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ASSESSMENT OF FACTORS THAT CONTRIBUTE TO FOREST RESOURCE USE CONFLICTS: A CASE OF EBURU FOREST, KENYA

By:

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DECLARATION

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

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

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ABSTRACT

Eburu Forest is a montane forest that forms part of Mau Forest Complex. The aim of the study was to assess factors that contribute to forest resource use conflicts and their manifestation, as well as opportunities for conflict management. Conflicts among stakeholders over access, control or ownership of forest resources are a major impediment to achieving sustainable forest management globally.

The study area was stratified into three zones namely Eburu, Kiambogo and Ndabibi. This was based on the size of farm holding, land tenure, population density, ethnic composition, and administrative units. Both secondary and primary data was collected, using a combination of methods that included questionnaire, Focus Group Discussions (FGD), Key informant interviews and field observations. Statistical approach included a combination of descriptive and inferential analysis.

Majority of respondents (66.5%) revealed existence of forest resource use conflicts in Eburu Forest. Seven types of forest resource use conflicts were identified and analyzed. The study established that forest resource use conflicts manifest and affect forest management in different ways. Three main ways identified were; contribution to forest destruction, poor relations among stakeholders and less community participation in conservation activities specifically fire fighting. Forest destruction and poor relations among stakeholders arising from forest resource use conflicts featured more in Kiambogo followed by Ndabibi and Eburu in that order. Less participation in firefighting arising from forest resource use conflicts featured more in Eburu (37%), followed by Ndabibi (36%) and Kiambogo (31%).

Factors that contribute to forest resource use conflicts, as well as challenges constraining forest management include poor accessibility (26%), corruption (20%), lack of equipment (14%), poor relationship with the community (10%) and understaffing (11%). Inadequate funds and lack of training were also found to be of concern and require urgent attention. The study identified factors that lead to escalation of conflicts, which include; failure to address community grievances in a timely manner, incomplete or contradictory information, and inadequate platforms

and mechanisms for ventilating and redress of grievances. Opportunities to address forest resource use conflicts in Eburu include mechanisms to regulate access (forest legislation and rules), presence of partner organizations with on-going programs, and Eburu Forest Electric fence.

The study recommends strengthening of community participation in forest management, improving relationships and communication among partner organizations and setting up Forest Level Management Committee to provide a platform for redress of community grievances and ensure harmonious use of forest resources in keeping with Eburu Forest management plan. Further, the on-going review of the forest policy and Act should safeguard customary access rights of the community to forest resources and expressly provide for equity in distribution of benefits among parties involved in forest management. Of immediate priority however is strengthening the organizational capacity of key stakeholders under PFM arrangement to effectively undertake their mandates and promote community development targeting forest adjacent areas to minimize dependence on forest resources for livelihood.

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CHAPTER ONE: BACKGROUND

1.1 Introduction

Eburu Forest is an indigenous gazetted forest measuring 8,715.3 hectares. Located in Nakuru County, the forest is one of the 22 gazetted forest blocks that forms part of the expansive Mau Forests Complex that covers 416,000 hectares. The Mau Forests Complex is of national importance due to ecological services it provides in terms of river flow regulation, flood mitigation, water storage, recharge of groundwater, reduced soil erosion and siltation, water purification, promoting biodiversity and micro-climate regulation. Through these services, it supports key economic sectors in Rift Valley and Western Kenya, including energy, tourism, forestry (timber and non-timber products), agriculture (cash crops such as tea, sugar, rice, pyrethrum, subsistence crops, and livestock) and water supply. The Mau Forests Complex is particularly important for two of the three largest foreign currency earners: tea and tourism.

Conflicts arise from human relations when individuals have different values, rights, obligations, needs and interests that must be met from a particular resource. In forest management, conflicts can be occasioned by degradation or decline in forest resources and ensuing competition over reduced amounts of forest products; perceived scarcity through competitive use; and, a failure to negotiate rules and regulations for sharing a resource which are acceptable to all stakeholders (Castro and Nielsen, 2004). In a conflict over the use of natural resources, conflicting parties often end up contradicting, compromising, or even defeating the interest of the other in pursuit of their own interests (Ochieng-Odhiambo, 2000)

Kenya's economy heavily relies on the country's natural resources and agricultural output both in terms of people's livelihoods and as a contribution to national income. The exploitation and competition for the country's limited natural resources continues to jeopardize the state of the environment, mainly due to unsustainable and unplanned exploitation. Conflicts in the forestry sector are therefore mainly between the government and the forest adjacent communities (Castro and Nielsen, 2001). The major bases of conflicts therefore revolve around the government's need to conserve

the forest and the communities' requirements to have the forest meet their livelihoods. The main factors that contribute to conflicts in the forest sector therefore include population growth, continued dependence on the forest resources by many Kenyan communities, the existence of different tenure regimes in the forest sector, and the inordinate share of the forests and forest resources acquired by the politicians and other political elites (Wass, 1995 and 2000, Ochieng-Odhiambo 2000; Okoth-Ogendo, 2000).

KFS has made considerable effort to move from the previous centralized, top-down, forest management model towards devolution of authority and responsibilities to the local-level, and to establish joint forest management systems. This however has had minimal impact on addressing forest resource use conflicts in Eburu, as evidenced by on-going construction of an electric fence around the forest.

1.2 Statement of the research problem

The link between natural resource management and conflict is strong. Specifically, forest-related conflict is pervasive and widespread, and it can be extremely destructive. But conflict is not unique to forests. No natural resource used and managed by humans is completely conflict free (De Koning, et *al*, 2008). Changes in the management of natural resources may increase the supply of benefits which people seek and so reduce competition, while economic diversification or policy changes may reduce demand for particular resources and so reduce competition and the potential for conflict (Adrian, 1993). Existence of a multiplicity of forest resource users, some with incompatible goals and priorities, together with other factors lead to conflicts, that not only contribute to forest degradation but also compromise traditional access rights of local people to the forest resource.

Eburu Forest ecosystem is a critical resource providing a multiplicity of both environmental goods and services to a wide array of beneficiaries. Among the diverse uses include, carbon sequestration, water catchments key for maintaining hydrological cycle, source of medicinal herbs as well as an array of non-timber forest products, source of pasture and fodder for livestock, source of geothermal power, cultural uses,

habitat for wild life, recreation by both local and international tourists, source of wood mainly used for charcoal and construction.

The varied forest resource use in Eburu forest has contributed to conflicts among the users. Exploitation of geothermal power within the forest has been associated with wilting of crops on forest adjacent farms. Illegal extraction of forest products including wood (for construction, fuel wood, and charcoal production), honey, fodder and pasture has contributed to conflicts with management institutions like KFS and community groups like community forests association (CFA). Encroachment for cultivation has also created tension especially as relates to evictions and boundary location with local community. Also witnessed is inter-institutional conflict such as between KFS and Water Resources Management Authority over levying of water use fees inside the forest. The on-going erection of an electric fence aimed at securing Eburu has already created tension between pastoralists and fence implementers, who regard the fence as a violation of their customary access right to the forest for pasture especially during dry season.

Understanding factors contributing to forest resource use conflicts will enhance their resolution in a collaborative way that helps to develop trust and strengthen communication between various parties. The study will contribute to enhanced forest management, as a clear understanding of factors that contribute to forests resource use conflicts is critical for devising effective conflict management and resolution measures.

1.3 Research questions

The study was guided by the following questions:

- What is the nature of forest related conflicts?
- How do the conflicts manifest?
- Where do they occur, and does their occurrence have a pattern?
- What are the factors that contribute to forest resource use conflicts?
- What factors lead to escalation of forest resource use conflicts?

- What rules are in place to govern access to forest resources and benefit sharing?
- What community structures are in place for regulating access to forest resources?
- What conflict management structures are in place for handling forest related conflicts?

1.4 Objectives of the study

1.4.1 Broad objective

To assess factors that contribute to forest resource use conflicts and their manifestation in Eburu area as well as opportunities for conflict management

1.4.2 Specific Objectives

1. To document the different types of forest related conflicts in Eburu forest
2. To investigate factors that contribute to forest resource use conflicts
3. To identify opportunities for conflict resolution in Eburu forest

1.5 Research hypotheses

The study was guided by the following hypotheses

1. Ho: There are no resources use conflict in Eburu forest
2. Ho: There are no factors contributing to forest resource use conflicts in Eburu
3. Ho: There are no opportunities for conflict resolution within Eburu Forest

1.6 Justification and limitations of the study

1.6.1 Justification of the Study

The unique nature and role of forest ecosystems has long been acknowledged as being of pivotal necessity. Forest ecosystems play numerous important roles at all levels. Forests provide environmental services to nature in general and humans in particular.

In recognition of the important roles forests play, Stockholm Conference of 1972 recognized forests as the largest, most complex and self-perpetuating of all ecosystems (Hirakuri, 2003).

Eburu forest ecosystem is a critical resource providing a multiplicity of both environmental goods and services to a wide array of beneficiaries. The management and use of forest resources has contributed to conflicts among stakeholders that is affecting sustainable conservation of the forest and its ability to provide the much needed ecosystem goods and services.

Forestry studies in Eburu have given less emphasis on resource use conflicts. A clear understanding of factors contributing to these conflicts will enable development of strategies and measures that will effectively address the conflicts. Persistence of forest resource use conflicts in Eburu despite existence of some conflict management interventions points to the fact that the interventions have failed to adequately address the problem. Forest resource use conflicts contribute to decline and deterioration of forest resources through strained relations among actors compromising input towards sustainable forest conservation. A clear understanding of factors contributing to forest resources use would enhance use of forest resources to promote peace building.

How conflicts develop depends very much on how they are managed. Much can be done to prevent conflicts from taking violent or destructive courses by addressing their underlying causes at an early stage (Antonia, 2011)

Eburu forest was selected for the study given the diverse ecosystem services and goods it provides as well as a multiplicity of forest resource users and stakeholders with some having conflicting interests. The forest is among the first sites in Kenya where Participatory Forest Management (PFM) was initiated. Among reasons for PFM introduction was to minimize conflicts related to forest resource use. The study therefore brings out answers as relates to persistence of forest related conflicts despite introduction of PFM.

Findings of this study will help to alleviate forest resource use conflicts in Kenya by ensuring that conservation efforts facilitate attainment of multiple benefits to diverse

stake holders, prioritize relationships building and recognize stakeholder's needs within the context of inclusive governance. Findings of this study will contribute to the body of knowledge as relates to Participatory Forest Management in Kenya, and guide on-going forest sector reform.

1.6.2 Limitations of the study

The study focused on human-human conflicts. Human-wildlife conflicts also emanate from forest resource use, but were out of scope for this study. Due to financial and time constraint, representative sections of the forest were sampled. Some respondents especially the elderly, could not effectively communicate in neither English nor Kiswahili. To overcome this communication challenge, local enumerators were used to assist in administering questionnaire. Due to strained relationship between KFS officers (Forester and forest rangers) and community members, the communities felt intimidated to freely share information. To overcome the challenge, separate interviews were held between the two parties.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This section reviews documented information relating to forest resource use conflicts based on three themes; forest resources, factors contributing to forest resource use conflicts, and opportunities for addressing forest resource use conflicts. For each theme, the review looks at the global, Africa, national and project site perspective. Review findings were used to enrich discussion of results.

2.1.1 Forest resources

a) Global perspective

An estimate of the world's total forest area in 2010 was 4 billion hectares, corresponding to an average of 0.6 ha of forest per capita (FAO, 2010). However, the area of forest is unevenly distributed. Literature indicates that the five most forest-rich countries (the Russian Federation, Brazil, Canada, the United States of America and China) account for more than half of the total forest area (53 percent), while 64 countries with a combined population of 2 billion people have forests of no more than 10 percent of their land area. These include a number of fairly large countries in arid zones, as well as many small island developing states (SIDS) and dependent territories. Ten of these have no forests at all. The disproportionate distribution of forests across countries and the high value of forests across sectors qualify the need for good management to avoid conflicts.

Thirty percent of the world's forests are primarily used for production of wood and non-wood forest products. Close to 1.2 billion hectares of forest are managed primarily for the production of wood and non-wood forest products. An additional 949 million hectares (24 percent) are designated for multiple uses – in most cases including the production of wood and non-wood forest products. The area designated primarily for productive functions has decreased by more than 50 million hectares since 1990, or 0.22 percent annually as forests have been designated for other purposes. The area designated for multiple use has increased by 10 million hectares in

the same period, while legally established protected areas was estimated to cover 13 percent of the World's forests. An assessment of historical perspective on forestry reveals both the importance and the challenge of sustaining forests and striking a balance between conservation and use – practising sustainable forest management – to ensure the full range of forests' economic, social and environmental contributions. This in itself hints to a state of conflicts among stakeholders on the use of forest resources at the global level (FA0, 2010).

FAO (2002) confirms that forest utilization and exploitation differs significantly in most regions in the world, meaning that the degree of degradation and resultant forests related conflicts also differs. Illustratively, in Europe, exploitation of forest resources is minimal when compared to Asia and the Pacific regions; Latin American and the Caribbean and Africa. For example in Latin America and the Caribbean, forests resources are widely exploited in order to facilitate social economic activities such as wood for industry, provision of inputs for domestic consumption and export, provision of non-wood products as well as facilitating livelihoods for indigenous forest dwelling communities. In Africa, the situation is not that different from Latin America and the Caribbean: forests in Africa are also used as a source of substantive livelihood as well as a direct and indirect economic backbone; through provision of energy, food, timber and non-timber products and many other services (FAO, 2002).

b) Forest Resources: Africa's perspective

Forests and woodlands occupy an estimated 650 million ha or 21.8 per cent of the land area in Africa. These account for 16.8 per cent of the global forest cover (FAO, 2005). The distribution of forests and woodlands varies from one sub-region to the other, with Northern Africa having the least forest cover while Central Africa has the densest cover. The Congo basin in Central Africa is home to the world's second largest continuous block of tropical rain forest. Africa's forests and woodlands can be classified into nine general categories namely tropical rain forests, tropical moist forests, tropical dry forests, tropical shrubs, tropical mountain forest, subtropical humid forests, subtropical dry forests, subtropical mountain forests and plantations (FAO, 2003a).

The forest sector in Africa plays an important role in the livelihoods of many communities and in the economic development of many countries. This is particularly so in Western, Central and Eastern Africa where there is considerable forest cover. Africa has a high per capita forest cover at 0.8 ha per person compared to 0.6 ha globally (FAO, 2002). On average, forests account for 6 per cent of Gross Domestic Product (GDP) in Africa, which is the highest in the world (NEPAD, 2003).

Forests and woodlands provide a wide range of goods and services that create opportunities for development and improving human well-being. Some goods, such as wood for fuel and construction, are quite evident while others, such as water sources, are less obvious. The environmental functions of forests and woodlands include protecting catchment, purifying water and regulating river flows, which in turn ensure the supply of water for hydropower generation. Forests and woodlands also help prevent soil erosion (from water and wind) and thus are critical for agriculture and food production. They supply timber, wood for energy, construction materials and Non-Timber Forest Products (NTFPs) including food and medicines (UNEP, 2009).

In addition to the mainstream timber products, like timber and wood fuel, forests and woodlands support other activities including ecotourism, the crafts industry, the traditional medicine sector, the pharmaceutical industry and bush meat trade. These too are significant in enhancing household incomes. For example, it was estimated that 2.9 million people (530 000 households), lived within 5 km of closed canopy forest in Kenya in 1995, and depended on forests to provide timber and NTFPs. The woodcarving industry in Kenya, for example, supported over 80 000 people with approximately 400 000 dependants, and was worth US$8.21 million (Waithaka and Mwathe, 2003)

c) Forest resources in East Africa

In 1990 East Africa had 106.7 million hectares of forest. This area shrank by more than 9 per cent to 97.7 million hectares in 2000 and a further 13 per cent to 84.9 million hectares in 2010. In total, 21.8 million hectares of forests were cut down. In 2010 Tanzania had the largest share of forest area (including wooded land) in East Africa, with 45 million hectares (53 per cent). Tanzania reduced its forested area by

14.6 million hectares, accounting for 67 per cent of the region's total deforestation. Kenya's share of the forest area in 2010 was 32 million hectares (38 per cent), but this was almost 18 per cent less than in 1990. Kenya accounted for 33 per cent of the region's forest depletion. Burundi also lost some 117,000 hectares of forest. Uganda and Rwanda have expanded their respective forest areas by 43,000 and 3,000 hectares over the last two decades. This is, however, a very small percentage compared to the total deforested area (SID, 2012).

d) Status of Kenya's forests

According to a report compiled by the World Bank in 2007, approximately 2 percent (about 1.24 million hectares) of the total land is covered by closed canopy forest in Kenya. Plantation forests also constitute a certain percentage of forest cover in addition to closed canopy forest. These forests ecosystem comprise Montane Forest Region, Coastal Forest Region, Western Rainforest Region as well as Dry Zone Forest Region (World Bank, 2007).

Mau Forests complex is one of the closed canopy montane forest ecosystem in Kenya. It covers approximately 416,542 hectares and is said to have been larger than Mount Kenya and Aberdare combined prior to its recent deforestation. According to a project concept paper prepared by the office of the Prime Minster on the rehabilitation of the Mau, the Mau comprises 22 forest blocks of which 21 are gazetted and are under the management of the Kenya Forest Service (KFS). The only block that is not under the KFS's management is the Maasai Mau Forest, which is public land under the jurisdiction of Narok County Government.

e) **Forest Resources: Eburu Forest**

Eburu Forest is an indigenous forest that occupies an area of 8,715.3 hectares. The wider Eburu Forest ecosystem is rich in biodiversity. Wildlife inhabits the forest and surrounding farmlands and conservancies, including small and large herbivores, carnivores, and primates. Of particular interest in Eburu Forest is a small population of the critically endangered Eastern Mountain Bongo antelope. In addition, there is abundant birdlife within the ecosystem, with Eburu Forest Reserve identified as the hottest spot for bird species within the entire Mau Forests Complex. The area features

a diversity of flora including tree species such as *Acacia sp, Allophylus sp, Arundinaria sp, Buddleia sp, Dombeya sp, Dovyalis sp, Ekebergia sp, Galiniera sp, Juniperus sp, Maesa sp, Maytenus sp, Nuxia sp, Olea sp, Olinia sp, Podocarpus sp, Polyscias sp, Prunus sp, Rapanea sp, Schefflera sp, Solanum sp, Tarchonanthus sp, and Vernonia sp. Tarchonanthus sp* is predominant in degraded areas.

Overall, the forest plays an essential role as a national and international watershed, providing ecosystem services that conserve biodiversity, support livelihoods locally, regionally and internationally, sustain economic development, and contribute to mitigating and adapting to global climate change.

In recent years, given the high conservation value and increasing degradation trend, the Government of Kenya (GoK) has taken significant steps towards addressing the challenge. Revised forest policy and law were adopted in 2005. The forest law has placed significant emphasis on co-management of forest resources with local communities and the private sector and lays the foundation for the strict control of logging and human settlements. As a further sign of its commitment, the Government established a 30-member Task Force (reporting to the Prime Minister) whose responsibility was to study and make recommendations to GoK on the immediate, short- and long-term options for restoring the entire Mau Forests Complex. The Task Force completed its work and submitted recommendations to the Government in March 2009. GoK is committed to reversing the continued environmental destruction of the Mau in line with its medium and long-term national development plans, articulated in "Vision 2030" (ICS, 2009).

2.1.2 Forest resource use conflict and associated factors

a) Global perspective

Forest-based conflict is one of the major global challenges for the international forestry agenda together with poverty, climate change, conservation, and bio fuels (De Koning, et *al*, 2008). Forestry related conflicts are unique to the countries in which

they take place. They however seem to have common roots when looked at across countries (Antonia, 2011)

Forest trends, (2002) confirm that interactions between indigenous peoples, governments and commercial forest interests have historically often been contentious. Starting in the sixteenth century governments around the world have overridden the traditional rights of native peoples and have given government forest agencies authority over vast tracts of natural forest and indigenous inhabitants. During the nineteenth century most governments with substantial forest resources began to transfer forest management rights to private firms able to access investment capital for economic development with little regard to the interests or aspirations of indigenous peoples. These policies have denied indigenous peoples access to their forests, forests that are not only central to their cultural identity and life ways, but often their most important economic asset and primary option for advancing their own economic well-being. This situation continues to largely define the global forest estate today, spurring conflicts between indigenous peoples, governments and commercial forest enterprises. (Forest trends, 2002).

IUCN commissioned a study Lewis (1996) that examined diverse case studies and published a Handbook on managing conflicts in Protected Areas. Findings were that in almost all of the cases, the conflicts related to: 1) a lack of attention to the process of involving local people and others who care about the protected area in the planning, management, and decision making for the area, and/or 2) people in nearby communities having needs (e.g., for grazing land, firewood, building materials, fodder, medicinal plants, and hunting) that conflict with the objectives of the protected area.

Forest resources tend to invoke conflicts in many resource-dependent countries. For example, Blundell (2010) illustrate that, three-quarters of Asian forests, two-thirds of African forests and one-third of Latin American forests have been affected by violent conflicts. Many Countries that have been affected by forest related conflicts include but not limited to Burma, Colombia, Côte D'Ivoire, Democratic Republic of the Congo (DRC), India, Indonesia, Mexico, Nepal, Philippines, Sierra Leone, Solomon

Islands, Sudan, Kenya, Uganda and most notably Liberia, where the UN Security Council had to sanction against timber harvesting in 2003 in order to stop the flow of revenue to the country, that was associated with funding civil war.

Forest resources in the above-mentioned countries have been characterized by some negative trends, which fuel conflicts within those countries or between many countries. For example, the civil war was majorly fuelled by timber harvesting in Liberia between 1980-2003 and their spill over to Sierra Leone, Guinea, and Côte d'Ivore. While illustrating how conflicts over resources may begin in a country, Blundell (2010) continues to argue that, certain negative trends like corruption in the forest sector or in a country may allow the perpetrator to "circumvent the allocation process, avoid forestry regulations, evade taxes, and elude punishment". Resultantly, there is attendant impunity, loose rational management and economic development and inevitable conflicts. He also points out that revenue from forestry can be used directly to fuel conflict, especially in a situation where a country uses money taxed from forest resources to purchase arms.

Antonia, (2011) contends that conflicts between communities and outsiders (such as loggers, miners and hunters) are not a new phenomenon. In years past, conflicts were more limited in number and shorter in duration-with forest communities quickly overwhelmed by external powers. But things changed in 2009; forest carbon was not worth much to forest owners until that year, when the developed countries began announcing emissions targets and a deal on REDD+ became likely. Just as powerful investors and national governments realized the enormous profit to be made from the remaining tropical forests, violent conflicts in and over forests were sparked. The general legal assumption is that 'carbon goes with the trees, and trees go with the land'. Thus carbon goes with the trees and land.' But the confusing nature of forest tenure in most countries renders this simple logic naive. Deadly conflicts in Peru and the repression of a longstanding insurgency in India are the most prominent examples, but long-overlooked local disputes over resource rights have spun into international conflicts in Afghanistan and the Niger Delta. These examples are indicative of more to come. As the demand for controlling forests increase, so will violent conflicts over these valuable resources (Antonia, 2011).

b) Forest Conflicts; Africa

Sub-Saharan Africa experiences a wide range of inter-and intra-state conflicts. According to a report by the Secretary General of the United Nations "(Since 1970, more than 30 wars have been fought in Africa-In 1996 alone, 14 of 53 countries of Africa were afflicted by armed conflicts accounting for more than half of all war-related deaths world-wide and resulting in more than 8 million refugees, returnees and displaced persons (UN, 1998). As conflicts abound in Africa, the discernible trend in environmental resources is decline in environmental resources and deterioration. The deterioration of the environment has resulted in the vulnerability of the people in the region with increased exposure to environmental hazards and reduced capacity to cope with them. This is exacerbated by a high rate of population growth (Mbote, 2005).

Indeed, during the past 20 years, armed conflicts have struck forest areas in more than 30 countries in the tropics. Notorious examples are Cambodia, Liberia, Myanmar, and Sierra Leone where rebel warfare largely played out in remote cross-border forest areas. Conflicts of lesser intensity include inter-communal struggles and forms of protests frequently observed along forest frontiers in countries such as Brazil, Indonesia, and Mexico. Although each of those conflicts has its own historical and political context, many reveal a distinctive role of the forest, its timber, and the rights to them (De Koning, 2007).

Lewis, (1996) established that many protected areas appear to provide most benefits to the nation at large, which is why they are called "national parks" or "national nature reserves", or even for the entire planet, which is why some areas are given World Heritage status. Many such protected areas are a net cost to the people who live in and around them, either in terms of decreased access to resources, crop damage from wild animals, or the opportunity cost of using that habitat for another purpose. Thus the issue of distribution of costs and benefits is a critical one in helping to resolve conflicts in protected areas. In many parts of the world, new approaches often termed "co-management"–are being adopted as a way of helping to resolve conflicts between local people and protected areas (Lewis, 1996). The issue of benefit–cost sharing

among the state and local communities' sticks out as a major factor to forests resource use conflicts.

Sayer et al, (2005) found out that conflicts in the forest sector revolve around questions of control, access to the forest and forest products and historical claims over the forests. Although the demand of forest products has steadily risen, the total area of forests continues to decline and between 1990 and 1995, the total area of forests in developing countries decreased by 65.1 million hectares. The major causes of forest cover change in developing countries are conversion of forests to agricultural land and large infrastructural development. These have further intensified conflicts between forest managers who are often powerful, centralized state authorities or the ruling elite and the less powerful forest dependent communities.

c) Forest Resource Use Conflicts in Kenya

Some of the problems afflicting the forestry sector in Kenya may be due to conflicts between conservation and use and institutions involved in their management. Conflicts in the use of forests and forestland arise partly due to unclear tenure (Okoth-Ogendo, 2000). In the absence of clearly stated tenure regarding ownership of natural resources, some form of negotiation involving roles and responsibilities of the participating parties become necessary. Many forests adjacent communities believe that public forests belong to them although legally the government owns them. As a consequence, the community members have not accepted the legal position of government ownership and still wait for the time when the forest would be returned to them as the rightful owners of the resource. Furthermore, although forestland in Kenya is managed as a public resource, decisions pertaining to their use usually do not reflect the public good theory which requires that public goods are managed in such a way that they benefit the local people more than those from outside (Kigenyi *et al,* 2002).

Ongugo *et al* (2008) assessed the effects of internal human conflicts on forest conservation and sustainable development in Kenya. Several factors were identified as the major sources of human-to-human conflicts among forest users in the study area. These included legal claim of forest products, establishment and following of

rules governing the use of the forest, restrictions on quantity of forest products harvested, infractions, inadequate land, rights of forest use and products. As relates to conflicts among actors, a majority (51%) of community members mentioned that over the last two years (prior to the date when data was collected) there had been cases of conflicts among actors. The main nature of conflict identified was the increasing scarcity of land for the growing population and higher demands for forest products, which therefore led to a scarcity of the forest resources. The second major source of conflict was by the forest regulators who felt that communities were the main cause of forest destruction. Among the recommendations was that decentralizing power of decision-making from centre to local level institutions will maximise the involvement of local communities to ensure reduction of conflicts and improve the sustainable management of the forests. There is however need to further look at factors contributing to forest resource use related conflicts in a decentralised system.

2.1.3 Opportunities for addressing forest resource use conflicts

a) Global perspective

In many parts of the world, new approaches-often termed "co-management" are being adopted as a way of helping to resolve conflicts between local people and protected areas (Lewis, 1996).

b) Africa's perspective

In Central and Western Africa, the forest sector contributes more than 60 per cent of GDP through export of timber products. Africa's wood production (including round wood and fuel wood), increased from 340 million m^3 in 1980 to 699 million m^3 in 2000 (FAO 2003b). However, trade is characterized by unprocessed products, primarily round wood and sawn planks. This means that the full potential value of forest resources is not captured. A huge opportunity, therefore, exists in investing in value adding and processing of wood products. Greater benefits can be realized in those countries with significant hardwood forests, particularly the Democratic Republic of the Congo (DRC), Congo, Gabon, and Cameroon, through more innovative institutional arrangements such as market-based price determination through tendering, improving tax collection through the privatization of tax revenue collection, or privatizing commercial functions (FAO, 2005). A number of countries have now imposed restrictions on log exports to encourage domestic processing.

Domestic processing, however, has to be supported by strict quality control if African processed wood products are to gain secure access to the international market (UNEP 2009). Additionally, products will require certification to show that they come from sustainably managed forests, given the growing environmental consciousness of global consumers.

In Eastern, Western and Southern Africa, more than 90 per cent of rural households depend on wood fuel, including fuel wood and charcoal, for their energy requirements. The sustainability of this high dependence is questionable and, increasingly, African countries are looking at the energy opportunities offered by other resources, including solar and wind energy. Wood fuel supports lucrative local trade. Trade in charcoal is a major source of income for many households. For example, in Zambia, the charcoal industry generated about US$30 million in 1998 alone, and in the same year about 60 000 Zambians directly depended on charcoal production for the bulk of their income. As charcoal becomes an important tradable commodity, there is an opportunity for governments to recognize and regularize charcoal production by putting in place long-term plans for sustainable production, while at the same time creating a supportive legal and economic framework for micro- and small and medium enterprises (SMEs) development. Increasing efficiency and ensuring that the development of this sector does not accelerate deforestation requires appropriate policy interventions (Kalumiana, 2000).

c) Kenya

Most literature (Castro and Nielsen, 2004; Forest Act, 2005) deems participatory approach as a key opportunity for addressing forest resource use conflicts. The recognition of the role of conflict and conflict resolution has partly come as a result of decentralization and participatory approaches in natural resources management. These approaches imply a wider stakeholder involvement, each with their own priorities in respect to what products and services a forest should produce. Benefit sharing has emerged as a major issue among stakeholders during the on-going review of the Forest Act 2005. The National Alliance of Community Forest Associations (NACOFA) has contested in a court of law the planned rolling out of Concession

Management Framework that would see the management of some forests concessioned out to private companies.

The Forests Act 2005 officially entrenches adoption of participatory forest management (PFM) in Kenya. It is anticipated that introduction of PFM in a forest area would, among others result in the following;

- Fewer conflicts and improved relations among major stakeholders
- Increased social (sometimes political) acceptability and so can form alliances more easily
- Empowerment of marginalized groups through recognition of rights and responsibilities
- Stronger partnerships and alliances against external conservation threats
- More cost and resource efficiency (in the long term)
- Enhanced skills of many different stakeholders/institutions
- Enhanced mechanisms for working together that can be used to address other issues
- Can lead to a 'win-win' situation vis-à-vis poverty alleviation and natural resource conservation.

The Forests Act 2005 establishes new structures to take on devolved functions including KFS Board, Forest Conservation Committee (FCC) and Community Forest Association (CFA). An entire section (section 1V) of the Act is dedicated to detailing procedures, requirements, roles and user rights for community engagement in joint forest management.

Section 35 (1) of the forest Act 2005 requires that every state forest, local authority forest and provisional forest shall be managed in accordance with a management plan. Participatory Forest Management Plan of Eburu Forest (KFS, *et al*, 2008) signed by the KFS director is a critical tool under PFM that sets to minimize conflicts and enhance sustainable forest management among different stakeholders. The plan zones the forest and prescribes management interventions for respective zones, identifies key stakeholders and assigns roles, responsibilities and rights.

Besides a management plan, section 36 (1) of the Forests Act 2005 requires the Director, with the approval of the Board, to enter into an agreement with any person for the joint management of any forest. Eburu Community Forest Association (ECOFA) developed, and entered a Forest Management Agreement with KFS. The agreement, signed in 2010 spells out the roles, responsibilities and rights of KFS and ECOFA. It further details user rights, terms of engagement and termination procedures.

Rhino Ark is facilitating construction of an electric fence to secure the forest. (KWS *et al*, 2012). The overall goal is to protect the forest against encroachment, degradation, and to reduce human-wildlife conflicts. The fence will also improve social order and general security by reducing incidences of cattle raids and conflicts between local conservationists and illegal loggers. Maathai (2005) points out that sustainable management of forest resources in Kenya will only be possible if we practice good governance of the forest resources; which calls for the respect for the rule of law, respect for human rights, a willingness to give space and voice to the weak and the more vulnerable in our society; and that we respect the voice of the minority, even while accepting the decision of the majority; and, respect diversity.

2.2 Theoretical framework

Conflict occurs when there is an incompatibility in interests, behavior, goals, values, needs, expectations, and/or ideologies between parties (Boschken, 1982). Daniels, 1993) defines conflicts as disagreements between two or more parties which cause stress for or between the individuals concerned. Theory on conflicts suggests that most conflicts have *substantial issues*, as well as *relationship* and *procedural issues* (Moore, 1996, Daniels and Walker 2001). Frustrations with livelihood outcomes and unfair procedures, historically strained relationships and hostility, fear and anger among groups prevent constructive communication which in turn hampers conflict resolution; circular dynamics may lead to rapid escalation and intractability (Opotow, 2000, Coleman, 2000, Ajulu 2002, Kagwanja 2003, Ribot *et al*. 2010).

Galtung's (1969) classical model of conflict suggests that conflicts are highly dynamic and can be viewed as a triangle formed by Attitude, Behaviour and Contradiction. *Attitudes* include the parties' perceptions of each other and of themselves. In violent conflicts, demeaning stereotypes and emotions such as fear, anger, bitterness and hatred are often prevalent among the parties. *Behavior* can include cooperation or coercion, conciliation or hostility and in violent conflicts threats, coercion and destructive attacks are widespread. *Contradiction* refers to the actual or perceived incompatibility of goals and interests. This study adopts Galtung's model.

Daniels (1993) argues that existence of a conflict assumes not only that there is interaction between people or parties, but also that there is at least some view of the existence of a form of dependence between them, whether or not this view is based on practical or emotional circumstances or merely on an assumption of such dependence. He notes the connection between the inner feeling of stress and outward conduct, which he argues means that a conflict will exist even if only one of the parties feels the stress. He further states that there would still be a conflict between the parties even if, they do not have the same feelings about it. He observes thus that the conflict cannot be 'owned' by one party alone, but instead be seen as an individual conflict (an inner conflict) and a relational and contextual conflict.

Adam *et al*, 2003 argues that the management of common pool resources can be viewed as a problem of collective action and analyzed in terms of the costs and benefits of cooperation, institutional development, and monitoring, according to variables such as group size, composition, relationship with external powers, and resource characteristics. He notes however, that resulting policy debates are often flawed because of the assumption that the actors involved share an understanding of the problem that is being discussed.

Most communities locally develop procedures and mechanisms to determine access and rights to forest resources (Ostrom, 1990). If conflicts are complex (e.g. many issues and/or many parties) or aggravated, the established local procedures may not suffice and uncontrolled escalation and violence may occur. The theory of 'hurting

stalemate' (Zartman, 1989) predicts, in absence of appropriate conflict management mechanisms, that individuals/groups at some point (when the conflict is "ripe") take initiative to resolve the conflict. These and related theories will be helpful to develop procedures and mechanisms to timely address conflicts.

Adams *et al*, (2003) further argues that Conflicts over the management of common pool resources are not simply material but depend on the perceptions of the protagonists, in that different people will see different resources in a landscape. He notes that parties will perceive different procedures appropriate for reconciling conflict and that perceptions change, because different elements within the landscape will be-come "resources". He cites an example of a market that may develop for something previously regarded locally as useless or destructive of value, such as wildlife tourism. In these situations, he argues, the realm of conflict between beneficiaries and others will be both cognitive and material.

Most conflicts have multiple causes because it usually takes more than one problem for a dispute to occur. Five major causes of conflict (Moor, 2003), that guided the study include problems with people's relationships, problems with data, perceived or incompatible interests, structural problems, and differing values.

According to Barnes' (2005) "Conflict occurs when two or more parties (individuals or groups) have or *perceive* that they have incompatible goals and this perception of incompatibility shape their attitudes and behaviors toward each other".

2.3 Conceptual framework

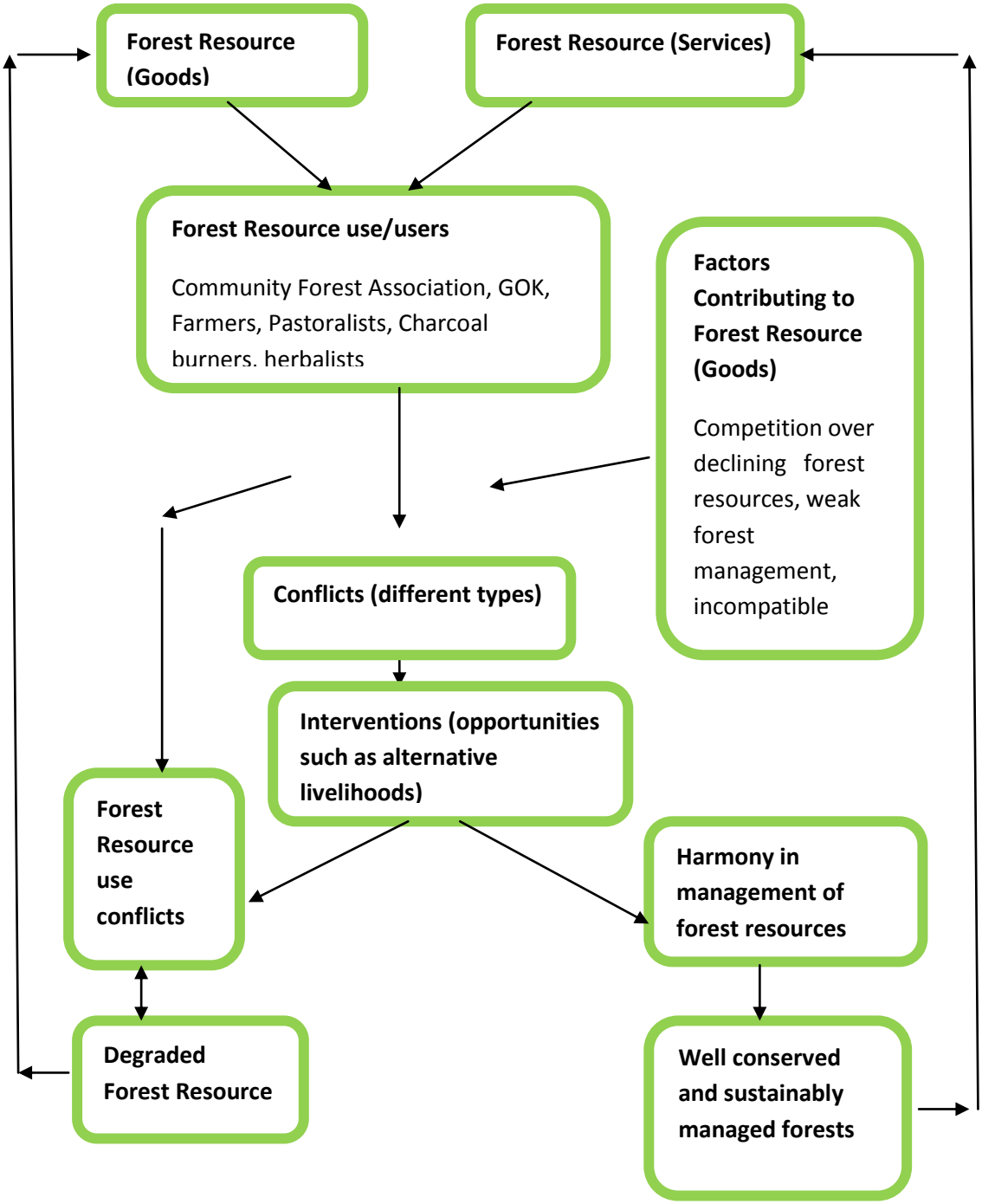


Figure 1: Conceptual Framework *Source: Researcher, 2015*

Interaction of man and the forest resource is given for man's survival. There is a multiplicity of forest resource users with different needs as well as incompatible goals that coupled with factors such as population growth, competition over dwindling forest resources, strained relationships among actors, weak forest management and governance among others that lead to forest resource use conflicts, that contribute to forest degradation (Fig:1)

However there are opportunities for intervention to avoid, transform or manage forest resource use conflicts, such as provision of alternative livelihood options, capacity strengthening on conflict management and forest management, improved forest governance and effective information flow that contributes to harmonious forest management and well conserved and sustainably managed forest resource. However some interventions such as the on-going construction of an electric fence around the forest also fuel further conflicts.

CHAPTER THREE

STUDY AREA CHARACTERISTICS

3.1 Location and size

Eburu Forest is an indigenous gazetted forest measuring 8,715.3 hectares and located in Gilgil sub-county. It is one of the 22 forest blocks constituting Mau Forest Complex, an important water catchment (one of the five Kenya's water towers). It is under the management and responsibility of the Kenya Forest Service, jointly with the community under Participatory Forest Management approach (PFM), that is defined 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 (KFWG, 2007). The reserve borders Ol Jorai Agricultural Development Corporation (ADC) in the North, Loldia Farm to the East and Ndabibi ADC in the South. The eastern part of the forest is in Naivasha sub-district while the northern western portion is in Gilgil Division. It is part of the Mau Forest Complex. It is situated on an eastward facing spur of the Mau Escarpment. The forest lies between longitudes 36° 05' and 36° 16' East and latitudes 0º 40' and 0º 41' South. It was gazetted in 1932 under proclamation (legal notice) No.44 of 1932 and occupies an area of 8,715.3 hectares. This excludes the proposed annexation of the Ol Jorai Agricultural Development Corporation (ADC) complex. The forest forms part of the catchment for Lakes Naivasha and Elementaita with several ground springs. It is the source of Ndabibi River and other small streams. It has several craters, and is still volcanically active as evidenced by many steam jets. The study area constituted the gazetted forest area and the adjacent area within a five kilometre radius as shown in Figure 2.

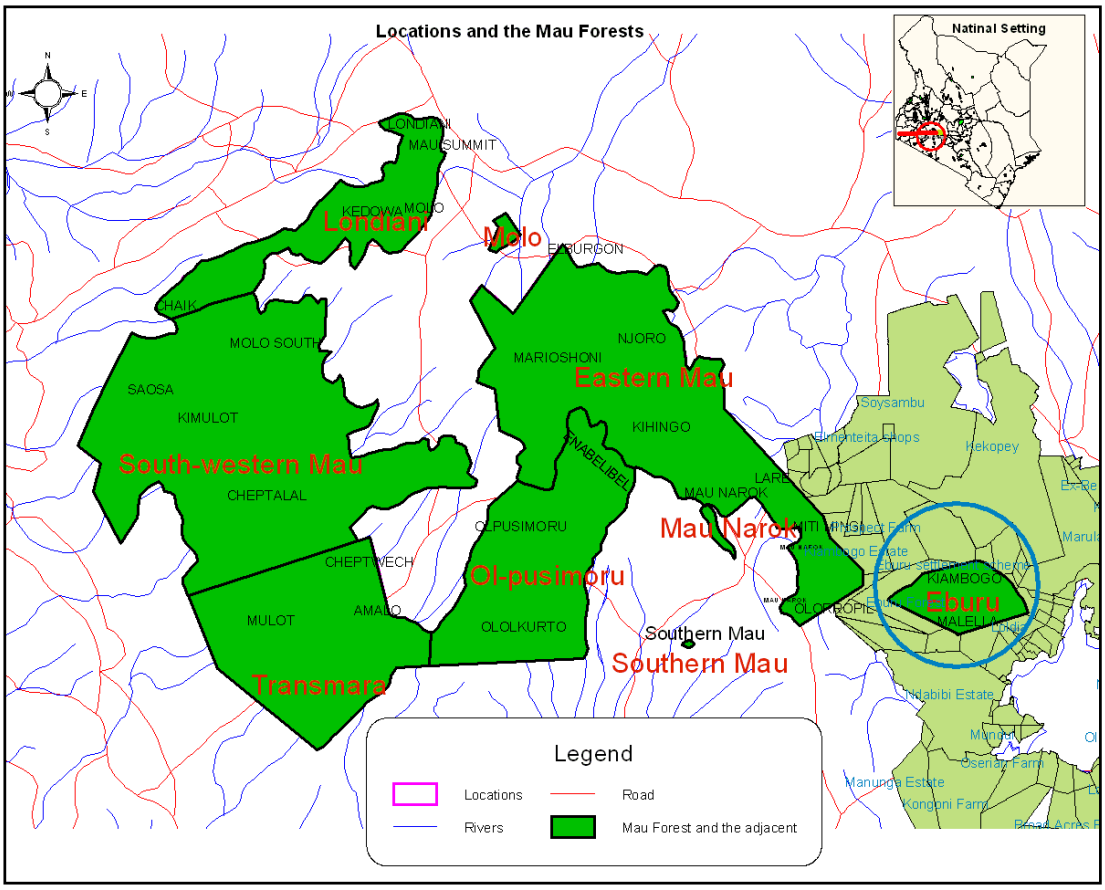


Figure 2: Location of Eburu forest reserve in Mau Complex (Source: KWS *et al*, 2012)

3.2 Physical features

The Eburu Volcanic Complex is located to the north west of Lake Naivasha and forms the drainage divide between the Lake and the Laikipia-Elementaita basin (Clarke *et al*. 1990). The complex extends over an area of about 470 km² and comprises three topographic entities: Western Eburu, Eastern Eburu and Waterloo Ridge. The youngest volcanicity and highest concentration of surface geothermal activity is associated with Eastern Eburu. Western Eburu forms about 35% of the total area and extends onto the down faulted platforms along the western rift margin. It has a maximum altitude of 2,820m and the upper flanks exhibit a radial pattern of ephemeral streams with gullies more than 200m deep.

3.3 Biodiversity

The wider Eburu Forest ecosystem is rich in biodiversity. Wildlife inhabits the forest and surrounding farmlands and conservancies, including small and large herbivores, carnivores, and primates. Of particular interest in Eburu Forest is a small population of the critically endangered Eastern Mountain Bongo antelope. In addition, there is abundant birdlife within the ecosystem, with Eburu Forest Reserve identified as the hottest spot for bird species within the entire Mau Forests Complex. The area features a diversity of flora including tree species such as Acacia sp, *Allophylus* sp, *Arundinaria sp, Buddleia sp, Dombeya sp, Dovyalis sp, Ekebergia sp, Galiniera sp, Juniperus sp, Maesa sp, Maytenus sp, Nuxia sp, Olea sp, Olinia sp, Podocarpus sp, Polyscias sp, Prunus sp, Rapanea sp, Schefflera sp, Solanum sp, Tarchonanthus sp, Vernonia sp* (KFWG, and KFS, 2008).

3.4 Soils

The soils of Eburu Forest belong to the group of Andosols, derived from pyroclastic parent material, notably volcanic ash tuff, pumice, cinders and other volcanic materials of various compositions (Driessen and Dudal, 1989). Andosols have an AC or ABC profile with a dark Ah-horizon from 20 to 50cm thick over a brown B- or C-horizon. Most Andosols have excellent internal drainage characterized by highly variable action exchange properties, (depending on age, pH and electrolyte concentration). The natural fertility of Andosols is high, particularly when not exposed to leaching and water erosion rendering it suitable for agricultural production (KWS *et al*, 2012).

3.5 Demographic characteristics

The total population of the three locations (Eburu, Kiambogo and Ndabibi) as per the 2009 National Population and Housing Census was 29,490. Eburu location had the highest population (13,573) followed by Ndabibi (8,398) and Eburu 7,161).

The high population growth rate has created a predominantly youthful population with about 55% of the population being less than 20 years of age and about 74% of the population being 30 years. The implication of a large youthful population is that it

exerts pressure on the available natural resources. This area is dominated by crop farming and pastoral communities. The settlement pattern around the forest is greatly influenced by the infrastructural network, proximity to urban set-ups and the availability of natural resources.

Agriculture is the main economic activity in the project area. Agricultural activities include farming, livestock keeping and floriculture along Lake Naivasha. An estimated 70% of the population is engaged in agriculture thus making it the major source of employment. In addition, the proportion of household incomes emanating from agricultural activities is about 80%.

The agricultural activities are heavily dependent to rainfall, which is generally low and inadequate, often resulting in drought. The lower regions have therefore continued to be vulnerable, food insecure and characterized by endemic poverty (KWS *et al*, 2012).

3.6 Land use and human settlement

The main land use around Eburu forest is small-scale subsistence farming and pastoralism. Maize, potatoes, beans and vegetables are the main crops grown around the area, while wheat and pyrethrum are the main cash crops grown. Large-scale farms owned by ranchers are also found in the southern part of Eburu. There are three major human settlement schemes around the forest which include Eburu, Ndabibi and Oljorai.

3.7 Climate and hydrology

The study area is located in Nakuru County, which falls under Ecological Zone III and receives an annual rainfall estimated at between 700-760mm. It has a bimodal rainfall pattern. Short rains fall between October and December while long rains fall between March and May. Annual rainfall is strongly influenced by altitude that ranges from 1,530 to 2,820 meters above sea level. Temperatures range between 24 and 29 degrees centigrade. The highest temperatures are experienced in the month of December, January, and February while the lowest temperatures are experienced in June and July. The forest forms part of the catchment for lakes Naivasha and

Elementaita with several ground springs. It is the source of Ndabibi River and other small streams. It has several craters, and is still volcanically active as evidenced by many steam jets.

3.8 Human-wildlife conflicts and forest degradation

Human –wildlife conflicts and escalated forest degradation has been experienced over time. This has seen construction of an electric fence around the forest. The fencing project is an initiative of the Kenya Wildlife Service (KWS), Rhino Ark Charitable Trust (RA), the Kenya Forest Service (KFS), the forest adjacent communities, and other neighbouring stakeholders. The project aims at conserving the Eburu forest ecosystem as part of Mau Forests Complex, with an overall goal of protecting the forest against encroachment, degradation, and to reduce of human-wildlife conflicts (KWS *et al*, 2012).

3.9 Geothermal development

Geothermal energy presents a clean and more environmentally friendly alternative to traditional fuels (Teklemariam, 2012). The forest has very high potential for Geothermal Power Generation as supported by the geothermal resources map of the country. Hydro-geologist studies carried out by the Kenya Electricity Generating Company (KENGEN) have established huge potential in Eastern Eburu Forest Reserve for geothermal power generation. (KWS *et al*, 2012). This has led to an expansion of geothermal development by the Kenya Electricity Generating Company (KENGEN), which has drilled six wells in Eburu. Of the six wells drilled, only EW-01, EW-04 and EW-06 were productive, with an estimated capacity of 2.4 MWe, 1.0 MWe and 2.9 MWt respectively, while the rest of the wells could not discharge. The Eburru geothermal power plant, utilizing steam from well EW-01, has been generating 2.5 MWe since 2012 when the plant was commissioned. There are plans by KenGen to drill and develop the field further (Mutugi, 2014). Kenya Forest Service has licensed KENGEN to exploit this renewable energy: this is being spearheaded by the Government of Kenya under the Accelerated Development of Green Energy Initiative. KENGEN has leased an area of 437 hectares for its geothermal power production wells and operations site within the Eburu ecosystem (KWS *et al*, 2012).

CHAPTER FOUR

STUDY METHODOLOGY

4.1 Sampling

a) Sample size

Households were used as a basis for sampling. Data on households at location level was derived from the 2009 Kenya Population and Housing Census (KNBS, 2010). Within each location, households within a 5km from the forest boundary were estimated based on KFS ground patrol reports, i.e. Kiambogo 200 households; Eburu, 350 households; Ndabibi, 300 households, making a total of 850. Through proportionate sampling, 155 households (Kiambogo, 40; Eburu, 60; and Ndabibi 55) were selected particularly as relates collection of primary data through questionnaires, as indicated by Table 1.

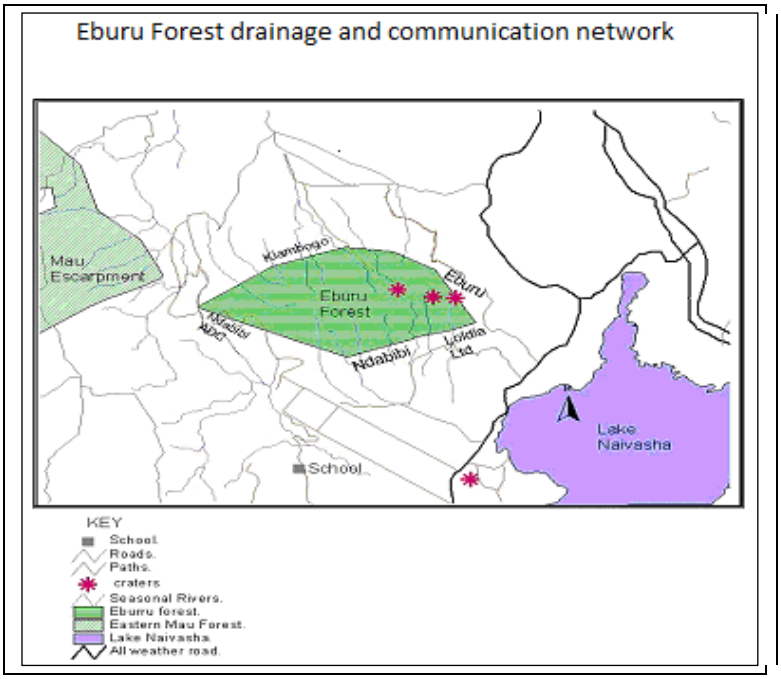
Table 1: Sample frame

Location	**Kiambogo**	**Eburu**	**Ndabibi**
Total population for entire location	13,931	7,161	8,398
Households	3,206	1,553	2,361
Total Area of location sq.km	134.3	245.9	2,361
Density	104	29	64
Estimated households within 5km distance from forest boundary	200	350	300
No. of households sampled	40	60	55

Source: KNBS, 2010

b) Sampling techniques

Multistage sampling was adopted, where purposive sampling was used to identify the sampling area, while random sampling was adopted in collecting data through administering questionnaires in the the three represenative sample areas. Following a reconnaisance survey the area was stratified based on land use and settlement schemes paying attention to large scale farms in the southern side that have low population (Ndabibi area), securely settled scheme towards north east (Eburu area) and densely populated squatter former ADC farms towards the north west (Kiambogo). Ndabibi, Eburu and Kiambogo were the selected sampling areas for the study. The selected sampling areas also constitute the three locations surrounding Eburu forest.



Source: KFWG *et al*, 2009

Figure 3: Eburu Forest Drainage and Communication Network Eburu

4.2 Data collection

4.2.1 Secondary data collection

Secondary data was obtained from libraries and the internet. The review focused on published as well as unpublished works entailing books, Journals, reports, policies and pieces of legislation. Issues that were reviewed included the status of forest management and governance, control of access to forest resources, level of community participation in key decision making processes environmental situation, information sharing, and nature and type of forest resource use. Other key elements explored were benefit sharing arrangements, regional and global forest conservation perspectives, existing conflict management structures, demographic characteristic, various management regimes of forest issues and maps of the area. Findings from desk review informed primary data collection.

4.2.1 Primary data collection

Raw data was obtained from the field through use of questionnaires, observations and guided discussions with key informants and during focused group discussions.

a) Questionnaire survey

A total of 155 structured questionnaires were administered within the stratified areas of Kiambogo, Ndabibi and Eburu. Out of the total, 59 respondents were male while 96 were female. Local enumerators familiar with the local language were engaged to assist in administering questionnaires. The enumerators were undertaken through a familiarization and training session on data collection, after which the questionnaire was pretested and refined. Questionnaire distribution was proportionate to the population of the stratified area (table 1). The survey distance from the forest boundary was determined based on local conditions such as roads, terrain, and settlement pattern that was maintained roughly within 5km from the forest boundary. Community members with good knowledge and experience on forest conservation and resource use conflicts in the area were identified during questionnaire administration.

b) Focused group discussions

After questionnaire survey and data analysis, FGD were organized using key respondents. Three Focus Group discussions were organized in Eburu (KFS Eburu office) Kiambogo center and Kongasis center. FGD held in Kiambogo targeted the CFA, while the FGD of Kongasis targeted pastoralists mostly from the Maasai Communities. The FGD held at Eburu KFS office targeted women, both CFA and none CFA members. The aim was to clarify and fill information gaps identified in the questionnaires.

c) Key informant interviews

The basis for identifying key actors for interview was based on both literature review as well as findings of field data collection. Actors identified were either those extensively mentioned, poses a wealth of information and experience on the subject, are key partners as relates to conservation of Eburu or have special interest and a good grasp of Eburu and the interplay of socio-economic and environmental aspects. Representatives of the following institutions were interviewed; KFS, Rhino Ark, ECOFA, NAPNET, Naivasha Professional Association, and Imarisha Naivasha.

4.3 Data analysis and presentation

Quantitative data obtained through questionnaires was checked, corrected, coded and entered into Statistical Package for Social Sciences (SPSS). Data analysis was done using both descriptive and inferential statistics and presented using Tables, charts and frequency distribution tables. The qualitative data obtained through key informant interviews and focus group discussions were analyzed along thematic areas.

4.4 Hypothesis testing

Chi-square test was applied in testing the null hypotheses. Feedback presented in the form of frequencies for three questions as per the respective null hypotheses was the basis of the Chi- square test.

CHAPTER FIVE

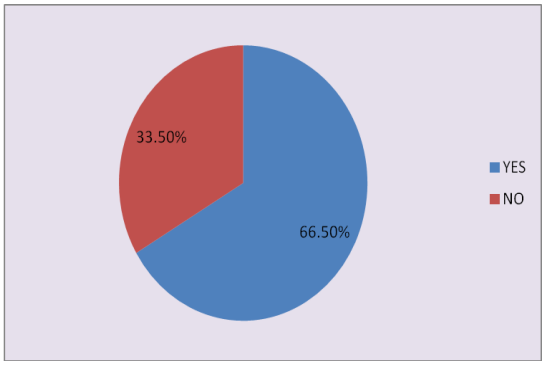
RESULTS AND DISCUSSION

This chapter explains findings from the field based on the objectives of the study and the hypotheses in the previous chapter. The results are based on the data collected between May to August 2014. Results presented here include; documentation of different types of forest related conflicts in Eburu forest, investigation of factors contributing to forest resource use conflicts and opportunities for conflict resolution in Eburu forest. Different approaches have been used to present the findings, which include use of charts, graphs, and tables for descriptive analysis.

5.1 Types and manifestation of forests resource use conflicts

5.1.1 Existence of forest resource use conflicts

Majority of respondents (66.5%) indicated existence of forest resource use conflicts in Eburu forest while 33.5% noted that they do not exist (figure 4).



Source: Researcher, 2015

Figure 4: Existence of forest resource use conflicts in Eburu

Viewed based on regions (table 2) proportionately more respondents noted existence of resource use conflicts in Eburu (48.8%) followed by Kiambogo (47.2%) and Ndabibi (44.0%).

Table 2: Existence of forest resource use conflicts

	Yes	No
Eburu	48.8%	48.5%
Ndabibi	44.0%	48.5%
Kiambogo	47.2%	43.1%

Source: Researcher, 2015

Findings are consistent with (Castro and Nielsen, 2004) that established that In forest management, conflicts can be occasioned by degradation or decline in forest resources and ensuing competition over the reduced amounts of forest products; from perceived scarcity through competitive use; and, and a failure to negotiate rules and regulations for sharing a resource which are acceptable to all stakeholders. Degradation of forest resources in Eburu has been witnessed over the recent past and the Forests Act 2005 has been contested for failing to adequately provide for benefit sharing mechanisms. (Matiru, 2004) argues that natural resources are important sources of livelihood security for communities, however the distribution of benefits from these resources is inequitable, where some communities that bear the greatest cost of current natural resources management practices reap the least benefits. This contributes to existence of resource use conflicts.

Hypothesis Testing

Ho: There are no resource use conflicts in Eburu forest

To enable testing of the null hypothesis, the study sampled one hundred and fifty five (155) Households adjacent to the forest and sought to establish if there are resource use conflicts among stakeholders in Eburu Forest. The data was analyzed using a *chi* square goodness of fit test.

Table 3: Chi Square Test (Are there any forest related conflicts among stakeholders in Eburu forest?)

	Observed N	Expected N	Residual
Yes	103	77.5	25.5
No	52	77.5	-25.5
Total	155		

Table 3.0 shows responses in frequencies to the question that sought to establish whether there are any forest related conflicts among stakeholders in Eburu forest.

Table 4: Inferential statistics

	Are there any forest related conflicts among stakeholders in Eburu forest?
Chi-Square	16.781[a]
df	1
Asymp. Sig.	.000

Source: Field data, 2014

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 77.5.

- Significance level (α) = 0.05
- p-value = 0.000
- Calculated *Chi* square statistic (X^2) = 16.781
- Degree of freedom (df) = 1
- ***X^2 (1) = 16.781, P< 0.05***

Table 4.0 shows that the calculated X^2 statistic, for degree of freedom of 1, is 16.781. It also indicates that the significance value (0.000) is less than the threshold value of 0.05, summarized as follows X^2 (1) = 16.781, $p \leq .05$

Table 5: Critical values of the Chi Square distribution

Percentage Points of the Chi-Square Distribution

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

Table 5.0 shows the critical values for chi-square distribution. The critical value at degree of freedom of 1 at significance level (α) of 0.05 is 3.84, in which case, the calculated statistic (X^2) of 16.781 is greater than chi-square critical value (3.84). The null hypothesis is rejected.

5.1.2 Stakeholders involved in forest resource use conflicts in Eburu forest

Table 6: Stakeholders involved in resource use conflict

Stakeholders	**Percent**
Community	47.0%
KFS	28.9%
KWS	13.9%
KenGen	2.0%
Rhino Ark	4.2%
No Response	4%

Source: Researcher, 2015.

As per table 6, the local community (47.0%) and KFS (28.9%) were identified as the main parties involved in forest resource use conflict. Other stakeholders noted to be involved include KWS (13.99%), Rhino Ark (4.2 %) and KenGen (2.0 %.)

From interviews with respondents, poor regulation of grazing is a key issue contributing to conflicts among the community due to competition for pasture inside the forest. KenGen was mentioned in relation to negative environmental impacts associated with geothermal power generation at the Eburu station. Rhino Ark was mentioned because of the Eburu Forest electric fence that has generated grievance owing to few access gates and perceived lack of community participation in selection of the location of access gates. Grazing and firewood collection are the main activities affected. Although the fence is a collaborative initiative respondents associate it more with Rhino Ark.

Findings are consistent with (Ongugo *et al,* 2008) that identified forest resource regulators and the community as the main stakeholders involved in conflicts over use of forests resources, in a study undertaken targeting 14 forests on the Effect of internal Human Conflicts on forest conservation and sustainable development in Kenya. Whereas the forest regulators (KFS, KWS and County councils) felt communities were the main causes of forest destruction, the communities felt the regulators were corrupt and denying them the right of access to forests.

5.1.3 Types of forest resource use conflicts

The study identified and described different types of conflicts based on actors involved in the respective conflicts.

a) Conflict between local community in Eburu and KenGen

Focus Group Discussion with representatives of women groups in Eburu indicated existence of a conflict between KenGen and the local community. The conflict revolves around KenGens geothermal power generation and perceived negative environmental impacts. KenGen has a power generation station at the forest edge within the forest but close to human settlements. The main issue of concern was noted as emission of hydrogen sulfide gas and deposition of silica on crops that were reported to contribute to respiratory diseases specifically to children below ten years and declining crop yields respectively. Another issue of concern the community raised as relates to KenGen was failure to honor its promise of providing job opportunities to the local community at Eburu. It was learnt that the community staged demonstrations as a way to express their grievances, which succeeded in bringing KenGen to a negotiation table, where a compensation arrangement was arrived at. The company also offered to commission studies to generate scientific evidence to provide a basis for arriving at a long-term remedial action.

Source: KFWG, 2013

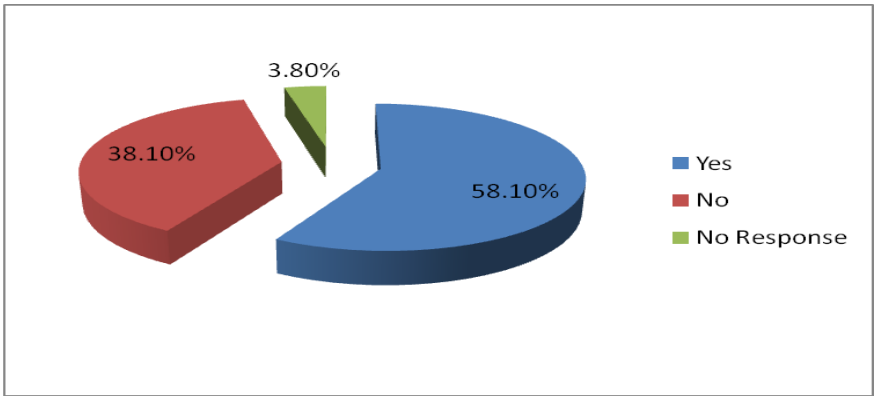
Plate 1: KenGen Geothermal Power plant at Eburu

Hydrogen sulfide is a colorless, flammable, extremely hazardous gas with a "rotten egg" smell. The primary route of exposure is inhalation and the gas is rapidly absorbed by the lungs. It occurs naturally in crude petroleum, natural gas, and hot springs. It is both an irritant and a chemical asphyxiate with effects on both oxygen utilization and the central nervous system. Low concentrations irritate the eyes, nose, throat and respiratory system. Asthmatics may experience breathing difficulties. Repeated or prolonged exposures may cause eye inflammation, headache, fatigue, irritability, insomnia, digestive disturbances and weight loss. Moderate concentrations can cause more severe eye and respiratory irritation (including coughing, difficulty breathing, and accumulation of fluid in the lungs), headache, dizziness, nausea, vomiting, staggering and excitability. (US Department of Labour, 2006)

b) Conflict Between the local community and Rhino Ark

The conflicts relates to erection of an electric fence around Eburu Forest. According the environmental impact assessment report, the fencing project is an initiative of the Kenya Wildlife Service (KWS), Rhino Ark Charitable Trust (RA), the Kenya Forest Service (KFS), the forest adjacent communities, and other neighboring stakeholders. Its overall goal is to protect the forest against encroachment, degradation, and to reduce human-wildlife conflicts. The fence was thus seen as a tool for enhancing forest conservation and restoration by controlling illegal human activities and overexploitation of forest resources.

According to the study, overall, respondents indicated that the fence was necessary for conservation of the forest. However, majority (58.10%) noted that they had concerns about the fence that required urgent attention (Figure 5).



Source: Researcher, 2015

Figure 5: Community perception on Eburu electric fence

Majority of those interviewed (38.7%) cited inadequacy of access gates as the main challenge (Table 7). Of the respondents, (38.1%) had issues with the fence restricting firewood collection while (14.8%) had specific issues with restricted access to authorized grazing. Pastoralists indicated they were not consulted as relates to location of access gates. Short-circuiting of the fence for illegal entry (4.5%) also emerged as an issue.

Table 7: Community members' issues about Eburu Forest electric fence

Issues	**Percentage**
Gates are not enough	38.7%
The fence is restricting firewood collection	38.1%
The fence is restricting grazing	14.8%
It is short-circuited by people for illegal entry	4.5%
No Response	3.9%

Source: Researcher, 2015

Contrary to the local community's negative feelings about the fence, findings of an Environmental, Social and Economic Assessment of the fencing of the Aberdare Conservation Area (KWS et al, 2011) undertaken five years after completion of the fence reported the following impacts; *reduction in human-wildlife conflicts, enhanced crop production and farm forestry, reduction of illegal activities, improved livelihoods and household incomes, appreciation of land values, Increased revenue to*

the government, improved security, improved water flow and increased forest cover. The assessment establishes the following challenges about the fence that are consistent with the findings of this study;

- Inadequate community involvement in decision making especially as relates to location of gates
- Inadequate number of gates that denies facilitation of managed access.
- Claims by the community of unfulfilled promises by fence implementers
- Illegal activities have persisted in spite of the presence of the fence, fence attendants, KFS and KWS staff. These include illegal logging of poles, bamboo, harvesting of medicinal products, cutting grass/fodder without permit and fence destruction.

c) Conflicts between KFS and the community over illegal activities

KFS Officers at Eburu Forest Station have a primary duty of enforcing the Forests Act 2005. From interviews and discussions with key informants, it was however felt that the Act is too restrictive and denies the community some customary rights on access to forest products. Forest adjacent community incur costs related to presence of the forest such as wildlife damages, yet the Forests Act 2005 does not provide for benefit sharing between the government and the community. It was felt that the user rights the Act provides are not regarded as benefits as they are traditional customary rights. It was indicated that the feeling of being disenfranchised has contributed to an escalation of illegal access to forest products. The view held by community members that some KFS officers at the station are corrupt and collude with illegal dealers seem to encourage illegal forest activities. It was established that the conflict led to shooting to death of a suspected charcoal dealer in Ndabibi.

A study on the effect of internal human conflicts on forest conservation and sustainable development in Kenya (Ongugo *et al, 2008)* identified legal claim of forest products, establishment and following of rules governing the use of forest, infractions, restrictions on quantity of forest products harvested and rights of forest

use as major sources of human-human-conflicts among forest users. This is consistent with the study findings that established that illegal forest access is a major issue as relates to forest resource use conflicts.

Forest trends, (2002) confirm that Interactions between indigenous peoples, governments and commercial forest interests have historically often been contentious. Starting in the sixteenth century governments around the world have overridden the traditional rights of native peoples and have given government forest agencies authority over vast tracts of natural forest and indigenous inhabitants. Adoption of a multiple–use approach, in a consultative environment, would win community support hence enhance forest conservation objectives.

d) Conflict between KFS and the community over firewood collection

Majority of respondents noted biomass energy (firewood and charcoal) as their main energy source as indicated by table 5. In Eburu, charcoal (40%) is the main source of energy followed by firewood (39%), while in Ndabibi and Kiambogo firewood is the main source of energy. In all areas electricity constitutes a relatively small portion as energy source. There was no mention of solar or biogas.

From interviews, firewood is collected from the forest at a fee through firewood permits. Charcoal is not among user rights granted to CFA members. It is thus illegally produced and accessed from the forest. It was indicated from an interview with the forester at Eburu Forest Station that some of the authorized fire wood collectors engage in unauthorized activities, which prompted him to suspend issuing permits. From interviews with CFA members, it was indicated that the community felt aggrieved as the forester's decision was not consultative, and no advance notice was given.

This is consistent with (Lewis,1996) who analyzed case studies on managing conflicts in protected areas and found out that in almost all of the case studies, the conflicts relate to: 1) a lack of attention to the process of involving local people and others who care about the protected area in the planning, management, and decision making for the area, and/or 2) people in nearby communities having needs (e.g., for grazing land, firewood, building materials, fodder, medicinal plants, and hunting) that conflict with the objectives of the protected area.

Table 8: Main energy source for cooking

Energy source	Eburu	Ndabibi	Kiambogo
Firewood	39%	40%	56%
Charcoal	40%	31%	29%
Electricity	21%	22%	15%

Source: Researcher, 2015

e) Conflicts among community members over forest resource use

Interviews with respondents indicated existence of numerous conflicts among the community over forest resources use. Among conflicting activities that have resulted to conflicts were noted as.

- Uprooting of seedlings planted in a section of the forest due to differences among two community groups
- Trampling and browsing of thousands of tree seedlings planted in rehabilitation areas by livestock
- Clash between pastoralists watering animals right at the source of the spring, and CFA members out to conserve and protect the spring (Ole Sirwa)
- Burning down of ecotourism *banda's* that were inside the forest due to differences among community members.

f) Conflicts between pastoralists and local farmers over water

Water from springs occurring inside the forest has been piped to watering/collection points outside the forest. Among the springs are Ole Sirwa and Morop.

Although most of the pipes were leaking out of old age, there is a perception that pastoralists break the pipes to access water for watering livestock within the forest. It is also alleged that pastoralists water their animals direct at the spring, which degrades the catchment and pollutes the water. These two activities were seen as main causes for diminished water downstream. It was reported that a conflict resulted out of this situation leading to loss of life at Morop in 2009 during dry season.

The findings point to competition for scarce water resources during dry season. This is consistent with Wood (1993) who establishes that shortages of natural resources lead to competition which may result in conflict. He further concludes that fighting and insecurity may prevent appropriate management of natural resources and reduce their production, thereby worsening shortages and intensifying competition and conflict. As individual and communities endeavor to secure their rights of access to natural resources, the ensuing competition borne out of the disproportion between supply and demand, leads to conflict over the resources. However, as observed by (De Koning et al, 2008) the study established that besides resources there are other, often intangible, interests tied up in a conflict, that in this case include the right of participation in forest management.

g) Conflicts between KFS and pastoralists over grazing

During Focus Group Discussions held in Kiambogo, Eburu and Kongasis the following grievances were raised as relates to grazing inside the forest

- Trees were planted in preferred grazing zones i.e. open areas at forest edges, forcing locals to drive animals deep inside the forest that exposes them to predation by wild animals. Long distances covered lower productivity of lactating cows (milk production goes down.

- The forester directly oversees grazing without working closely with the CFA/Grazing User Group. It was indicated that grazing permits are issued to any member of the community irrespective of CFA membership. This acts as a disincentive for joining the CFA. As per the Forest Act 2005, user rights including grazing are accorded to the community under the CFA structure. It was further noted from interviews that due to absence of a system to identify genuine animals for forest adjacent community large herds of cattle from far off areas (as far as Bisil and Gilgil) are brought in to graze inside the forest disguised as locally owned, that creates competition. Locals who pay the Ksh.120.00 monthly grazing fee lament that foreign herds have exhausted pasture due to overstocking.

- Cut and carry was prohibited without consultation, yet it suites farmers with zero grazing animals.

- Access gates are far much spread apart, at an average distance of 8km (3 hours walk) that is made worse by the rough and hilly terrain. Long distance made to and fro the forest makes grazing and firewood collection strenuous. Prohibiting use of donkeys to ferry firewood inside the forest makes the burden of ferrying firewood mostly by women tougher. Pastoralists also have grievance as relates to location of gates in relation to pasture and water. It was felt that grazing preferences, as relates to sources of good pasture and water was not factored in location of the gates. They cited Mukuru ya Nursery that has plenty of pasture and water but has no gate nearby. Grazing, and movement pattern, essential to the pastoralists was not considered.

- The grazing fee of Ksh.120 per month per animal is high for majority of community members.

- Pastoralists find the arrangement of making monthly payments of grazing fees to KFS tedious and time consuming given their nomadic way of life. They request for flexibility, to enable them pay at two or three months interval.

- A false promise was made to pastoralists during fence construction sensitization that once the fence would be established, sufficient access gates would be provided and grazing would be free of charge.

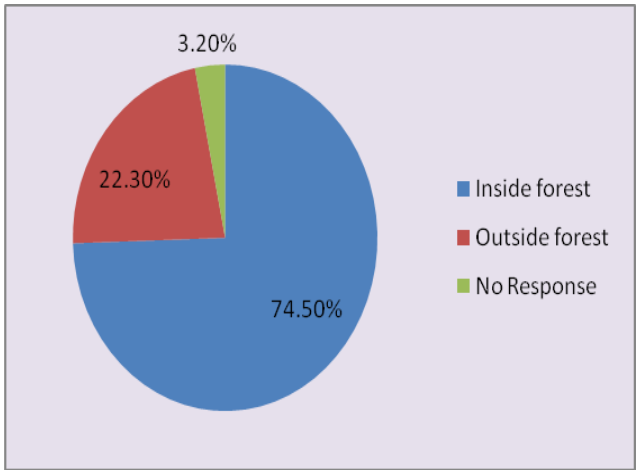
- There were complaints that casual laborers engaged in fence construction and maintenance are inclined towards only one ethnic community. Maasai community felt alienated.

Study findings are in agreement with (Lewis, 1996) whose study on managing conflicts in protected areas observes that protected areas appear to provide most benefits to the nation at large, or entire planet, but most such areas are a net cost to the people who live in and around them, either in terms of decreased access to resources, crop damage from wild animals, or the opportunity cost of using that habitat for another purpose. He further states that the issue of distribution of costs and benefits is a critical one in helping to resolve conflicts in protected areas.

Incompatible goals underlie the different types of resource use conflicts identified in this study that is consistent with (Barnes, 2005) conflict model. The main incompatibility is desire and push by the local community to retain the right to access and benefit from forest resources against the central governments protectionist approach of safeguarding forests through alienation of the community.

5.1.4 Location of activities that contribute to forest resources use conflicts, and whether there is a pattern

Majority of respondents (74.50%) indicated that activities that contribute to forest resource use conflicts occur inside the forest, while 20.60% noted that they occur outside the forest.



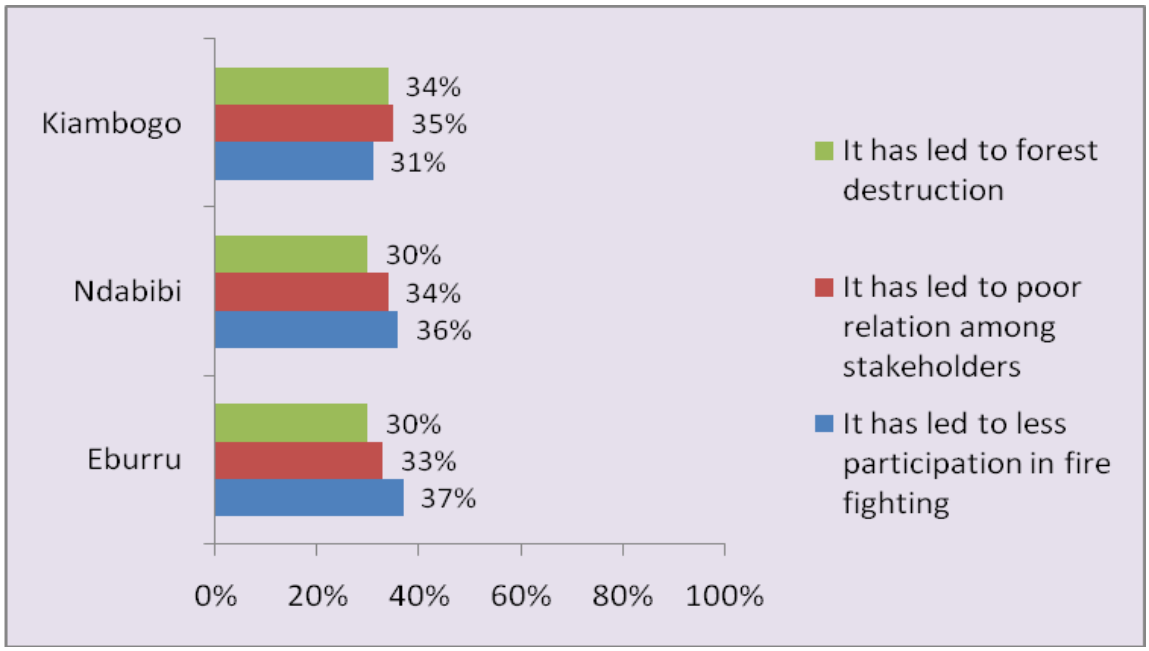
Source: Researcher, 2015

Figure 6: Location of activities that contribute to resource use conflicts

As to whether resource use conflicts have a pattern, interviews indicated that most conflicts are witnessed during dry season. This could be associated with competition arising from scarce pasture and water resources.

5.1.5 Ways in which conflicts affect forest management/manifestation

Figure 7a captures respondents views on how forest resource use conflicts have affected forest management



Source: Researcher, 2015

Figure 7a: Ways in which forest resource use conflicts affect forest management/manifestation

It reveals that resource use conflicts have influenced forest conservation differently across the three study sites. Three major ways in which forest resource use conflicts has negatively influenced forest management are; has led to forest destruction, has led to poor relationship among stakeholders, and has led to less participation in fire-fighting. The manifestations featured differently among the three data collection clusters.

Forest destruction and poor relations among stakeholders arising from forest resource use conflicts featured more in Kiambogo followed by Ndabibi and Eburu in that order. Less participation in firefighting arising from forest resource use conflicts featured more in Eburu (37%), followed by Ndabibi (36%) and Kiambogo (31%).

Findings are consistent with (Ochieng-Odhiambo, 2000) that illustrated that in a conflict over the use of natural resources, conflicting parties often end up contradicting, compromising or even defeating the interests of the other in pursuit of their own interest. Condoning or taking an active part in forest destruction or declining to participate in firefighting by some community members could be seen as an attempt to defeat the governments conservation pursuit due to the government's failure or reluctance to negotiate and address the communities grievances.

5.2 Factors that contribute to forest resource use conflicts

5.2.1 Forest policy and legislation

The study analyzed the Forest Policy of 1968, Kenya Forestry Master Plan of 1994 and the Forests Act 2005. The analysis was based on an understanding that policy and legislation are key governance instruments with immense capacity to cause or diffuse forest resource use conflicts.

a) Forest policy of 1968: A narrow and restrictive Forest Policy that has formally governed the forestry sector. The outdated Forest Policy has been contentious in the powers given to the Minister to de-gazette forest reserves without consultation. Community participation in the form of PFM was neither encouraged nor explicit. The Forest Policy also was restrictive in terms of new management approaches and strategies for partnership and expansion into new areas that acted as incentives for forest resource use conflicts.

The Kenya Forestry Master Plan (KFMP), produced in 1994, is still considered the most authoritative analysis of the forest sector and relevant blueprint for the sector today. At the time, it called for an institutional overhaul to manage forest resources more effectively but, due to political inertia and weak governance, issues identified in the plan were not adequately addressed. They remain pertinent today and are reflected in the draft Forest Policy (Sessional Paper 1, 2007) and the *Forests Act 2005*. It provides for an overarching framework for forestry development in the country for the 25-year period up to 2020. It recognizes the environmental role of forests including water values, biodiversity values, climate change values through carbon sequestration and other environmental services.

On-going policy review has however generated an advanced Draft forest policy (Forest Policy 2014), whose main features are:

- The mainstreaming of forest conservation and management into national land use systems.
- The clear division of responsibilities between public sector institutions: through the Ministry responsible for forestry to provide an oversight role in national forest policy formulation, and regulatory function of the sector, thereby allowing KFS to focus on the management of forests on public land, and the role of the County governments in implementing national and County forest programmes including the delivery of forest extension services to communities, farmers and private land owners.
- The devolution of community forest conservation and management, implementation of national forest policies and strategies to the County government and the deepening of community participation in forest through the strengthening of community forestry associations, and the introduction of benefit-sharing arrangements.
- The preparation of a national strategy to increase and maintain forest and tree cover to at least 10% of the total land area and for the rehabilitation and restoration of degraded forest ecosystems, and the establishment of a national forest resource monitoring system. A *State of the Forest* report will be published on a regular basis.
- The adoption of an ecosystem approach for the management of forests, and recognition of customary rights and user rights to support sustainable forest management and conservation
- The establishment of national programmes to support community forest management and afforestation/reforestation on community and private land.
- The preparation of national standards for forest management and utilization, and the development of codes of conduct for professional forestry associations.

b) The study analyzed the Forest Act 2005, and also subjected it to a discussion during key informant interviews. The following key issues were raised as key weaknesses of the Act seen to contribute to resource use conflicts in not only Eburu but other forest areas;

- No financing mechanism to support PFM implementation
    - ✓ The Law provides for establishment of CFAs but fails to create funding arrangements to facilitate their operations.
    - ✓ The law ties engagement of the community with KFS in co-forest management with existence of a participatory Forest Management Plan, whose financing it does not provide for.
- It fails to provide benefit-sharing mechanism among stakeholders. The community through CFA has responsibilities to support KFS in conserving forests yet there are no tangible benefits. User rights provided by the Act are traditional customary uses which the communities were entitled to since time immemorial.
- Fines and penalties are too lenient, thus does not provide strong deterrent against illegal activities.
- There is no clear separation of functions. Currently KFS serves as both regulator, and manager/implementer
- It has minimal incentives (fiscal among others) for private sector participation that would have increased investment in forestry, as promotion of forest-based investments is in itself a conflict management strategy.

Findings by the study that inadequacies of the Forest Act 2005 and policy are among factors contributing to forest resource use conflicts in Eburu are amplified by (Koziell, and Saunders, 2001), who calls for the need to integrate forest and biodiversity policy within the wider land use policy framework, with a focus on win-win options, adding that balance between biodiversity and livelihood objectives is usually best achieved at the landscape level. She also identifies the need for forest legislation to secure local rights and responsibilities, so that stakeholders can be both

effective stewards of biodiversity and meet their livelihood needs. Further, (Pimbert and Pretty, 1995) indicates that biodiversity protection measures, which are imposed, tend to fail in the end when poverty is not addressed, because they are undermined by both the livelihood demands and weak institutional capacities of poor groups, and concludes that the success of biodiversity conservation therefore depends on poverty alleviation. The findings of this study are in line with this conclusion specifically as relates to the identification of poverty- associated high dependency on forest resources for livelihood as among factors contributing to forest resource use conflicts.

5.2.2 Institutional structures

The study investigated the capacity of KFS at Eburu Forest Station, Mau Forest Conservation Committee, Forest Level Management Committee and Eburu Community Forest Association (ECOFA). As per the Forests Act 2005, Eburu forest is managed under Participatory Forest Management (PFM) arrangement, where KFS and the community through the CFA (ECOFA) are the main partners. The structures noted above have a role as relates management of forest resource use conflicts in Eburu.

a) KFS, Eburu forest station

The study sought to establish priority capacity gaps and challenges faced by Eburu Forest Station. From the respondents (n=155), the main challenges constraining effective management of Eburu Forest (table 6) are poor accessibility (26%), corruption (20%), lack of equipment (14%), poor relationship with the community (10%) and few staff (11%). Inadequate funds and training were also indicated to be of concern and require addressing.

The forest has infrastructural challenges. Accessibility inside the forest is poor. Housing for staff is another critical challenge. The forester and most rangers reside outside the forest. There is however a big improvement with establishment of three outposts (Ole sirwa, Fire tower, and Eburu main station. With regard to corruption, interviews with the community and other stakeholders indicated that some officers in collusion with dealers, engaged in illegal activities (trade in charcoal, posts and timber (table 15) to generate income.

Equipment and field logistics are essential for officers to effectively play their roles. Among equipment and facilities noted to be urgently needed include field vehicles, firearms, communication equipment and housing. By the time of data collection, the station had one vehicle, a big improvement in comparison to previous years where it had none. Staff housing was pointed out by interviewees as a critical challenge. Majority of officers reside in urban centers outside the forest (Eburu, Ndabibi and Kiambogo), roughly four kilometers away from the forest, that compromise rapid response in case of an emergency. The challenge of few staff was confirmed by the forester who indicated that essential duties such as forest patrol, manning of access gates and other enforcement functions were constrained. The forest had a total of eleven forest rangers at the time of data collection. With a total size of 8,715ha, divided in 5 beats/management units, the forest requires approximately twenty seven forest rangers (five per beat and two for undertaking administrative duties). The study established that all the forest rangers and the forester were yet to undergo PFM training.

Table 9: KFS capacity Gaps at Eburu forest station

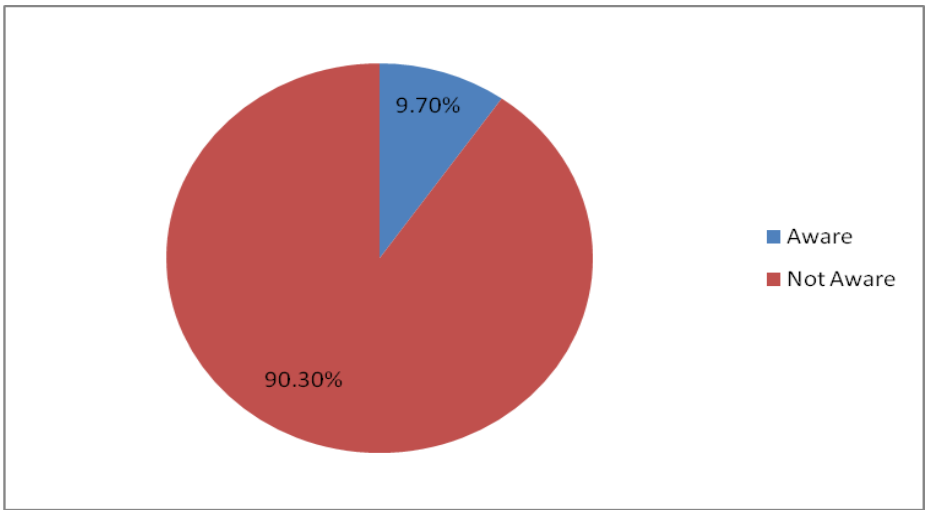
Capacity gaps	**Percentage**
Poor access roads	26%
Corruption	20%
Lack of equipment(vehicles, guns, houses, radio calls)	14%
Few staff	11%
Poor relationship with community	10%
Training	8%
Inadequate funds	8%
No response	3%

Source: Researcher, 2015

b) Mau Forest Conservation Committee

The study evaluated the performance and effectiveness of the Mau FCC in view of its functions and contribution in relation to forest resource use conflicts in Eburu. Most of the community members interviewed (90.3%) did not know what Mau FCC was (fig 7b). Only 9.7% of those interviewed were familiar with its functions. None of the

community members interviewed was aware of the four community representatives, selected from among CFAs in Mau conservancy to represent community interests at FCC.



Source: Researcher, 2015

Figure 7b: Awareness of Forest Conservation Committee.

c) Forest Level Management Committee (FLMC)

In keeping with the spirit of decentralization, the Forests Act 2005 provides for governance structures at national and forest level for enhanced decision making. At the forest station level, The Forests (Participation in sustainable forest Management) Rules, 2009 (clause 46) provides for establishment of Forest Level Management Committee, whose objective is to assist the forest association (CFA) in the implementation of community forest management agreement. The study established that the agreement referred to here is a legally binding instrument aimed at governing KFS and the community in implementing Participatory Forest Management Plan (PFMP). Clause 35 (1) of the Forests Act 2005 requires that every state forest, local authority forest and provisional forest shall be managed in accordance with a management plan that complies with the requirements prescribed by rules made under it. As per the rules stated above, membership of FLMC consists of representatives

from the service, representatives from the forest association; and other stakeholders in the area.

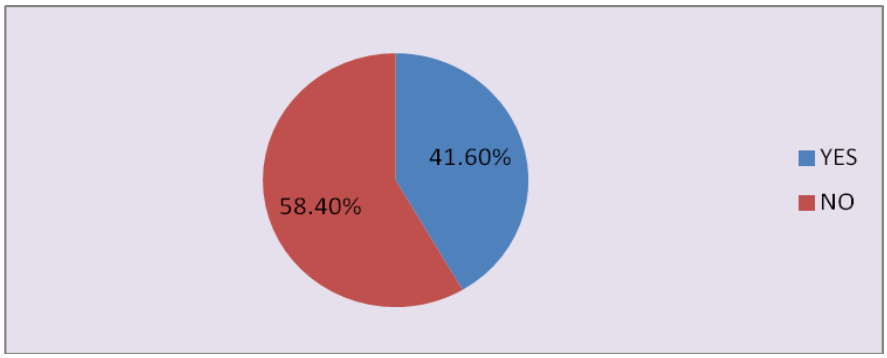
The study established that this critical PFM organ (FLMC) was not in place.

d) Eburu Community Forest Association

The study assessed the status of the CFA based on the understanding that given its central role in co-management of the forest with KFS, its capacity or the lack of it would contribute to forest resource use conflicts.

Membership

As indicated by Fig.8 majority of respondents (58.40%) were non-CFA members, while only 41.60% were members (n=155).

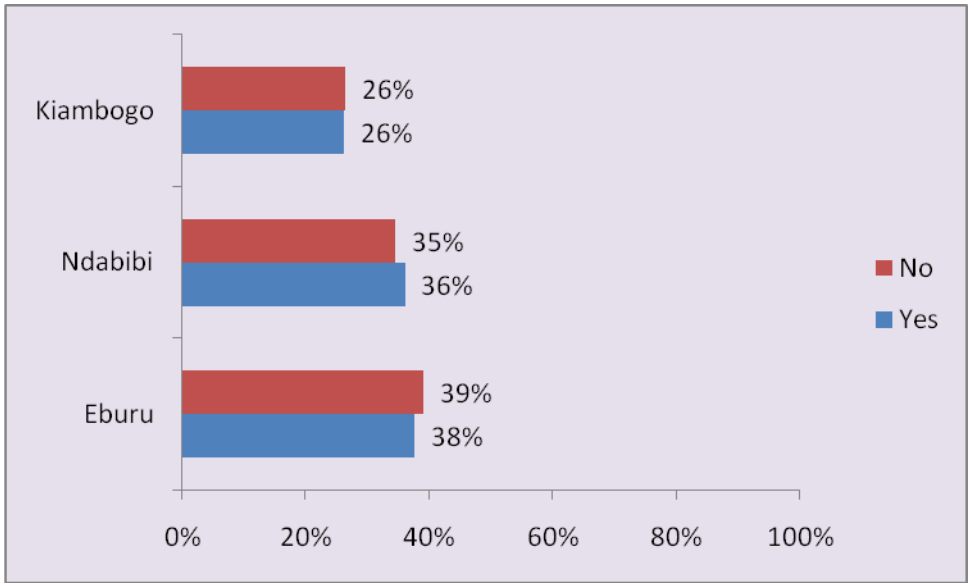


Source: Researcher, 2015

Figure 8: Eburu CFA membership

Viewed as per regions (fig 9), Ndabibi had a majority of those interviewed being CFA members (36%). Of respondents interviewed in Kiambogo, the members and non-CFA members were of equal proportion. Majority of respondents in Eburu (39%) were non- CFA members. However Eburu region had proportionately more of respondents being CFA members.

Presence of the Forester's office in Eburu and occurrence of more CFA activities in Eburu could explain the proportionately more CFA membership in Eburu. It is through the CFA that the community is sensitized on conservation values.



Source: Researcher, 2015

Figure 9: Membership of Eburu CFA as per region

From the findings (Fig 9) only about half of the respondents in the study sites were members of ECOFA. As per the Forests Act 2005 however, CFA is the official community structure through which KFS engages with to conserve forests under PFM arrangement and grants user rights for regulated access to forest products and services. From the findings, it is implied that the 50% of the community who are non-CFA members either do not benefit from the user rights or they do it illegally. From interviews with the community and forester, the study established that access to forest products and services is open to both CFA and non-CFA members provided that the required fee is paid.

Varied reasons were given by respondents for not joining ECOFA (Table 7). Majority of the respondents indicated Lack of awareness (24.8%), 'Not interested' (16.2%), and Not aware of its benefits (14.5%) as main reasons for not joining ECOFA.

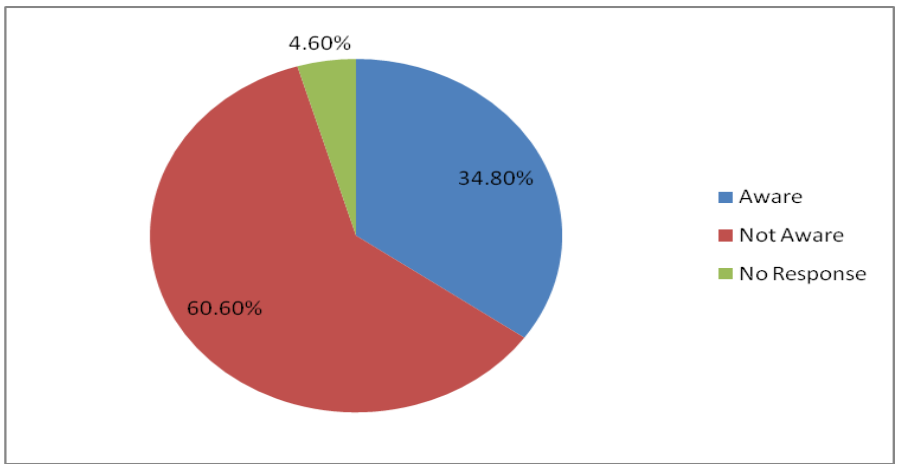
Table 10: Reason for not joining CFA

Reason	Percentage
Poor health	3.9
Lack of awareness of need to join	24.8
Lack of time	4.5
Not interested	16.2
Only the educated were allowed to join	9.0
Not aware of its benefits	14.5
I was not given a chance	12.7
Am a forest ranger	4.5
No Response	9.9

Source: Researcher, 2015

CFA Governance and management

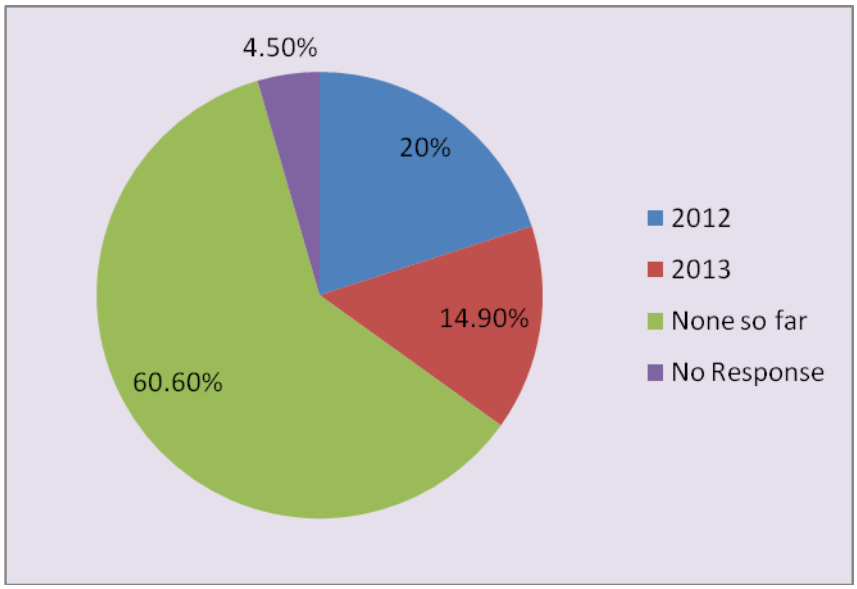
Interviews revealed that among key challenges affecting performance of ECOFA included lack of a common vision and shared understanding among members of its functions. As per the findings, majority (60.60%) of community members were not aware of existence of a constitution governing ECOFA. 34.80% of respondents confirmed awareness of its existence, (fig 10). Interviews with the CFA members and other stakeholders indicated CFA meetings were ad hoc.



Source: Researcher, 2015

Figure 10: CFA governance, awareness of existence of constitution

From findings, only 20% of respondents had correct information when office bearers were elected to office. Interviews with CFA officials and the forester revealed that elections were held in December 2012. It was also established that despite the CFA having 26 user groups of about 25 members each, there were no by-laws to guide and govern members operations. The study found out that forest zonation, where specific sections of the forest are delineated (clearly mapped out and marked) and designated for respective management purposes had not been adequately done. Interviewees indicated that this has contributed to clashes among users with conflicting interests.

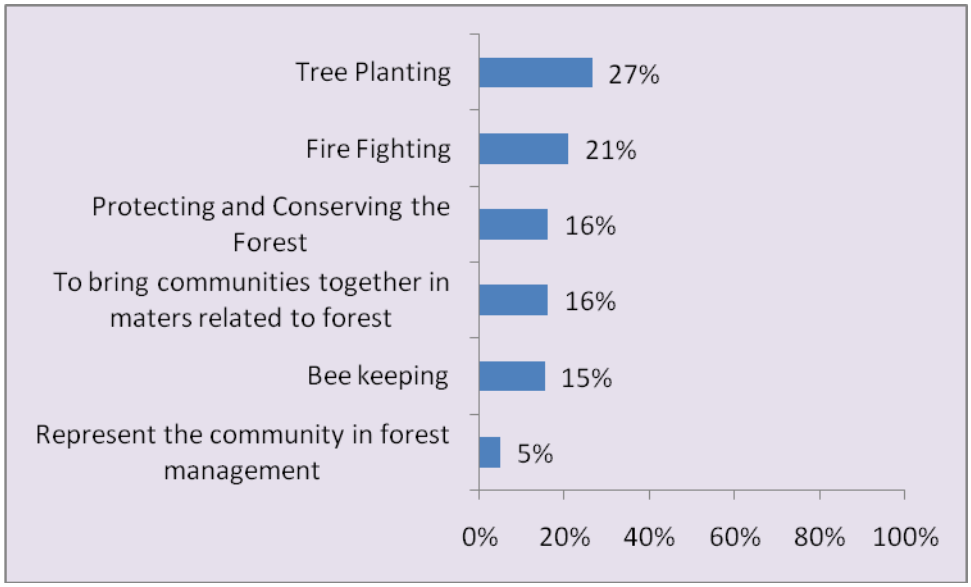


Source: Researcher, 2015.

Figure 11: Community members' familiarity with CFA elections

The community's familiarity with CFA's role

The study investigated the community's awareness of the role of ECOFA. Findings (fig 12) indicated that tree planting (27%) and fire-fighting (21%) are what the community viewed as the main role of ECOFA. Bringing the community together in matters related to forest conservation (16%) and representing the community in forest management (5%) were viewed as the least roles.

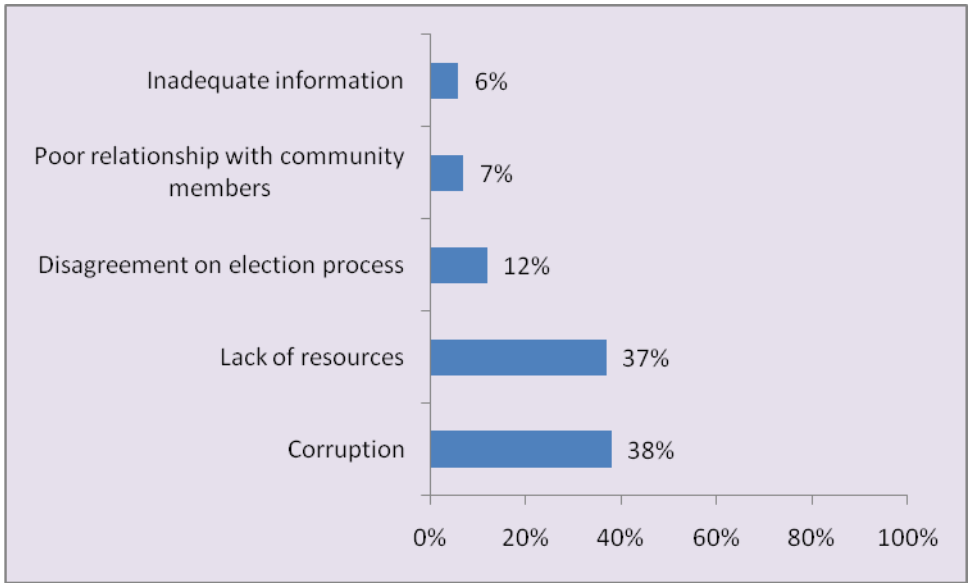


Source: Researcher, 2015

Figure 12: Role of Eburu Community Forest Association (ECOFA)

CFA areas of weakness

In recognition of the fact that CFA is among the critical PFM structures, the study looked at reasons that make ECOFA less effective in playing its role thus contributing to forest resource use conflicts. Corruption (38%) (Figure 13) followed by lack of resources (37%) were noted as main reasons. Other reasons given were disagreements on election process (12%), poor relationship with the community (7%), and inadequate information (6%). As relates to corruption, the study found out from interviews that some ECOFA members engage in unlawful activities after gaining authorized entry to undertake conservation related work. It emerged from interviews with the forester that firewood collection was suspended as some community members were using it as a front to engage in illegal activities.

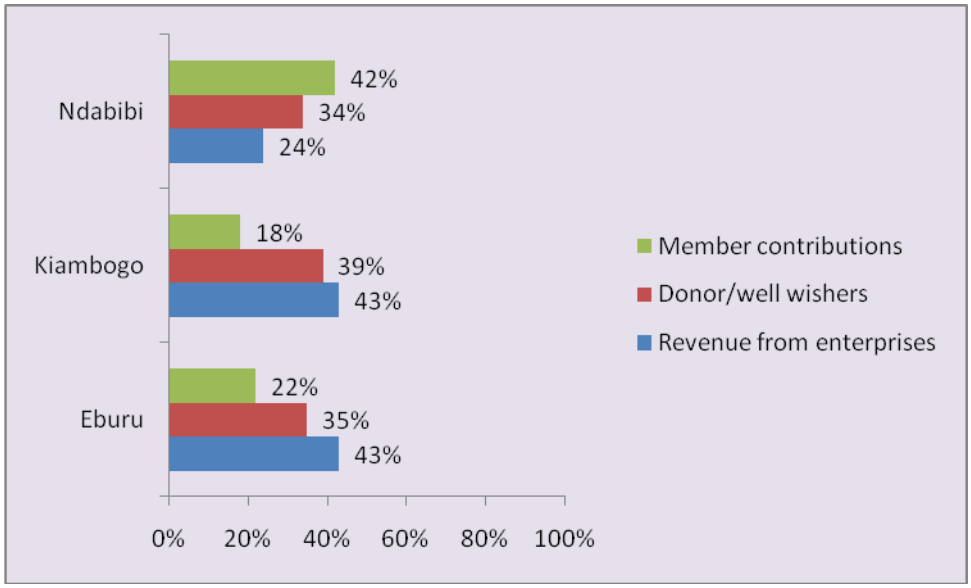


Source: Researcher, 2015.

Figure 13: Perceived ECOFAs weaknesses

Source of funds for CFA

Donors/well-wishers, member's contributions and revenue from enterprises constitute the main CFA income streams (fig 14).



Source: Researcher, 2015.

Figure 14: ECOFAs main sources of income

Member contribution (42%) was viewed as the largest revenue stream in Ndabibi followed by Eburu (22%). Revenue from enterprises was viewed to constitute a higher contribution (43%) of revenue to the CFA in Eburu and Kiambogo. Income from donors and well-wishers was ranked second in the three regions.

5.2.3 Grievance and unmet expectations by ECOFA members

Table 11: Reasons for joining ECOFA

Reason	**Valid Percent**
Forest rehabilitation through tree planting	10.5
To get forest products for income purposes	19.7
To be part of conservation team	20.7
To protect Eburu forest	5.2
To be allowed to keep beehives in the forest	5.2
No response	5.2
To gain access and benefit from the forest	33.5
Total	**100**

Source: Researcher, 2015

The study examined the main reasons why the community members joined ECOFA. Table 11 indicates that to gain access and benefit from the forest (33.5%), be part of conservation team (20.7%), and get forest products for income (19.7%) were the main reasons. Interviews with ECOFA members revealed that they are dissatisfied with the benefits that accrue to them from participation in PFM. Besides the benefits being negligible, they are equally available to non-CFA members.

Grazing was raised as a key grievance (others are as detailed under 5.1.3). Pastoralists regard as too high a grazing fee of Ksh.120.00 a month per animal. Most pastoralists who are unable to raise this amount graze illegally, with cases of vandalism of the electric fence that is under construction having been reported in Oldonyo puru. Interviewees from the pastoral community noted cases of corruption where pastoralists from far off areas (as far as Bisil and Gilgil) collude with forest adjacent community members and drive large herds of animals for grazing inside the forest

disguised as local animals. The study established that locals are paid a fee for hosting the large herds. This was identified as a major source of conflict among pastoralists in the area, as large foreign herds compete for scarce pasture resources with local herds. Due to this, local pastoralists lament about meager pasture even after paying the required monthly grazing fee.

Interviews with pastoralists showed they had concerns with the Eburu Forest electric fence. Access gates are considered few and far apart, and the decision on where to locate them was not consultative thus interferes with long established grazing pattern and access to water. The entire length of the forest boundary has seven (7) gates. It is by design that access gates are few (Rhino Ark, 2012). KFS, Eburu forest station lacks adequate staff/Forest Rangers to man the gates. Only five gates (Eburu, Morop, Ole sirwa, Kahuho and Fire tower) were operational at the time of data collection.

5.2.4 Conflicting stakeholder interests and incompatible uses

a) Conflicting stakeholder interests

The Forests Act 2005 provides checks and balances in the form of user rights to CFAs to enhance sustainable forest use and minimize conflicts. Charcoal, timber, and poles for construction are not part of user rights accorded to CFAs in an indigenous forest such as Eburu. The study established however that these products are sourced from the forest. As indicated by table 12, where 10% of respondents indicated that charcoal is among forest products sourced from Eburu, as well as timber (5%) and poles (3%). Existence of these activities despite being illegal points to value dealers in these products attach to the forest that constitutes a conflicting interest.

Table 12: Forest Products Sourced from Eburu forest

Product	**Frequency**	**Percentage**
Honey	37	8%
Firewood	64	14%
Charcoal	48	10%
Herbal medicine	30	7%
Seedlings/Wildlings	47	10%
Grass	23	5%
Timber	23	5%
Poles	15	3%

Source: Researcher, 2015

b) Incompatible Uses

Table 13 captures respondent's views as per regions on existence of forest activities that are not compatible with each other/conflicting.

Table 13: Existence of incompatible uses

Area	Yes	No	No response	Total
Eburu	33	25	2	60
Ndabibi	29	22	4	55
Kiambogo	20	18	2	40
Total	82	65	8	155

Source: Researcher, 2015

Incompatible activities identified in Eburu forest were:

- Honey production and charcoal burning
- Geothermal power generation and human settlement
- Beekeeping and grazing
- Fencing and grazing/firewood collection
- Ecotourism and charcoal production
- Beekeeping and harvesting of posts
- Reforestation and grazing

Fencing was listed among incompatible activities as relates to grazing and firewood collection probably due to perceived few access gates, lack of consensus on where to locate them and few forest rangers. Inadequate forest rangers render some gates unusable as only manned gates are authorized for use.

5.2.5 Participation in decision-making and implementation of forest conservation

Under PFM arrangement, community participation in forest management is structured with Participatory Forest Management Plan (PFMP) and Forest Management Agreement (FMA) as main instruments of participation. The study found out that the two documents exist, although the implementation period for Eburu PFMP had expired (2009-2013). The two are principle documents guiding engagement of the community (together with other stakeholders) with KFS in co-management of the forest. Whereas the PFMP clearly identifies roles of respective actors and an action plan to guide participatory engagement, it was found out that majority of activities and programs detailed in the plan were yet to be implemented. Majority of respondents (89.70%) indicated that they are involved in the management of Eburu forest while 10.30% indicated that they were not involved (fig 15). Further, 71% of respondents noted that they were aware of the PFMP while 29% were unaware of it (fig 16). Of concern however is that involvement in conservation activities such as fire-fighting and tree planting does not serve the need of effective participation in decision-making.

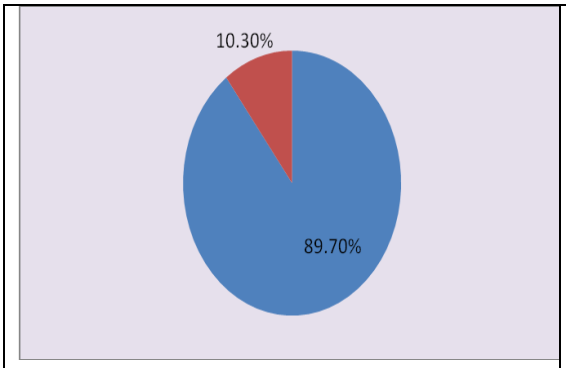


Figure 15: Community involvement in management of Eburu Forest.

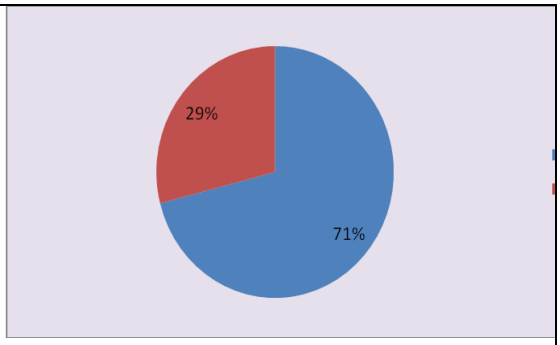


Figure 16: Community Awareness of Eburu Forest PFMP.

Source: Researcher, 2015

Focus group discussions and interviews with key informant persons indicated that community engagement was at the lower level of involvement as relates to contributing to field activities. Meaningful participation in decision-making process was lacking. This perhaps explains why tree planting, fire-fighting and beekeeping where ranked highly by majority of the community as relates to what they perceived as CFA role (fig. 12). The following cases were noted that indicate inadequate community involvement in decision-making:

- Firewood collection, the forester unilaterally suspended issuance of firewood collection permits without consulting with the community to come up with a mutually agreed upon solution.

- CFA feels alienated from decisions to regulate grazing as they are not consulted by the forest yet grazer's user group exists. The user group (part of ECOFA) recommends that guidelines should be put in place to regulate access to pasture as a conflict management strategy. The group was of the view that KFS should work with the user group in issuing monthly grazing permits. The arrangement during the time of study was that KFS officers at the station issued grazing permit equally to CFA and non-CFA members. It was discovered that the arrangement discouraged members from joining the CFA, and fuelled conflicts among pastoralists.

- Imposition of bans (grazing and firewood collection) by KFS in 2013 without consulting the community

- Granting of KenGen a license to set up a geothermal power generation station inside the forest but close to a community settlement in Eburu without due regard to socio-economic, human health and safety concerns of the community. The power station was noted to be a source of conflict between KenGen and Eburu Community, with demonstrations having been witnessed in 2014.

With the understanding that PFMP was instrumental for guiding and enhancing community participation, the study sought to find out reasons as to why it had not been implemented. Poor Management, lack of funds and inadequate sensitization (Table 14) were given as main reasons constraining PFMP implementation.

Table 14: Main challenges hindering implementation of Eburu PFMP

Region	Poor management	Lack of funds	Inadequate sensitization
Eburu	40%	40%	20%
Ndabibi	33%	27%	39%
Kiambogo	39%	29%	32%

Source: Researcher, 2015

5.2.6 Benefit sharing

A review of the Forests Act 2005 (clause 47, 2) revealed that it grants the community a range of user rights that could be accessed by being a member of a CFA. The user rights are:

- Collection of medicinal herbs;
- Harvesting of honey;
- Harvesting of timber or fuel wood;
- Grass harvesting and grazing;
- Collection of forest produce for community based industries;
- Ecotourism and recreational activities;
- Scientific and education activities;
- Plantation establishment through non-resident cultivation;
- Contracts to assist in carrying out specified silvicultural operations;
- Development of community wood and non-wood forest based industries; and
- Other benefits which may from time to time be agreed upon between an association and the Service:

A Forest Management Agreement, through a negotiation process between KFS and a CFA, is the legally binding tool that accords to a CFA the specific user rights out of the range of possible user rights listed in the Forest Act 2005.

From interviews, it was indicated that the accorded user rights are too limiting, and constitute traditional customary rights the community has been enjoying since time immemorial. It was noted that the Act should be revised and a proper benefit sharing mechanism incorporated, that would balance conservation needs and livelihood interests of the local community. Table 12 indicates products accessed from the forest. Majority of the products sourced (timber, charcoal, pole) are incidentally not among the user rights accorded to the CFA. They are illegally accessed. This could be a pointer to conflicting interests. However, it could also reflect the quality of law enforcement. Strong enforcement may provide an incentive for violators to enter into discussions about how to resolve a conflict. Without strong enforcement, there may be little reason for violators to consider any alternatives to illegal behavior that is contributing to a conflict.

Table 15: Forest products accessed from the forest.

Forest Product	**Frequency**
Charcoal	52
Firewood	79
Timber	37
Honey	29
Herbal medicine	21
Poles	15
Grass	38
Tree seedlings	15

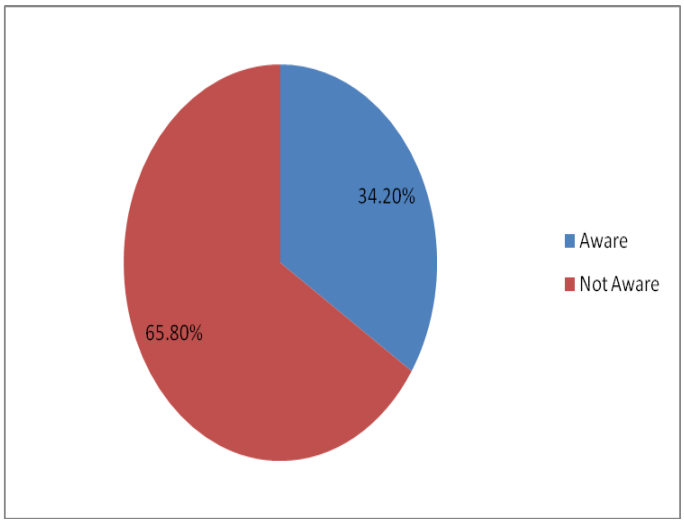
Source: Researcher, 2015

From Kenya's experience a number of PFM sites are yet to realize the anticipated benefits, hinting to existence of challenges. An assessment of CFM in Uganda also notes that the actual benefits accruing to local communities under the CFM agreement are largely unknown. Little is also known regarding the impact of CFM on the livelihoods of people. According to Scherl *et al*, (2004), an understanding of CFM actual benefits on the peoples' livelihoods around Protected Areas (PAs) is critical in sustainable forest management. Information is also lacking to show whether CFM has improved the condition of the forest by way of controlled illegal forest access, yet this

information is essential for strengthening both the CFM policy development and implementation in Uganda. Due to ingrained power structures within both government institutions and communities, it is not easy to promote social justice and sustainable livelihoods through CFM. Overall, mechanisms of CFM are diversifying, reflecting a greater recognition of the need for partnerships in forest management (Turyahabwe *et al*, 2012).

5.2.7 Awareness of, and compliance with the Forest Act 2005 and procedures for accessing forest products and services

Under PFM setup, forest management is founded on partnership, with stakeholder's participation being a key ingredient for sustainability. Based on this understanding, the study assessed awareness level as relates to the Forest Act 2005 and procedures for accessing forest products and services. Majority of respondents (65.80%) were unaware of the Forest Act 2005, while 34.20% were aware of it (Fig 17). This could explain high cases of illegal activities and low enrollment with, and participation in CFA activities.



Source: Researcher, 2015

Figure 17: Community awareness of the Forests Act 2005

Of the respondents aware about the Forests Act 2005, majority (65.8%) were not clear what specific element of the Forest Act they were familiar with, with 19.4 %

indicating that they were familiar with the aspect of community participation, while 14.8% were conversant with issues relating to rules and fines.

Table 16: Element of the Forest Act 2005 the community is familiar with

Element of the Act	Percentage
Rules and fines	21.1
Community involvement in forest management	56.1
Implementation of PFM	18
No Response	4.8
Total	100

Source: Researcher, 2015

Majority (56.10%) of the respondents familiar with the Forests Act 2005 indicated that they were aware of community involvement, Rules and fines (21.1%) and PFM implementation (18%) (Table 16). As to whether they were aware of forest products that require a permit before accessing, majority (81.30%) indicated yes, while 18.70% indicated that they were not aware. The study further found out that as to the details of accessing a permit for use of a forest product, majority (75.5%) were aware that one had to pay for it at the forest station. 24.5% of respondents were not aware of the process (Table 17).

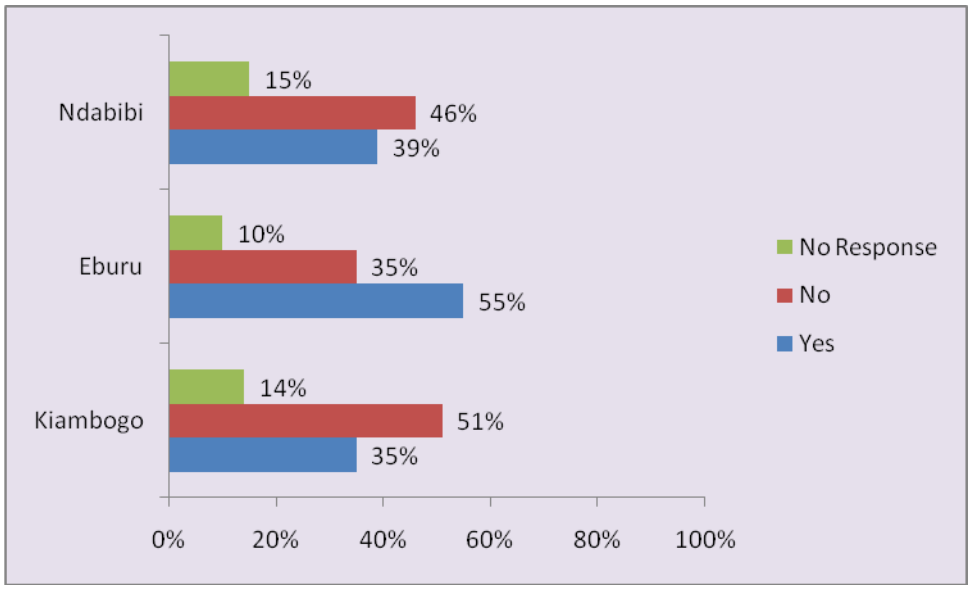
Table 17: Awareness of the procedure of acquiring a permit

Procedure	Frequency	Percentage
One must pay at forest office to get permit	117	75.5%
Don't know	38	24.5%
Total	155	100.0%

Source: Researcher, 2015

A finer scrutiny based on the three data collection areas as relates forest products that require permits (Fig 18) indicated Eburu had the highest level of awareness (40%), followed by Ndabibi (36%), and Kiambogo (31%). Proximity of the forester's office seems to have influenced the level of awareness. The forester's office is based in Eburu, which could make interaction with the community easier. Kiambogo is the

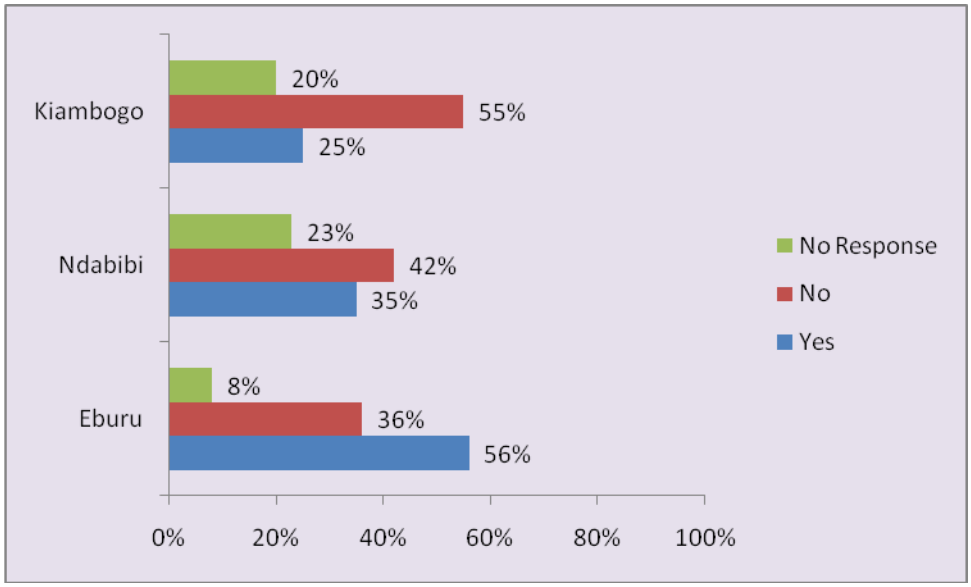
furthest, and accessibility issues due to terrain and field logistics could have contributed to limited awareness. The fact that ECOFA Chairman resides in Kiambogo seem not to have helped in awareness creation.



Source: Researcher, 2015

Figure 18: Awareness on forest products and services that require a permit before accessing

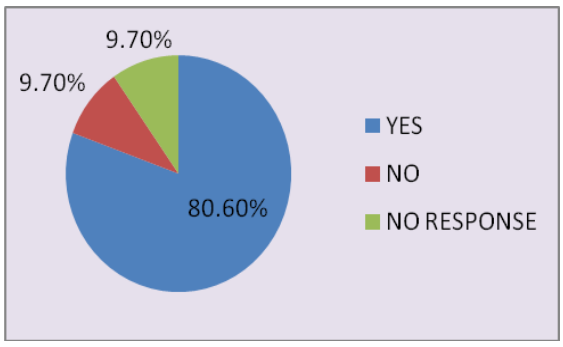
Figure 19 captured respondent's views as to whether or not they comply with procedures of accessing forest products and services. From the findings, Eburu had the highest (56%) number of respondents who indicated they comply with procedures, followed by Ndabibi (35%), and Kiambogo (25%). A significant number of respondents opted not to respond probably fearing that there would be follow-up by KFS. Kiambogo and Ndabibi are the main areas where majority of respondents failed to respond as relates to compliance with requirements and procedures of the Forests Act 2005. These were areas also that registered relatively high resource use conflicts and fewer CFA memberships.



Source: Researcher, 2015

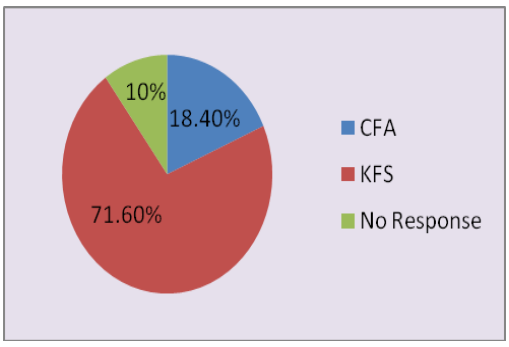
Figure 19: Compliance with the procedure of acquiring forest permits

Majority (80.60%) of respondents indicated that access to forest products is regulated, 9.70% were of the opinion that it is not regulated, while 9.70% were not sure (Fig 20). As to who regulates access, an overwhelming majority indicated KFS (71.60%), while 18.40.% noted CFA leaders, while 10% was a no response (Figure. 21).



Source: Researcher 2015

Figure 20: Whether access to forest products is regulated



Source: Researcher 2015

Figure 21: Who regulates access to forest products

5.2.8 Information and communication among stakeholders

Incomplete or Contradictory Information is known to be a major factor contributing to forest resource use conflicts. From interviews, missing or contradictory information was seen to apply to the conflict between KenGen and the local community at Eburu, where geothermal power generation was perceived by locals to contribute to respiratory diseases and declining farm yields. The study learnt that KenGen had plans to commission a study to generate scientific information on the issue.

The study also explored communication channels used to pass information, frequency of meetings, and whether joint planning was undertaken. From findings (Table 18) the bulk of communication is through meetings (30%) followed by word of mouth/verbal communication via messenger (28%), emails (10%), and letters (10). Other channels noted but of less preference include notice board (8%), mobile phone (5%), face book (5%) and twitter (5 %).

Table 18: Communication Channels used by KFS at Eburu

Channel of Communication	Frequency	Percentage
Meetings	46	30%
Notice boards	11	7%
Emails	16	10%
Letters	16	10%
Face book	8	5%
Word of Mouth	42	28%
Mobile phone	8	5%
Twitter	8	5%

Source: Researcher, 2015

There was no structured schedule for meetings to address forest resources conflicts. However, it was indicated from interviews with CFA members that they are held on need basis. It was learnt from key informant interviews that the frequency of meetings specifically among ECOFA members and between KFS and ECOFA was at its lowest level due to inadequate funds and weak leadership. Table 19 indicates the main

stakeholders who convened meetings on resource use conflicts; with the forester (32.2%) being the main convener followed by the community 23.9%, and ECOFA Chairman (20.6%). Other conveners noted were the Chief (16.8 %), and KenGen (6.5%). Outstandingly missing on the list are NGOs, and devolved units of governance such as Naivasha Sub-County Government. Effective participation by such external actors is essential as many of the factors that give rise to and affect the management and resolution of protected area conflicts are located outside protected area boundaries and are largely beyond the control of protected area staff.

Table 19: Stakeholders that convene meetings on conflicts over Eburu forest

Stakeholder	Frequency	Percentage
Chief	26	16.8%
KenGen	10	6.5%
Community	37	23.9%
CFA chairman	32	20.6%
Forester	50	32.2%
Total	155	100%

Source: Researcher, 2015

5.2.9 Land tenure

Interviews with key informants revealed that the status of land tenure had implications on the level of dependence and interaction with the forest. Secure land tenure, where owners have unlimited right to use and dispose of land in perpetuity subject to the rights of others and the regulatory powers of the national government, county government and other relevant state organs, provides security for long-term investments on land. Improved investments in land management contribute to enhanced productivity that generates alternatives as relates to timber and non-timber forest products. Eburu and parts of Ndabibi falls under this category. Dependence on the forests as well as cases of forest resource use conflicts are less. On the other hand insecure land tenure, where land occupants are semi-squatters, de-motivates long-term investments on land, where activities like farm forestry and soil conservation are not prioritized. Most parts of Kiambogo fall under this category. There is high

dependence on the forest for timber and non-timber forest products with high cases of forest resource use conflicts being witnessed.

5.2.10 Discussion on factors contributing to forest resource use conflicts

The study identified lack of equitable benefit sharing and inadequate stakeholder participation in decisions over the management of Eburu Forest as a key factor contributing to forest resource use conflicts. This is consistent with Lewis, (1996) who analyzed case studies on managing conflicts in protected areas and found out that in almost all of the case studies, the conflicts relate to: 1) a lack of attention to the process of involving local people and others who care about the protected area in the planning, management, and decision making for the area, and/or 2) people in nearby communities having needs (e.g., for grazing land, firewood, building materials, fodder, medicinal plants, and hunting) that conflict with the objectives of the protected area. He further notes that many protected areas appear to provide most benefits to the nation at large, which is why they are called "national parks" or "national nature reserves", or even for the entire planet, which is why some areas are given World Heritage status. Many such protected areas are a net cost to the people who live in and around them, either in terms of decreased access to resources, crop damage from wild animals, or the opportunity cost of using that habitat for another purpose. Thus the issue of distribution of costs and benefits is a critical one in helping to resolve conflicts in protected areas. In support of this, (Koziell, and Saunders, 2001) argues that the fences and fines approach, denying access to forest resources and any constructive engagement with the existing local economy, often results in discontinuation of traditional forest resource based livelihoods that fuels forest resource use conflicts.

Factors related to forest governance identified by the study are consistent with Awimbo *et al,* (2004) who argues that alienation of local communities from the management of natural resources is a key factor contributing to forest resource use conflicts. Within the different ecosystems, local communities had defined a wide range of rules and procedures for access, utilization and control of natural resources based on the communities' cultural norms and values. These rules and regulations were enforced by traditional institutions. However, authority of many of these

institutions for resource management was eroded following the introduction of central government institutions for management of the same resources. Changes in populations and land use practices also contributed to the undermining of traditional systems for resource management. Further, while previously, communities were relatively homogenous, the movement of people within the country has resulted to greater diversity of local communities, and a reduced respect for traditional norms and values for natural resource management. This argument is consistent with findings of this study that identified failure of the Forests Act 2005 to reconcile between forests conservation objectives and safeguarding customary rights of access to forest resources and participation in decision making processes over management of forests as a key factor contributing to forest resource use conflicts in Eburu. Legislation is seen as a conflict management tool. Review of the Forests Act 2005 is necessary to broker a win-win situation for stakeholders as an effort in which all interests are satisfied (i.e. a mutually agreeable or "win-win" outcome) is much more likely to result in a lasting and satisfactory resolution than one in which the interests of only one side are addressed (i.e. a "win-lose" outcome) (Lewis, 1996). New institutions put in place to manage forests under PFM arrangements are weak and lack adequate capacity.

The study identified weak enforcement of the Forests Act 2004 due to inadequate capacity at Eburu Forest Station level as among key factors contributing to forest resource use conflicts. This is consistent with (Koziell and Saunders, 2001) who indicates that protected areas are often very poorly resourced, understaffed, existing in many cases in name only. This means that protection is often inadequate and forests in so-called protected areas are subject to on-going unplanned clearance, depletion and over-exploitation.

The findings of the study, specifically as relates to inadequate implementation of PFM and how the resulting conflicts negatively affect forest conservation are consistent with (Wood, 1993) who identified a strong link between natural resource management and conflict. He argues that shortages of natural resources lead to competition, which may result in conflict. In addition, fighting and insecurity may prevent appropriate management of natural resources and reduce their production, thereby worsening

shortages and intensifying competition and conflict. Conversely, changes in the management of natural resources may increase the supply of benefits, which people seek and so reduce competition, while economic diversification or policy changes may reduce demand for particular resources and so reduce competition and the potential for conflict.

The study identified insecure land tenure, as is the case in Kiambogo, and the resultant poor land management practices on adjacent landscapes as negatively affecting forest conservation and contributing to forest resource use conflicts. This is consistent with (Kanowski, 1995) who indicates that protecting the islands of biodiversity also requires manning the seas' between; however good the protected area system is, what happens outside protected areas in managed landscapes may be of similar order of importance for conservation.

As relates to low awareness levels and erosion of conservation values pointed out by the study, (Lewis, 1996) indicates that it is unrealistic to expect local communities to support protection measures or accept compromises that may be necessary to resolve a conflict unless they have a sense of those values. He notes that education and public relations are key elements in most conflict resolution processes, and that educating the public about the potential benefits associated with a protected area can be an important tool in avoiding and resolving protected area conflicts, especially over the long term.

The observation by the study of the need to strengthen participatory approach in management of Eburu forest is amplified by (Koziell, and Saunders, 2001) who indicates that understanding how natural resource management activities relate to biodiversity and how they might affect progress towards sustainable livelihoods, does therefore, require recognition of the multifaceted and dynamic nature of the relationship between biodiversity and people's needs.

5.2.11 Hypothesis testing

Ho: There are no factors contributing to forest resource use conflicts in Eburu. To enable testing of the null hypothesis, the study sampled one hundred and fifty five (155) households adjacent to the forest and sought to establish whether there were uses that are not compatible thus create tension among stakeholders in Eburu. The data was analyzed using a *chi* square goodness of fit test.

Table 20: Chi-Square Test (Are there uses that are not compatible thus create tension among stakeholders in Eburu?)

	Observed N	Expected N	Residual
Yes	82	51.7	30.3
No	65	51.7	13.3
No Response	8	51.7	-43.7
Total	155		

Table 21: Inferential Statistics

	Are there uses that are not compatible, thus create tension among stakeholders in Eburu?
Chi-Square	58.155[a]
df	2
Asymp. Sig.	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 51.7.

Significance level (α) = 0.05

p-value = 0.000

Calculated *Chi* square statistic (X^2) = 58.155

Degree of freedom (df) = 2

X^2 (1) = 58.155, P< 0.05

Source: Field data, 2014

Table 20 indicates that the calculated X^2 statistic, for degree of freedom of 2, is 58.155. It also shows that the significance value (0.000) is less than the threshold value of 0.05, summarized as follows X^2 (1) = 58.155, $p \leq .05$

Table 21: Critical Values of the Chi-Square Distribution

Accept Hypothesis ← → Reject Hypothesis

Percentage Points of the Chi-Square Distribution

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

Table 21 indicates the critical values for chi-square distribution. The critical value at degree of freedom of 2 at significance level (α) of 0.05 is 5.99. In this case, the calculated statistic (X^2) of 58.155 is greater than chi-square critical value (5.99). The null hypothesis is rejected.

5.3 Factors that lead to escalation of conflict

Unresolved conflicts persist and assume wider proportions and high intensity, making it harder to resolve them. The study established the following as factors that lead to escalation of forest resource use conflicts in Eburu.

a) Failure to address grievances in a timely manner

This was noted to be a key reason contributing to escalation of forest resource use conflicts. Among cases cited included delayed response by KenGen to address grievances by Eburu Community as relates the negative impacts of geothermal power generation. It was noted that complaints went unheeded until the community staged a three-day demonstration before action was taken and compensation arrangements put in place. By the time action was taken, conflict had escalated. The same applies to

grievances as relates to inadequate gates and poor location of the gates. The community noted having submitted a formal complaint to the Fence Technical Committee in the month of February 2014 requesting for a gate at Tangi Moja but there was no feedback. It was also noted that delays to fix gates and assign forest rangers to man them was contributing to the escalation of the fence conflict. The fact that some gates were non-operational because of few forest rangers was seen to be fanning the fence conflict.

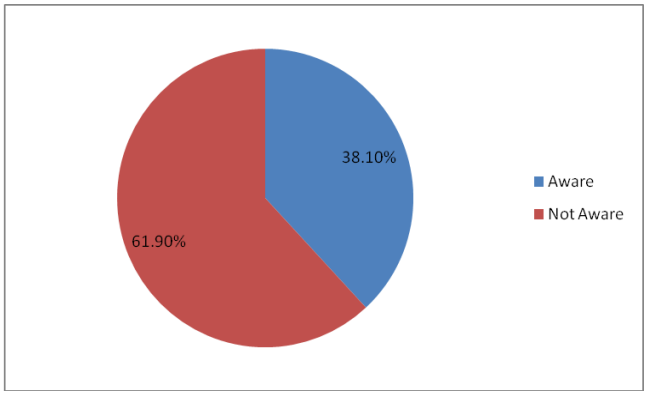
Increasing cases of vandalism of the fence is a pointer to an escalation of the conflict. It was also reported that grazing and firewood collection bans imposed by KFS in 2013 without consulting the community had seen some members of the community setting the forest on fire in protest.

b) Incomplete or contradictory information

Lack of information about impacts of activities on protected area resources fuel a conflict and make it more difficult to resolve it. Scientific uncertainty and tension between scientific and traditional/anecdotal/local knowledge often complicate forest resource use conflicts. The need to develop solutions to conflicts in the face of missing or contradictory data is often one of the most frustrating aspects of conflict resolution in protected areas. From interviews, it emerged that the forester had suspended cut and carry, a practice where fodder and pasture is harvested from the forest and transported to feed animals outside the forest. The community felt the decision lacked scientific basis, as harvesting grass has no detrimental effect on trees. They argued that in fact during dry season the activity is beneficial to the forest as it minimizes cases of forest fire.

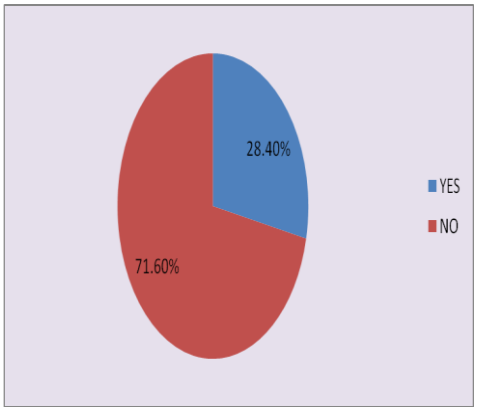
c) Inadequate platform or mechanisms for ventilating and redress of grievances

Majority of respondents (61.90%) indicated that they were not aware of any meeting held to address forest resource use conflicts (fig 22). For those that were aware majority (71.60%) were of the opinion that resolutions of the meeting were not implemented.



Source: Researcher, 2015

Figure 22: Awareness of meetings held to address forest resource use conflicts.



Source: Researcher, 2015

Figure 23: Whether the resolutions of the meeting were implemented

As to how conflicts are resolved in the area on forest resource use (Table 22) majority of respondents identified public barazas (33.5%) and focused meetings (24.5%). A significant number of respondents (23.9%) indicated that nothing is done to address some conflicts. Failure by responsible parties to take prompt action was noted to be a key factor leading to conflict escalation, as well as unsuccessful prosecution that sees arrested offenders being released.

Table 22: How conflicts on environment issues are resolved in the area

	Frequency	**Percentage**
Through public barazas	52	33.5%
Focused meetings	38	24.5%
Arresting/judicial process	21	13.5%
Nothing is done	37	23.9%
No Response	7	4.6%
Total	**155**	**100%**

Source: Researcher, 2015

5.4 Opportunities for conflict resolution in Eburu forest

Table 23: Existence of opportunities for conflict resolution in Eburu Forest

Region/cluster	Yes	No	Total
Eburu	34	21	55
Ndabibi	31	17	48
Kiambogo	24	12	36
Total	89	50	139

Source: Researcher, 2015

Table 18 captures respondents' views on whether there are any opportunities that could be utilized to resolve or manage forest resource use conflicts in Eburu. In the three clusters sampled majority of the respondents indicated existence of opportunities for conflict resolution in Eburu over forest resource use. Proportionately more respondents indicated existence of opportunities to solve forest use conflicts in Eburu, followed by Ndabibi and Kiambogo in that order.

5.4.1 Existence of rules to govern access to forest resources and benefit sharing

a) Forests Conservation and Management Bill 2014

The Forest Act 2005 is under review. A Forests Conservation and Management Bill 2014 exist that addresses most of the shortcomings of the current Act. Major strengths of the bill that would address forest resource use conflicts in not only Eburu but also other forests include;

- Introduces development of National Forest Management guidelines to enhance sustainable forest use (clause 5)
- Provides for establishment of Forest Conservation and Management Trust Fund to finance forestry development (clause 28)
- Provides for establishment of a facility to provide financial and technical support to create incentives for increasing forest tree cover
- Provides for benefit sharing mechanism, that would be elaborated in subsidiary legislation (clause 55)

- Provides for fiscal incentives for participation of the private sector in investing in forest sector (clause 56)

b) ECOFA By-laws for regulating access and use of forest products among user groups

The by-laws elaborate on the Forest Management Agreement, and detail procedures and dos and don'ts for the respective user groups. Although they are in draft form, some user groups are applying them.

5.4.2 Community Structures in Place for regulating access to forest products

a) ECOFA

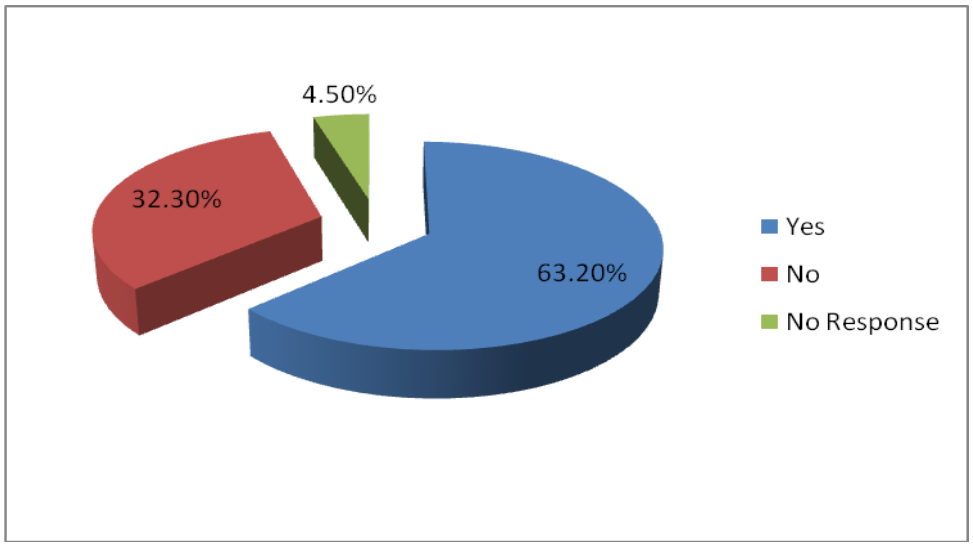
Eburu Community Forest Association is the local CFA that serves as a vehicle for collective community engagement with KFS in co-management of Eburu forest. It has a membership comprised of 26 user groups. Although it has operational challenges, it presents an invaluable platform for representing the interests of CFA members and redress of grievances among CFA members.

b) Eburu electric fence Management and Technical Committees

The two committees are important platforms that provides for stakeholder participation in decision making process as relates to fence construction and management. The Fence Management Committee is at a lower level dealing with operational issues on the ground while the Technical Committee is a higher level inter institutional decision making organ providing technical guidance. Grievances as relates to the fence are channeled through the Fence Management Committee for discussion and forwarding to the Technical Committee for action. The two committees present a good opportunity for addressing grievances on issues relating to access to the forest. Effective stakeholder representation should however be ensured to effectively address concerns as they emerge. Of priority is to have adequte representation of pastoralists.

5.4.3 Patnership opportunities due to existence of diverse stakeholder groups and organizations

Existence of development and conservation organizations with projects that contribute to enhanced environmental conservation and community development significantly assist to minimize forest resource use conflicts. Majority of respondents 63.20% confirmed existence of projects targeting to enhance forest conservation. 32.30% were of the opinion there are no such projects, while 4.5% did not give feedback (Fig 24). This implies that such projects are not evenly distributed in the sampled areas.



Source: Researcher, 2015

Figure 24: Existence of projects targeting to enhance forest conservation in Eburu

The study established (Table 24) that majority of the projects supported focus on capacity development (43.9%) followed by tree planting (18.1%). Others include fencing (11.6%), beekeeping (16.1%), and tree nurseries (9.0%). The fence referred to is the electric fence spearheaded by Rhino Ark. From the findings there is relatively less focus on supporting livelihood projects.

Table 24: Nature of conservation projects in Eburu

Project focus	Frequency	Percentage
Beekeeping	25	16.1%
Fencing	18	11.6%
Tree planting	28	18.1%
Conserving forest and capacity building	68	43.9%
Tree nurseries	14	9.0%
No Response	2	1.3%
Total	155	100.0%

Source: Researcher, 2015

Table 25.0 indicates the main partners in Eburu that have supported conservation, where KFS (35.5%), Community (27.6%), Green Belt Movement (7.7%), KFWG (6.1%), Rhino Ark (5.8%) and Equity Bank (4.0%) were regarded as the main ones. It was noted from interviews that Rhino Ark was supporting implementation of water projects and bio-enterprises aimed at improving livelihood of the local community. Rehabilitation of Olesirwa spring, and Ndabibi bore hole were among water projects supported by Rhino Ark. The list of stakeholders provides a good starting point for resource mobilization. In establishing Forest Level Management Committee to oversee PFM in Eburu, it would be prudent to incorporate such organizations.

Table 25: Main donors of projects in Eburu

Main stakeholders	Percentage
KFS	35.5%
KWS	3.7%
KenGen	3.7%
Community	27.6%
Lake Naivasha Riparian Association	1.9%
Rhino Ark	5.8%
Safaricom	1.9%
Equity Bank	4.0%
KFWG	6.1%
Nation Media	2.1%
Green Belt	7.7%
Total	100%

Source: Researcher, 2015

Majority of respondents (56.80%) were aware of past projects and donors in Eburu (over the past 5 years) while 43.20% were not. The main partners (GBM and KFWG), as shown by table 26 were noted to be inactive as they do not have on-going projects in Eburu. The CFA and KFS may need to liaise with these organizations that were active in Eburu aimed at enhancing resource mobilization for improved conservation and livelihood diversification.

Table 26: Donors who have supported conservation projects in Eburu over the last five years

Donor	Frequency	Percentage
GBM	37	24.0%
Equity Bank	15	9.7%
KWS	14	9.1%
KBL	7	4.5%
Nation Media	15	9.7%
Self help Africa	15	9.7%
KFWG	44	28.6%
Imarisha Naivasha	7	4.5%

Source: Researcher, 2015

5.4.4 Eburu electric fence

The fence provides a good opportunity for enhancing forest conservation and restoration by controlling illegal human activities and overexploitation of forest resources that would minimize cases of forest resource use conflicts. Some positive impact as relates to increased pasture, improved security and reduced illegal activities has been observed. Grievances raised by the local community on gates should be addressed and a communication strategy put in place and implemented. Non-state actors should join hands and work with Rhino Ark to implement identified bio-enterprises for improved livelihood.

5.4.5 Hypothesis testing

Ho: There are no opportunities for conflict resolution within Eburu Forest

To enable testing of the null hypothesis, the study sampled one hundred and fifty five (155) households adjacent to the forest and sought to establish whether there are opportunities for conflict resolution within Eburu Forest. The data was analyzed using a *chi* square goodness of fit test.

Table 27: Chi-Square Test

	Observed N	Expected N	Residual
Yes	89	51.7	37.3
No	50	51.7	-1.7
No Response	16	51.7	-35.7
Total	155		

Table 28: Inferential Statistics

	Are there any opportunities that could be utilized to resolve or manage forest resource use conflicts in Eburu?
Chi-Square	51.652[a]
df	2
Asymp. Sig.	.000

Significance level (α) = 0.05

p-value = 0.000

Calculated *Chi* square statistic (X^2) = 51.652

Degree of freedom (df) = 2

X^2 (1) = 51.652, P≤ 0.05

Source: Field data, 2014

Table 28 indicates that the calculated X^2 statistic, for degree of freedom, is 51.652. It also shows that the significance value (0.000) is less than the threshold value of 0.05, summarized as follows X^2 (1) = 51.652, $p \leq .05$.

Table 29: Critical Values of the Chi-Square Distribution

Accept Hypothesis ← → Reject Hypothesis

Percentage Points of the Chi-Square Distribution

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

Table 29.0 indicates the critical values for chi-square distribution. The critical value at degree of freedom of 2 at significance level (α) of 0.05 is 5.99. In this case, the calculated statistic (X^2) of 51.652 is greater than chi-square critical value (5.99). The null hypothesis is rejected.

CHAPTER SIX

CONCLUSION AND RECOMMENDATION

6.1 Summary of findings

The study identified and described seven types of forest resource use conflicts in the study area, which are; conflict between local community in Eburu and KenGen, conflict between the local community and Rhino Ark, and conflicts between KFS and the community over illegal activities. Others are; conflict between KFS and the community over firewood collection, conflicts among community members over forest resource use, conflicts between pastoralists and local farmers over water, and conflicts between KFS and pastoralists over grazing.

As relates to key factors contributing to forest resource use conflicts in Eburu, the study identified and described the following;

- Forest Policy and Legislation
- Weak institutional structures as relates to participatory forest management
- Participation in decision-making and implementation of forest conservation
- Grievance and unmet expectations by ECOFA members
- Conflicting stakeholder interests and incompatible uses
- Inequitable sharing of benefit among stakeholders accruing from forest management
- Inadequate information and communication among stakeholders
- Inadequate awareness of, and limited compliance with the Forest Act 2005 and procedures for accessing forest products and services
- Land tenure

Factors that contribute to escalation of forest resource use conflicts in Eburu forest were identified as failure to address grievances in a timely manner, incomplete or contradictory information, and inadequate platform or mechanisms for ventilating and redress of grievances. Several opportunities exist for managing forest resource use conflicts in Eburu. Those identified by the study are; existence of rules to govern access to forest resources and benefit sharing, existing community structures for regulating access to forest products, partnership opportunities due to existence of diverse stakeholder groups and organizations, and Eburu electric fence.

6.2 Conclusion

The local community is a party to all forest resource use conflicts identified by the study in Eburu forest. This confirms the high stake the local community has in the management and use of the forest, hence the need to mainstream community participation in forest management as well as safeguard their access rights to forest resources.

Existing conflicts within Eburu Forest arise from human relations among stakeholders having different values, rights, obligations, needs and interests that are met from the same resource. Incompatible use of Eburu Forest has contributed to decline and degradation of forest resource. The ensuing competition over reduced amounts of forest products; perceived scarcity through competitive use; and, a failure to negotiate rules and regulations for sharing the resource, which are acceptable to all stakeholders, fuel conflicts among forest resource users. A multiplicity of forest resource users some with incompatible goals and priorities, together with other factors lead to conflicts, that not only contribute to forest degradation but also compromise traditional access rights of local people to the forest resource.

The disproportionate distribution of forests related benefits as implied by user rights provided by the Forests Act 2005 and the high value of forests as well as varied and conflicting needs and interests qualifies the need for good management to avoid conflicts among forest resource users. Inadequate adoption of Multiple-use approach has created a notion that most benefits accruing from the forest mostly benefit the nation at large with local communities viewing the forest as a net cost in terms of

decreased access to resources, crop damage from wild animals, and the opportunity cost of using that habitat for another purpose

The fact that most conflicts occur during dry season confirms existence of a pattern. This points to competition for scarce forest resources especially water and pasture. Dry season deserves special attention as relates to effort in addressing forest resource use conflicts.

Legislation and rules alone cannot deliver sustained forest conservation. Forest resource use conflicts can be effectively addressed through active management that seeks to reconcile and harmonize conservation objectives and local community development and livelihood priorities within a participatory and consultative environment. Failure to timely resolve forest resource use conflict leads to conflict escalation, which complicates conflict resolution.

Forest resource use conflicts, as experienced in Eburu reveals both the importance and the challenge of sustaining forests and striking a balance between conservation and use –practising sustainable forest management to ensure the full range of forests' economic, social and environmental contributions. Forests provide a wide range of goods and- services that create opportunities for development and improving human well-being

There are opportunities that if utilized, can minimize forest resource use conflicts. Management and use of forest resources has contributed to conflicts among stakeholders that is affecting sustainable conservation of the forest and its ability to provide the much needed ecosystem goods and services.

Participatory approach should be considered in adoption of conflict management opportunities (such as fencing) in order to minimizing secondary conflicts.

6.3 Recommendations

Forest Resource use conflicts

- Strengthen community participation in forest management (including in decision-making) and improve relationships and communication among partner organizations.

- Set up Forest Level Management Committee to provide a platform for redress of community grievances and ensure harmonious use of forest resources in keeping with Eburu Forest management plan.

- The local community is a party in all forest resource use conflicts identified. Interventions to address forest resource use conflicts in Eburu should focus on addressing their grievances, safeguarding customary access rights and promoting community development to minimize dependence on forest resources for livelihood.

- Despite the finding by the study that majority of the forest resource use conflicts occur inside the forest, conflict management interventions should also target forest adjacent landscapes with the aim of creating alternative livelihood options.

Factors contributing to forest resource use conflicts

- Interventions aimed at addressing forest resource use conflicts in Eburu forest should aim at addressing identified factors key of which include strengthening community participation in decision making, ensuring equity in benefit sharing, and mainstream livelihood and poverty considerations in biodiversity conservation objectives.

- There is need for adoption of multiple-use approach in forest management aimed at broadening the basket of benefits. Meeting the needs of majority of the stakeholders secures their support for conservation. This contributes to reduced conflicts and sustained forest conservation.

- The management of Eburu forest should be informed and based on Eburu Forest Management Plan, a negotiated document that reconciles conservation and development objectives. This would minimize conflicting and incompatible stakeholder interests.

- Strengthen the organizational capacity of ECOFA for effective delivery of its functions of which includes providing a platform for redress of conflicts and communication.

Opportunities for addressing forest resource use conflicts

- The County Government should strengthen partnerships with development partners including non-state actors to undertake community development projects for poverty alleviation and diversified livelihoods.

- Review the Forests Policy and Forests Act 2005 to provide for benefit sharing mechanisms among key stakeholders responsible for conserving Eburu Forest. However, developing a Natural Resources Benefit Sharing Legislation would have more impact as it is encompassing and addresses a wide range of resources that ordinarily occur within an ecosystem.

- Enhance conservation education and public relations to secure the support of the community in safeguarding forest biodiversity. Educating the public about the potential benefits associated with a protected area can be an important tool in avoiding and resolving protected area conflicts, especially over the long term.

- Strengthen advocacy capacity of CFAs for effective representation and negotiation of members' interests specifically as relates to influencing legislative reforms for equitable benefit sharing.

- Lobby the National Land Commission to fast track the adjudication process of former ADC farms in Oljorai.

- Review Eburu Forest Management Plan (PFMP) that expired in 2013, to reflect emerging realities. The plan does not reflect salient developments such as the electric fence.

- Set up Forest Level Management Committee to provide a platform for redress of community grievances and ensure harmonious use of forest resources in keeping with Eburu Forest management plan.

- Put in place measures to ensure enforcement /implementation of Eburu PFMP, once revised, where priority would be to set up Forest Level Management Committee to oversee its implementation. Ensuring that the plan forms the basis of all forest conservation activities would promote harmony hence minimizes conflicts associated with incompatible and overlapping forest conservation activities.

- Develop a business plan to guide operation of nature-based enterprises within the forest.

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8.0 ANNEX

Annex 1: Questionnaire

Project Title: Assessment Of Factors That Contribute To Forest Resource Use Conflicts, A Case Of Eburu Forest, Kenya

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

Location……

Area……..Date……

Responsible Person……Questionnaire No……

Section A: Demographic information

A1. Name of Respondent …….

A2. Sex Male ☐ Female ☐

A3 Age (tick one) 30 yrs ☐ Btn 30 & 50yr ☐ Above 50 yrs ☐

A3. Highest Education Level Attained…….

A4. No of years of stay in Eburu…….

A5. Ethnic Group…….

A6. Estimated distance from Forest Boundary……

A7. Average Land size ……

A8. Main Source of income…….

A9. Tel ---------- (Optional)

Section B. Community structure and livelihoods.

B1. Are you aware of Eburu Community Forest Association (ECOFA) Yes….. No…..

B2. If yes, are you a member of ECOFA. Yes……No…….

B3.If not state groups you are a member of……..

B4.Reason for joining CFA if a member……

B5. Reason for Not joining CFA if not a member……

B6.What is the role of Eburu Community Forest Association (ECOFA)?.....

B7. What are some of the activities the CFA has been engaged in?

B8.What strengths does the CFA possess that enables it enhance forest conservation?

B9.What are the CFAs weaknesses that make it less effective?

B10.Does the CFA have a constitution? Yes----No-----

B11.When was elections of CFA officials held?

B12. What is your main source of income/CFA? Choose One

A. Membership contributions
B. Donors/Well wishers
C. Revenue from Enterprises
D. Other ……

Section C. Stakeholders conflicts

C1.Who are the main stakeholders as relates to Eburu Forest?

C2. Of the above listed stakeholders give their main interest in Eburu Forest

C3.What part of the forest do they undertake their activities?

C4.For how long have they operated in Eburu?

a) Over last 20 years and beyond b) 10 yrs c) 5 yrs d) last 2 yrs and

C5.Are there any forest related conflicts among stakeholders in Eburu Forest? Yes…..No…..

C6.If yes name the stakeholders involved in the conflict----------

C7.What is the conflict about?

a) Land Related b) Forest Resources c.) Ethnic d) Political e) Other…….

Briefly explain

C8. Are there uses that are not compatible, thus create tension among stakeholders in Eburu? yes….No…

Name them----------

C9. Has there been a recent change that has affected the flow of benefits to any of the stakeholders?

C10. Is there a new development that has increased demand for a given forest product or service? Yes---No

Explain----------

C11. In what way does the conflict affect forest management?

C12. What is your main energy source for cooking?

A. Firewood
B. Charcoal
C. Bio-Gas
D. Electricity
E. Other…..

C13. What forest products are accessed for sale/trade----------.

C14.Are you aware of any meeting held to address a conflict over Eburu forest? Yes--No

C15. If yes, when was the meeting held and who convened it?

C16. Were the resolutions of the meeting implemented? Yes—No

If Not, why?

C17. What should be done to avoid or address the above forest related conflicts in Eburu?

Section D: Forest Management

D1. Is access to forest products regulated? Yes…….No……..

If yes explain how----------

D2. Who regulates access to Eburu Forest?

D3. Is the community involved in the management of Eburu Forest? Yes……..No…….

If yes explain how……

D4. To what extent will you rate KFS's involvement in working with the community on conservation of Eburu forest?

a) Very high b) High c) Moderate c) Poor

D5. List some recent activities (if any) where KFS and the Community worked on together.

1.
2.

D6.Are joint planning meetings held between KFS and the CFA? Yes…..No…..

D7. What channels of communication does KFS use in disseminating information on Eburu forest? (Meetings, notice board, email, letters, etc)

D8. How is the relationship between KFS and the community?

a) Very good b) Good c) Warm d) Cold /poor

D9.Does KFS at Eburu forest station possess adequate capacity to manage the forest? Yes---No---

D10.Explain----------

D11.What are the three most important KFS capacity gaps at Eburu that require addressing for improved forest management?

D12. Are you aware of any rules or procedures for controlling access to and use of forest products? Yes------No------.

D13. If yes, mention them

1.
2.
3.

D14. Are you aware of the Forest Act 2005? Yes …….No……

D15.What do you know about it?----------

D16. Are you aware of Participatory Forest Management Plan (PFMP) of Eburu? Yes --No-?

D17. What are the main challenges hindering implementation of Eburu PFMP?

Section E: Forest Products

E1.What are the main 3 forest products utilized from Eburu Forest?

E2.What is the procedure of accessing/getting the forest products?

E3. Are you aware of a forest product that requires a permit before accessing? Yes---No--

E4.If yes, state the products?----------

E5. Are there products that do not require forest permit? Yes….No….List them.

E6. Do you comply with/follow the procedure of acquiring forest permits? Yes…No..

E7. Are there people or groups of people who access the forest and get products without following the right process? Yes-------No------.

E8.If yes who are they----------E9. Is access to forest products fair to all? Yes-----No-----

Briefly explain----------

E10. If access is not fair, how can this be improved?----------

E11.What alternatives are locally available in place of above stated main forest products?

E12.Which forest product use attracts the highest level of conflicts.

E13. Where do these conflicts occur and why?

E14. Have there been bans by KFS on use of certain forest products? Yes—No---

E15. If yes, what was the ban on?

E16. Was the decision to impose the ban participatory? Yes—No----

E17. Are there sections of the forest boundary that are contested? Yes---No----

E18. If yes, why and which sections?

Section F; Forest Management Agreement/Benefit sharing.

F1. Are you familiar with the Forest Management Agreement of Eburu? Yes---No----

F2. Did you participate in Forest Management Agreement (FMA) negotiation? Yes---No----

F3. Are there issues that you proposed but were not included in the forest management plan of Eburu? Yes…….NO……
…

F4. Are there issues you would like to include in case FMA was reviewed? Yes …No…

F5. What benefit do you currently get from the forest based on the FMA?

F6.Which are the main sources of revenue from Eburu?

A. Grazing

B. Fuel wood collection
C. Tourism/recreation
D. Water abstraction
E. Special use
F. Other……

F7.Who are the main beneficiaries of the revenue arising from Eburu Forest?

F8.Is the revenue equitably shared among stakeholders engaged in conserving Eburu Forest? yes….No….

F9. Are there measures to ensure equitable benefit/ revenue sharing among stakeholders involved in forest conservation? Explain----------

Section G: Threats to the forest

G1. Are there any changes you have noticed about the forest? . Yes---No---

If yes what changes have you observed.

G2. Are there any changes in the goods and services the forest provides? Yes----No----

If yes, what changes have you noticed----------

G3. State any forest products initially found in the forest that are not found any more?

G4. What are the main threats contributing to forest loss? Tick the main ones.

A. Illegal logging
B. Encroachment for farming
C. Charcoal Burning
D. Firewood Collection
E. Illegal grazing
F. Other

G5. Are you aware of an electric fence being constructed around Eburu Forest? Yes – No—

G6.Are there any issues about the fence you are not happy about? Yes –No---.

If yes explain----------

Section H: Opportunities for Conflict Resolution

H1.How are conflicts among stakeholders in the area sorted?----------

H2. Have you ever attended a meeting on the use or management of Eburu forest? Yes….No……

H3.If yes, when did the meeting take place and who organized it?.....

H4.What was the meeting about?.....

H5.How are conflicts on environment issues resolved in the area.----------

H6.Are there any opportunities that could be utilized to resolve or manage forest resource use conflicts in Eburu? Yes---No------

If yes, which ones----------

H7. Are you aware of Forest Conservation Committee? Yes----No------

If yes what does it do?----------

Section I : Conservation Initiatives

I1. Are there projects targeting to enhance forest conservation in Eburu? Yes---No-----

If yes name the projects and provide details on what they are about and when started.-

I2. Who are the donors of the above projects----------

I3. Are you aware of past projects and donors over the last 5 years? Yes----No-------

I4.If yes list any four of them, and project target areas----------

THANK YOU!