA than youth. Old members of the community joining CFA with an increase in distance from forest edge decreases. This could be attributed by the fact that they may not be capable to get into the forest easily by walking within or to the forest. With modern life style where education is the prime order of the day make the youth to spent most of their time in school hence have little time and attention on forests. Even after their school days are over, majority of them move out of their villages to various destinations in search of jobs. Few youth who remain within the vicinity of their birth can develop interest in forest resources. Most of them have adopted the modern religious way of life. They mostly use churches for worship hence the forest is not used for the same.

5.3 Local Community Participation in Conservation

It was noted that range of homestead distance from the forest had a very significant influence on the number of community members participating in forest conservation. As the distance of homestead from the forest increased, the number of community members participating in forest conservation activities decreased. This concurs with several studies done on people's participation including Holmes (2007), Chhetri (2005) and Kugonza *et al.* (2009) who reported that proximity of forest-dependent communities to forests has positive association with the extent of voluntary participation. Phiri (2009) findings indicated that communities closed to forest areas participated more in forest decisions and management than distant communities. Respondents living a distance less than 1 km from the forest reserve showed a higher degree of participation as compared to those living a distance more than 1 km (Alhassan, 2010). This result is probably due to the fact

that distant forest-dependent communities feel that adjacent forest-dependent communities have more ownership and access rights of the reserve compared to them. However, there was a higher mean population of CFA members at 3 kilometers and its participation index as compared to others distances. This could be explained by the location of the CFA leaders who could have major influence on persuasion of members to get involved in planning of the forest.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

This chapter gives conclusion of the study and recommendations.

6.1 Conclusion

Distance of an individual from a forest is a key factor in forest utilisation and interaction, CFA membership and participation in conservation. Those who are located closer to the forest have more attachment to the forest in terms of their utilisation, interaction hence join CFA for their involvement in conservation planning of it. However, those who are far away from the forest especially after three kilometre distance from forest edge show little attachment to it. Because of higher dependence on forest by those at close proximity, they are so keen in various activities and management decisions done about the forest hence should be involved in every forest activity.

Mean populations of community members who utilise forest for various uses decreases as their location from the forest increases. Community members within three kilometre range from the forest have a higher frequency of visit. Means population utilising the forest for honey farming, herbal, and seeds/seedlings score higher even at far distances of 4, 5 and 6 kilometres while pasture and firewood are mostly utilised by those individuals within three kilometres and none at six kilometres. Interaction of forest adjacent community members with the forest declines with an increase in distance of their location from forest edge. Those who are closer to the forest have higher interaction than those who are further away from the forest. The participation index is minimal for those who are at distance of six kilometres from the forest while those within three kilometres often get involved in forest conservation activities.

CFA membership declines as distance in which an individual is located from the forest increases. Majority of members within three kilometres join CFA while beyond four kilometre distance have few members joining CFA. More individuals at age of thirty five and above join CFA than those between eighteen and thirty five.

6.2 Recommendation

Since most of the people within three kilometres utilise forest and have higher interaction with the forest they should be involved as much as possible in forest management activities. When planning on use of forest products such as firewood and pasture utilisation, community members within three kilometres should be involved adequately. Those at 5 and 6 kilometres need not be involved on the same. On matters relating honey, herbal medicine, and cultural practices need to involve all the members up to 6 kilometre distance. Therefore it is possible to do zoning on forest adjacent communities to reflect their preferred forest uses for easy planning on the use of forests.

The CFA membership and leadership need to be concentrated within a closer distance from the forest. At three kilometres distance from the forest, there was a higher PI of 0.8 thus further research is required to ascertain the influence of CFA leaders on CFA membership.

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APPENDICES

Appendix I: Questionnaire

1. Personal information: Tick appropriate box

i) Please state your: a) sex: Male Female

b) Age: (youth) 18-35 Above 35(old)

ii) Are you a member of community forest association (CFA)?

Yes

No

iv) How many times do you visit the forest per week? _____

v) State your participation in conservation planning: (tick one) –

PI values (always=1.0, often= 0.8, occasionally= 0.6, rarely= 0.4 and never= 0.2))

➤ Never (do not participate)

➤ Rarely participate

➤ Occasionally

➤ Often

➤ Always

