INFLUENCE OF GENDER ON ACCESS, USE AND MANAGEMENT OF FOREST RESOURCES IN KAPCHEMUTWA FOREST, ELGEYO MARAKWET COUNTY, KENYA

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A THESIS SUBMITTED TO THE SCHOOL OF ENVIRONMENTAL STUDIES, IN PARTIAL FULFILLMENT FOR THE AWARD OF MASTER OF SCIENCE IN ENVIRONMENTAL STUDIES (HUMAN ECOLOGY) UNIVERSITY OF ELDORET, KENYA

NOVEMBER, 2016

DECLARATION

Declaration by the Student

This is my original work and has not been presented for a degree in any other University.

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To my husband Joel Kibet and my children; Jebiwott, Jeruto and Deborah for standing with me and giving me the much needed moral and financial support during my studies. May the almighty bless you abundantly.

ABSTRACT

The main purpose of this study was to examine the Influence of gender on access, use and management of Forest Resources in Kapchemutwa forest, Elgeyo Marakwet County. The specific objectives were to examine factors that defines gender roles in relation to forest resource management, to identify the practical and strategic needs of different gender groups in relation to access, use and management of forest resources, to analyze the ways in which gender roles affect access to access, use of forest resources at community level for livelihood improvement and to determine how the different gender groups could be integrated into sustainable management of forest resources, based on their roles, relations and needs. This study adopted a descriptive survey design. The sampling frame for this study comprised of key informants, drawn from 3288 households. Both primary and secondary data was obtained for the study. Interviews, questionnaire, focus group discussions, observations and photography comprised the main sources of primary data. Secondary data was obtained from review of published and unpublished materials. Quantitative data was analyzed by use of descriptive statistics such as measures of central tendencies such as frequencies, means and percentages while qualitative data were summarized and interpreted in line with the research objectives and questions. Results of data analysis were presented in form of figures and tables. The study findings showed that males and youth depended on the forest for poles, timber and charcoal while women mostly obtained firewood, medicine and food from the forest. Further, the major factors that influenced the access, use and management of forest resources in Kapchemutwa forest were resource use and monetary values attached to the resources. However, knowledge on forest resources, climatic conditions and cultural values also influenced the access, use and management of forest resources. The study findings further found out that involvement of men and women in decision making on matters concerning the use of forest resources was a key element in achieving forest resource management and sustainability. It is hoped that the findings of this study may benefit the inhabitants of Keiyo North Sub-County in terms of sharing of community resources. The study will further benefit the government through the Kenya Forest Services (KFS) in formulating policies and decisions on gender equity on forest resource management. The study will further form a basis for further research on gender and natural resources management.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

LIST OF ACRONYMS

CFA	Community Forest Association
GED	Gender, Environment and Development
KFS	Kenya Forest Services
KNBS	Kenya National Bureau of Statistics
KWS	Kenya Wildlife Service
NTFPs	Non-Timber Forest Products
PGNs	Practical Gender Needs
PSUs	Primary Sampling Units
SGNs	Strategic Gender Needs
SSUs	Secondary Sampling Units

ACKNOWLEDGEMENT

The following institutions and people are greatly acknowledged for their support and input in this thesis. Without them this work would not have been completed successfully.

First, I am greatly indebted to University of Eldoret for having offered me an opportunity to undertake this Master of Science degree programme. I appreciate the technical and logistic support from the Department of Applied Environmental Studies (Human Ecology).

Special thanks go to my supervisors, Prof. Cheserek and Dr. Kiptui, for their tireless and patience in organizing and shaping my study. Their useful, constructive and critical comments were of valuable assistance to me.

I also express my sincere gratitude to the respondents; Residents of Kapchemutwa, Kamoi and Chebaror, Kenya Forest Service personnel, Forest Conservators and chiefs of Keiyo North Sub-County who spared some time from their tight scheduleS to mobilize organize barazas to enable respondents to respond to interview questions. Without their co-operation, this thesis could not be in existence.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Natural resources must be used in a way that meets today's needs, while conserving them for future generations. The influence of gendered relationships on access to forests and forest sustainability remains a concern for scholars and practitioners. Approaches to forest management the world over have undergone profound changes. Despite this, women's involvement in decision making has hardly kept pace with the earlier changes (Agarwal, 2001) and they do not seem to fare any better under devolution programs (Jumbe & Angelsen, 2007).

Forests are the key components of biodiversity that represent the foundation of ecosystems and that, through the services they provide, affect human well-being. Forest provide services such as food, water, timber, and fibre; regulate services like the regulation of climate, floods, disease, wastes, and water quality; cultural services such as recreation, aesthetic enjoyment, and spiritual fulfilment; and support services like as soil formation, photosynthesis, and nutrient cycling. It has been estimated that one quarter of the world's poor population directly or indirectly depends on forests for their livelihoods (WB/DFID, 2006). Forests are crucial for delivering multiple outcomes such as livelihoods, carbon sequestration and biodiversity conservation (Chhatre & Agrawal, 2008).

Women continue to be disadvantaged by various factors ranging from insecure access and property rights to forest and tree resources to discrimination and male bias in the provision of services, including credit and technology (Doss, 2001; German *et al.,* 2008), and by exclusion from decision making at household, community, and national levels (Agarwal, 2001). Women disproportionately bear the costs of tree and forest management, realize only a fraction of the benefits, and are mostly enlisted to decision making when forest and tree resources are degraded or after conflicts (Agrawal & Chhatre, 2006). Moreover, because of a lack of formal education, employment, and personal networks, they are poorly placed to influence resource allocation or research priorities (Crewe & Harrison, 1998).

The need to understand this continued lack of involvement is urgent because women continue to be among the poorest in many developing countries and their dependence on forest resources for subsistence, as safety nets, and for incomes will assume even greater importance as forests become more threatened because of increasing global trade, climate change, urbanization, and energy and food insecurity (CIFOR, 2008). The inclusion of women in resource management offers a potential pathway for empowering women both within their private and public lives (Torri, 2010).

Changes in tree cover and loss of community access to forests can have a disproportionately adverse impact on women, with indirect impacts on households and, consequently, on the livelihoods of 5–10 times as many people. Gender equity in the

forestry and agroforestry sectors can thus contribute to the achievement of broader social and economic goals, including the post-2015 development goals (Ferrier, 2002).

In Africa, information on gender differences in knowledge and use of local flora and fauna are just beginning to become available and what is known so far shows that women are quite knowledgeable both about the environment and the natural resource base and its uses. The variety of knowledge women have about forestry, forest products, and plant and tree species is immense and includes knowledge on the degree of scarcity of products such as fodder, fuel, medicinal plants, resins and dyes, fruits and berries, and nuts and mushrooms. Furthermore, the type of planning required integrating harvesting and processing of minor forest products with other work responsibilities. Women also have knowledge of the medicinal uses of plants and information on the varieties of wild fruits and plants that are important supplements in the diets of poor rural people, especially during the hunger/famine season. The rapid pace of resource depletion and environmental degradation in developing countries, combined with women's poverty and limited access to technical information and productive resources poses significant constraints for women. The contribution of natural resources to the livelihood strategies of poor people has long been appreciated as significant. Hence, how to ensure that, poor people have rights and opportunities to access natural resources, as well as responsibilities for sustainable management of natural resources, has become a central question in debates over poverty alleviation (FAO, 2006).

The history of control of forests by the government for conservation purposes in Kenya dates back to the colonial period. By 1908, the colonial government had put all the major forest areas in Kenya under the control of the government (Kamugisha *et al.,* 1997). By 1932 a total of 43 forests were defined as government forests. The colonial government emphasized that "the public good was best served through the protection of forests and water resources, even if this meant the displacement of local communities *(Ibid*). But at the time, the population was still small and competition for land resources had not been predicted. By 1990 the total area of gazette forests was about 1, 930, 000ha and the process of gazettement still continued (Wass, 1995). Currently the total area of Kenya's forest cover is 6.99% (World Bank, 2014). Of this, indigenous forests occupy 2.1%, plantations (exotic) forests occupy 3% while the rest occupy 1.89%. All these forests are useful in providing both timber and non-timber products to communities that live within and around them.

Despite a wealth of studies demonstrating the critically important role women play in managing forests, agroforestry and tree genetic resources, women's contributions remain underappreciated. Women are traditionally the main collectors of fuelwood, medicinal and aromatic plants as well as other non-timber forest products from forest and agroforestry landscapes. Their participation in decision making at household and community levels, although limited, has demonstrably improved forest regeneration, increased crop yields, improved financial management, and prioritized funding for pro-poor and empowerment programs (Colfer, 2005; Shanley & Gaia 2001; Agarwal, 2007; Agarwal, 2009; Acharya & Gentle, 2006; Komarudin *et al.,* 2008). Women in forest

communities can generate more than 50% of their income from forests, compared with about a third for men (World Bank, 2009).

Elgeyo forest is one of the protected forests in Kenya although currently the government is managing it with the local community through community forest associations where members of the community are allowed to sustainably use the forest resources. It is now internationally recognized that greater community participation in forest management can contribute to reducing over-exploitation of forest resources. Conservation of environmental resources including forests can only succeed if the social factors which influence people's interaction with the environment, are addressed. These include access to the natural resources, the level of decision making processes and empowerment (Ghai, 1994). These will make communities to consider forests as belonging to them. In Kenya, there are some mechanisms used to enhance the levels of community involvement in forest management such as revenue sharing in national parks (only operational in a few parks), permitted use under government control (such as the forest reserves) and consultation over government planned initiatives. According to GoK (2014) the public can actively be involved in forest conservation and management through the CFA.

The Forests Act, 2005 provides for engagement of local communities in forest management through CFAs (KFS, 2007). This requires members of a forest community to enter into partnerships with KFS through registered CFAs. The associations are registered only if their objectives and composition of their management committee, election procedures, and purpose for which their funds may be used are considered

satisfactory by KFS. Members of a forest community and local residents who form such associations may apply to the KFS for certain rights in relation to management and utilization of particular forest areas and forest produce rights. The associations are also granted use rights to the forest resources on the condition that these rights do not conflict with the conservation of the forest (GoK, 2007) Communities also have exclusion rights subject to management plan submission and contracting with the KFS.

As the main users of natural resources and forests in particular, women are the primary sufferers from environmental degradation. Scarcity of water, firewood and forest or wildlife products means that women have to travel long distances in order to collect water, firewood, or food products for basic household needs and this negatively impacts on the time they can devote to other activities. This also leaves them vulnerable to gender based violence or animal attacks. Even where formalization of property rights has been encouraged, there is some evidence that this may not necessarily serve the interests of women, as formal title is likely to be vested in the head of the household who are mostly men (World Bank 2009). Formal property rights may not increase natural resource access for women without changes to restrictive gender norms.

A varied body of research suggests that a group's gender composition can significantly affect decision-making processes and their outcomes. For example, forest management committees with a higher proportion of women represented have a greater likelihood of improving forest conditions (Agarwal, 2009). Collaboration, conflict resolution, and the capacity for self-sustaining collective action can increase when women are part of a

natural resource management group (Westermann, et al, 2005). Women's participation in a policy-making group can also lead to choices that promote particular public goods (Agarwal, 2010).

In rural India, for instance, female leaders on village councils were found to be more likely to invest in public goods such as drinking water facilities than male leaders (Chattophadhyay & Duflo, 2004). There may also be a critical mass of women for instance, one quarter to one third of a group that is required before women effectively participate in decision making (Agarwal, 2010). At the same time, data from forest-user groups in Uganda, Bolivia, Kenya and Mexico (although based on small country samples which preclude generalisation) suggests that too high a proportion of women may also be suboptimal in that pre-dominantly female groups may be disadvantaged (Agarwal, 2010). In short, there is emerging evidence suggesting that the gender balance of decision-making groups influences outcomes.

In rural Kenya women (and not men) are indeed the (invisible) managers of forest resources. Most rural women are comparatively poor and uneducated. Most of them do not hold a monthly paying job and therefore are commonly referred to as housewives. But these women are great sustainers of rural micro-economic activities. Despite this, nowhere is their impact and activities more significant as their indigenous knowledge of, and management of natural resource such as forests. They are crucial because their traditional gender roles bring them in direct contact with these natural resources, and their survival and that of their families depends directly on exploiting and harnessing supplies

from these forest resources. Women constitute a large percentage (over half) of the rural population. Women are socially more burdened in rural Kenya. Their activities range from family economic activities to running of homes and rural development projects. They are also a more appropriate group to target for cultural and social changes. Their activities in development and family care put them in the central position regarding impacts to forest resources (Volunteers for Africa, 2009).

Destruction of forests and other sensitive areas arises mostly due to increase in population thus having a direct impact on environment as a consequence of economic and social factors. Notable of these factors is population size and growth rate. To be able to control population, improve rural development, and protect forest resources, the role of gender is critical. Rural Kenya is among the areas with the highest population size growth rates, and forests resources found in these areas have been decreasing (Gok, 2007).

1.2 Statement of the Problem

Men and women's survival and that of their households and communities depends on their having access to and control of natural resources which include water, land, forests and wildlife among others. Over generations both men and women have developed in-depth knowledge and understanding of the uses and care of natural resources, and have learned to manage these resources in order to preserve them (WEDO, 2003). Despite this, women's access to and control of these resources is far from being guaranteed. Over the years, interests in natural resources and environment have not always included concern for the role of different gender groups. According to UNDP (2002) one of the key issues

that needs to be addressed by African countries is the low participation of women in terms of access, control (decision-making structures; unequal power relations and limited control by women over basic resources) and management of natural resources due to lack of opportunity and information.

Women and youths remain largely absent at all levels of decision-making process involving project formulation, and management of natural resources and environment. In addition to women being the main managers of natural resources while having little or no access to or control over the resources, women are mostly the most affected by natural resource degradation because of the gender roles they play. If there is scarcity of food and forest products, it is women who have to travel long distances in order to collect firewood, or food products to meet basic household needs. This means that women are robbed of time that they could allocate to other domestic and economic activities. Women and other vulnerable groups are seldom given the opportunity to access, control or manage forest resources. It was therefore important to assess how different gender groups living around Kapchemutwa forest access, use and management of the key forest resources if sustainable management of these resources and development is to be achieved.

1.3 Purpose of the Study

The main purpose of this study was to assess the influence of gender on access, use and management of forest resources in Kapchemutwa forest, Elgeyo Marakwet County, Kenya.

1.4 Objectives of the Study

This study was guided by the following specific objectives;

i. To determine gender roles in the access, use and management of Kapchemutwa forest and its resources.
ii. To examine the factors that influence gender roles in relation to resource use in Kapchemutwa forest
iii. To identify and analyze the practical and strategic needs of different gender groups in relation to access, use and management of Kapchemutwa forest resources
iv. To determine how different gender groups can be integrated to promote sustainable management of Kapchemutwa forest and its resources.

1.5 Research Questions

This study sought to answer the following research questions;

i. What are the gender roles in the access, use and management of Kapchemutwa forest and its resources?
ii. What are the factors that influence gender roles in relation to Kapchemutwa forest resource use?
iii. What are the practical and strategic needs of different gender groups in relation to access, use and management of Kapchemutwa forest and its resources?
iv. In what ways can the different gender groups be integrated in sustainable management of Kapchemutwa forest and its resources?

1.6 Significance of the Study

It is envisaged that findings of this study will benefit the inhabitants of Keiyo North Sub-County in terms of managing and sharing of community resources. Study findings will benefit the government through the Kenya Forest Services (KFS) in formulating policies and making informed decisions on gender equity in forest management. Results will help shade light on the influence of gender access, exploitation and management of forest resources such as fuel wood, construction materials medicine, timber, fruits, water, honey, food and cultural sites and ways of mainstreaming the gender roles in order to eliminate disparities in the exploitation of forest resources. The study will also form a basis for further research on gender and natural resources management.

1.7 Scope of the Study

This study was carried out among communities living adjacent to Kapchemutwa forest in Elgeyo Marakwet County between the months of June and October, 2015. The study focused on factors that influence gender roles in forest resource management, ways in which gender roles affect access to, use and management of forest resources at household and community level, the influence of access to, use and management of forest resources on the livelihoods of the different gender groups the practical and strategic needs of different gender groups, in relation to access, use and management of forest resources, and strategies to the integration of different gender groups into sustainable management of forest resources. The study targeted local people living adjacent to the forest and key informants drawn from Kenya Forest Service (KFS), Community Forest Associations (CFA) and other relevant organizations.

1.8 Assumptions of the Study

The study assumptions were;

(a) Men, women and youth access, use and manage forest resources in Kapchemutwa forest.

(b) Forest resources are available to all community members irrespective of gender and age.

1.9 Theoretical Framework

This study was guided by the Eco-feminism theory advanced by Ruether (1975) which posits that humans and nature are separated and as such there is hierarchy where humans dominate nature. However, women are very visible in local grassroots movements and other political activist groups centered on changing policy and rampant consumerism in order to save the environment. ”Eco-feminists believe that there is a relationship between women, human rights, and the exploitation of nature. They argue that male domination is harmful to both women and the environment. Men desire to control women and the environment in order to have complete power. An attempt to control women and the environment leads to the destruction of the environment.

Women, like nature, are viewed as objects to control, manipulate, and plunder (Momsen, 2004). Complete liberation of humans and recovery of biodiversity is closely linked to the liberation of non-humans. Ecofeminists believe that there is a deep connection between earth and women, hence the terms “Mother Nature” or “Mother Earth”. Women have special affinity with nature through their reproductive rights (Shiva, 1988). It is

against this background that the notion of care is central to eco-feminists who feel that women can care better for the environment. Merchant (1995) further calls this "earth-care", which is crucial if humans, non-humans, and the earth are to be liberated. Merchant (1995) observed that women have a central role in preserving and understanding nature. Women are called to 'lead an ecological revolution to save the planet'. However, this can be done if women's role in the construction of environmental knowledge is recognized (Shiva, 1988).

Women have little access and control of environmental knowledge and the natural environment, for example, wild vegetation, plantations, wildlife, and resort areas, among others. It is unfortunate that women's knowledge of the environment is not considered scientific by Western scientific standards (Momsen, 2004). Their indigenous knowledge, or farming, forests and trees is viewed as linked to intuition, or supernatural knowledge, therefore excluded, despite environmental movements of the late twentieth century (Njiro, 1999). Eco feminism has, however, given rise to a twenty-first century contemporary approach; gender, environment, and development (GED), which encourages environmental programs that focus on women's roles in environmental management. In this study the influence of gender on access, use and management of forest resources could lead to sustainable forest resource management.

1.10 Conceptual Framework

This section gives the conceptual framework where the independent variables of the stud were gender roles, factors that define gender roles, practical and strategic needs and gender mainstreaming in the management of forests. These factors may influence the forest resources in terms of access, use and management (Dependent variables). The intervening variables in this study were government policies on forest management, culture, education of the community members and demographic trends in the study area. These were integrated while designing the main research instruments to minimize their effects on the study findings.

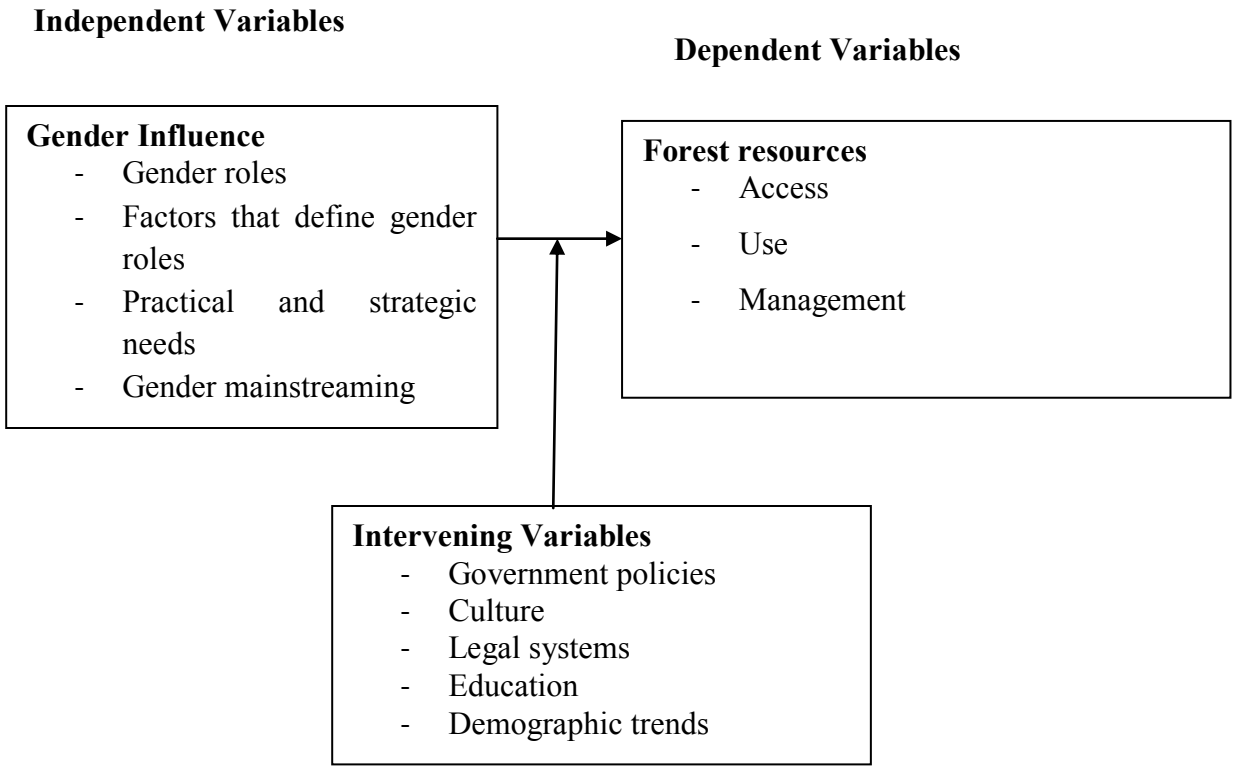

Figure 1.1: Conceptual Framework

Source: Researcher, 2015

1.11 Definition of Operational Terms

Access: Access to resources implies that both women and men are able to use and benefit from specific forest resources.

Forest Management: The organization and coordination of the forest activities in order to achieve sustainable management.

Gender Roles: Are cultural and personal factors that determine the access, use and management of forest resources.

Gender: is used to describe all the socially constructed attributes, roles, activities, and responsibilities connected to being a male or a female in a given society.

Gender-mainstreaming: These are efforts to integrate gender into existing forest management structures, programs and activities in order to achieve gender equality and achieve sustainable forest resource utilisation.

Practical Gender Needs: Practical Gender Needs (PGNs) are identified by women within their socially defined roles, as a response to an immediate perceived necessity. PGNs usually relate to inadequacies in living conditions such as water provision, health care and employment, and they do not challenge gender divisions of labour and women's subordinate position in society.

Resource management: is the skillful control of resources by those who ensure that they are used economically and with forethought. It includes those activities which are designed to govern the use of forests resources in a given environment, taking into account environmental constraints, social,

economic, and political implications, technological inventions, national policy, and possible future needs.

Resources: Resources are means and goods that can be obtained from forests including, firewood, timber, poles, medicine, honey, food among others.

Strategic Gender Needs Are identified by women as a result of their subordinate social status, and tends to challenge gender divisions of labour power and control, and traditionally defined norms and roles.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews literature related to the influence of gender on access, use and management of forest resources. Literature reviewed is from books, journals, both published and unpublished theses. It mainly covers factors that defines gender roles in forest resources, ways in which gender roles affect access to, control and use of forest resources at household and community level, how access to, control and use of these resources affect the livelihoods of the different gender groups, practical and strategic needs of different gender groups in relation to access, use and management of forests and their resources and how the different gender groups could be integrated into sustainable management of forest resources based on their roles, relations and needs.

2.1 Forest Resources in Relation to Gender

Gender as a social construct has continued to be considered as an important pillar in sustainable development in the forestry sector. Gender roles and relations, gender practical and strategic needs, factors influencing access to, control and use of resources particularly culture, economic situation, education, legal systems, demographic trends, political climate and environment as well as benefits from forest resources are important in determining the relationship between and among gender roles in forest resource access, control and use (FAO, 2009).

In many of the world' s most vulnerable and biologically diverse landscapes, women' s access to, control over, and use of local natural resources often differs from that of men. For example, a gender-disaggregated study of forest dependence in 24 tropical countries found that, in some contexts, men tend to focus more on hunting and collecting building materials while women focus more on collecting edible and medicinal plants (Sun, et al., 2011). However, the same study found that gender roles determining the collection of forest products may also vary.

Women and girls, for example, typically collect firewood in parts of Africa and Asia (Agarwal, 2009), although in some instances, both women and men can be found collecting firewood (Sun, Mwangi & Meinzen-Dick, 2011). Differences in women and men's access to, control over, and use of local natural resources may shape the management of resources, and including both women and men in resource management institutions could lead to improved environmental governance and biodiversity conservation outcomes. A growing understanding of the influence of gender on natural resource outcomes has led to greater attention being paid to gender among conservation organizations (Sunderland et al., 2014; Aguilar, 2013).

In Africa, property rights are gendered (Leisher, 2014). Gender gaps are widespread in access to and control of resources in economic opportunity, power, and political voice. Women and girls bear the largest and most direct costs of these inequalities (World Bank, 2001). In Botswana, Lesotho Namibia, and Swaziland, women are under the permanent guardianship of their husbands and have no independent rights to property. While female-

headed households form about one-third of all households in Zambia, they (women) are underrepresented among the larger farms, with only a fourth of farms larger than two hectares owned by women (World Bank, 2001). In Kenya, female-headed households own less than half the farming equipment compared to male-headed ones (World Bank, 2001).

Buchy and Subba (2003) asserted that participatory process in resource management should benefit everybody in a given community. The social reality and complex relationship among different actors however, impede the management of community resources like forests. The foregoing authors addressed how institutional model like community forest fail to integrate gender as a variable. Järvilehto, (2005).suggest that 'Environmental security' is influenced by gender relations. Their study also reveal that men and women in rural areas are primary resource users, but access to resources is socially constructed, so that men and women derive different benefits and uses from natural resources, and in times of environmental shocks and crises women may have fewer assets to fall back on, and limited diversification strategies.

Forests make a significant contribution to community livelihoods in the developing world. An estimated 1.2 billion people rely on agroforestry farming systems. Although the net loss of forests is slowing down, deforestation and forest degradation continue, especially in tropical regions. Because of the growing demand for ecosystem services from forests, a strategic approach is needed to optimize the capacity of forests to mitigate climate change, conserve biodiversity, safeguard wildlife and protect land and

watersheds. Hence, trees and forests are more important to rural women's livelihoods than to those of men (FAO, 2010). In many countries, forest land is owned by the state, while local men have rights to trees and women to tree products such as fruit. On the Pacific islands, women harvest breadfruit for food, although breadfruit trees are controlled by men, who use its timber to make furniture. For both men and women, access to forest resources is becoming complex, as rights based in negotiable customary law give way, increasingly, to government action to protect threatened forest habitats by restricting human encroachment (FAO, 2010).

Restrictions on access affect men and women in different ways although forests can be crucial to farming women's survival strategies. In sub-Saharan Africa, responsibility for caring for household members afflicted by HIV/AIDS and other terminal disease falls mainly on women, leaving less time for agricultural production. As a result, they are becoming more reliant on forest foods and income derived from fuelwood. During conflicts and natural disasters, displaced rural people also become more reliant on forest products and services. Given their responsibility for meeting household food and fuel needs, depletion of forest resources increases burdens especially on women. A study in Malawi found that deforestation was forcing elderly women to walk more than 10 km a day to collect fuel wood. Women spend on average 800 hours a year in Zambia and 300 hours a year in Tanzania on the same task. In East Africa, fuel wood scarcity has led to a reduction in the number of meals cooked in poor households (FAO, 2009).

Resource management and property rights in rural Africa are both gendered (Matsa & Matsa, 2015). This is despite the fact that there is a strong relationship between gender, resource management, and ownership of natural resources in the African rural landscape. Women have more user rights, than ownership, to forest resources, making it difficult for them to make decisions relating to use of forest resources. Women's indigenous knowledge is not respected and women are also excluded from scientific environmental knowledge, forest resource management, and administrative structures. However, men's participation is significant at household and community levels.

A study by Suliman (1991) revealed that the rate of deforestation in Malawi was approaching 4% per annum, while in Mozambique it was proceeding at 100,000 hectares per year. Zimbabwe's rate of deforestation has been estimated at 2% a year, with a fuelwood deficit in five of the nine provinces including Matabeleland North, Matabeleland South, the Midlands Masvingo, and parts of Mashonaland East (Morse and Stocking, 1995). With the current fast-track land reform and resettlement program, the figure is likely to have significantly increased as wildlife and forestry resources are obviously put under pressure as a result of high numbers of people allocated land without any institutional framework for the management of natural resources in place (Marongwe, 2004). Newly resettled farmers have been left to build their houses, granaries, and cattle pens on their own with little monitoring on the impacts of these activities on the environment. The use of wood fuel as the main source for burning farm bricks has also resulted in an increase in deforestation.

In patriarchal societies, like Kenya, Tanzania, and Zimbabwe, women are frequently defined in relation to men. In these societies, women are largely excluded from inheriting resources and also from formal social significance (Morse and Stocking, 1995). In Hausaland (Northern Nigeria), women are reported to be "strangers" in their marital homes while in Zimbabwe, with regard to taboos governing tree-use, some women are not allowed to burn certain tree species in their marital homes (MacGregor cited in Morse and Stocking, 1995). Such cultural restrictions worsen woman's plight and results in the overuse of other tree species contributing to depletion and /or degradation.

Kenya had a total of about 1.7 million ha of gazetted forestland and about 100,000 ha of trust lands by 2003 (World Bank, 2003). The country's closed canopy forests are concentrated in the moist central highlands where the human population and agricultural production are also concentrated (Wass, 2000). In the semi-arid region, closed canopy forests are mainly found on isolated hills and along riverbeds. Unsustainable forest resource use can lead to depletion leading to desertification.

In 2001, a total of 67,000 ha were cleared (UNEP, 2005; Mathu 2007). Another example occurred during the creation of the Nyayo tea zones by theNyayo Zone Corporation in 1986, where forested land was cleared in Mount Kenya, Mount Elgon, West and East Mau, Trans Mara, Tinderet, North and South Nandi, Kakamega, Kipkabus, Uplands, Kikuyu escarpment and the Aberdares. The creation of Nyayo Teas was intended to deter encroachment and support local communities through employment creation. Officially, a '100 m' strip from the forest boundary was nominally used as a guideline. However, this

guideline was ignored and resulted in greater deforestation because in some cases, the width of the tea zone strip ranged between 5 and 25 km and by 1990 the total area cleared for tea planting was 11,000 ha (Mathu, 2007).

The area of closed canopy forest cover in Kenya is considered to be very low (less than 2%), compared with 9% for sub-Saharan Africa and 21% for the rest of the world (Forest Society of Kenya (FSK) 2006). The country's total forested area is 37.6 million ha, of which 2.1 million ha are classified as woodlands, 24.8 million ha as bushlands and 10.7 million ha as wooded grasslands. Of the total forested area, only 1.7 million ha (4.5%) are set aside for management by the Kenya Forest Service (KFS). In addition, approximately 4.6 million ha or 8% of Kenya's land mass are protected areas for wildlife conservation. Protected areas are declared landscapes/seascapes that have been surveyed, demarcated and declared as national parks and/or reserves and managed by Kenya Wildlife Service (KWS, 2014).

In addition, a further 9.4 million ha (25%) of tree-covered land is in farmlands, settlements and urban centers. Overall, indigenous forests cover 1.2 million ha (2.2%). Overall, the area under indigenous forests has declined by 8.1%, indicating an annual decline of 0.4%. Public forest plantations showed a significant decline (37.1%) between 1990 and 2010, resulting in an annual decline rate of 1.8%. By contrast, the area of private forest plantations increased by 1.6%. A similar rate was observed for trees on farms and this was attributed to clearing and poor establishment in planted forests (Nield *et al.* 2000). The ban on harvesting in public forests from 1999, created a scarcity of

wood products and increased the prices of wood products (Cheboiwo & Langat, 2006). The resultant high wood products prices acted as an incentive for private farmers to expand the areas under trees (Cheboiwo & Langat, 2006).

While the loss of forest cover through clearing for settlement and agriculture as well as uncontrolled exploitation of forest products is thought largely to be the result of a rapid increase in population, there are other more serious underlying issues such as gender inequality in access to forest products, greed, corruption, and policy failures. Moreover, the forest department (the precursor of KFS), the official manager of forests, had little capacity to implement its extensive mandate. The forest department had limited financial and human resources and the institutional framework at the time severely limited opportunities for management innovations. Up until this new Forest Act of 2005, forest management objectives have been preservationist, excluding local resource users from decision-making and forest management, with minimal and stringent provisions for subsistence extraction and use of forest products for the distribution of property rights to forest resources between the forest department and the local communities). Yet there was massive extraction both by the government and large commercial industries. This contributed to increased illegal exploitation for both subsistence and commercial use.

The Forest Act of 2005, unlike its precursor, provides a framework and incentives for community and private sector involvement in the forestry sector. A key motivator for this has been the very rapid decline of the forest estate (about 8 per cent in the 1990s), and some recognition of the roles of local communities in management. Its goal is to

"enhance the contribution of the forest sector in the provision of economic, social and environmental goods and services" (GoK, 2007). Two specific objectives of the current forest policy and Act that touch on activities of forest associations include: contribution to poverty reduction, employment creation, and improvement of livelihoods through promotion of participation of the private sector, communities, and other stakeholders in sustainable use, conservation, and management of forests and trees; and contribution to sustainable land use through soil, water, and biodiversity conservation, tree planting, and the sustainable management of forests and trees (GoK, 2007). These objectives will be achieved through the contributions of the CFAs, which will be legally registered, and will enter into contractual agreements with the KFS. PFM processes in some pilot sites are raising questions on the capability of CFAs to manage forests, while more questions are being raised as to whether the communities through the CFAs will actually benefit from the decentralisation. This is occasioned by the fact that the decision-making power still remains largely with the KFS even after the passing of the new Forests Act 2005.

2.1.1 Gender Roles in the Access, Use and Management of Forests and its Resources

The differential access to, use and control of natural resources by men and women determine how much influence they have on environmental management. In many African societies, productive and parenting roles are clearly divided along gender lines. Gender roles, however, are complex and shaped by other factors, such as age and position in the family. Rural women in many parts of Africa for example are responsible for child rearing, the nutritional and health needs of the family, food production, and weeding of crops, while men open up the land. In many places, women are the primary custodians of

environmental resources by virtue of their position in the household, giving them responsibility for managing energy, water, and farming among other things. They are often the repositories of indigenous knowledge and the promoters of biodiversity conservation and environmentally-friendly management (UNEP, 2005).

Gender divisions of labour and roles and responsibilities influence the ability of women and other marginalized groups to participate in forest governance processes. Frequently, women's responsibilities and workloads limits access to decision making processes. Women, for example, often work in the evenings when customary forest use decision making meetings are held (de Vries & Sutarti, 2009). Socio-cultural factors may also limit women's mobility and participation in forest governance decision making (Gurung *et al.,* 2011).

A number of gender injustices limit women's involvement in forest governance in Indonesia. Women's roles in the forest sector are invisible and informal, leading to poor working conditions and lower remuneration (World Bank, 2009). In many community forestry projects in Indonesia, women are significantly involved in propagation, planting, maintenance, replanting trees, harvesting non-timber forest products (NTFP) and connecting these products to market. Yet women's participation in the forest farmers groups that form a key forest governance function is non-existent (Gurung *et al.,* 2011). Support from government or civil society is necessary to assist women to access markets for NTFP, including information on certification schemes and support to access credit (Marshall, et al. 2006).

The roles, knowledge, and skills of rural men and women differ with respect to forest use and management (Agarwal, 2009; Bechtel, 2010; Hecht, 2007; Mai, Mwangi, & Wan, 2011; Peach Brown, 2011). Gender-differentiated tasks and responsibilities in food production and provision, as well as in the generation of cash income, often result in different needs, opportunities, priorities, and concerns for men and women. Previous research has suggested that while the specific roles and responsibilities of men and women vary across regions and cultures, they often follow similar broad gender divisions of labor (Bechtel, 2010; Mai et al., 2011). For example, men are typically reported to manage and use natural resources for cash crop based agriculture, hunting, logging, construction, and the harvest of a smaller portfolio of high value forest products for sale (Cavendish, 2000; Shackleton, Shackleton, & Cousins, 2001). In contrast, women are said to focus more on subsistence agriculture and to be primarily responsible for collecting wild resources for household use, with a particular focus on those products that contribute to immediate household-level food security (Cavendish, 2000). Yet, although women seem to commercialize forest products less often than men, the sale of forest products is believed to be an essential source of cash income for women, who lack many of the opportunities for generating cash-income that are more commonly available to men.

Women, and particularly those in female-headed households, are therefore often thought to be, overall, more directly reliant on consumption and sale of forest resources than men (Dovie, 2003; Vodouhe, et al, 2009). These divisions of responsibility and resource use have been attributed to factors such as the physical nature of certain tasks, historical

patterns of natural resource use and ownership, and cultural barriers to accessing markets and harvesting infrastructure (Shackleton et al, 2011). However, despite this gender differentiation in the management and utilization of forest resources, research has also shown how in certain instances men and women work jointly or in complementary ways (Bechtel, 2010). For example, the harvest and sale of high-value products such as Brazil nuts (Bertholletia excelsa) in Latin America (Duchelle, *et al.* 2011; Stoian, 2005) or bush mango (Irvingia spp.) in Central Africa (Sunderland et al., 2010) are often undertaken jointly by both men and women. Additionally, in forest-based swidden agriculture, men often clear forests for farmland while women subsequently plant and tend crops (Howard, 2006). Cavendish (2000) also noted this labor sharing, particularly in cases where the harvesting activities require more than one adult laborer. As these examples show, the gender patterns in the exploitation and use of natural resources can be diverse and context specific.

Past research has highlighted two additional points in the analysis of the relations between the different genders and natural resources. First, in most cultures use and access rights to natural resources, including land, trees, water, and animal protein are often differentiated along gender lines. In many societies, women have fewer ownership rights than men (Agarwal, 2010; Coulilay-Lingani, *et al.* 2009). Although women may frequently possess de facto or land use rights (compared to men's de jure rights), women's access rights are often mediated by their relationships with men, such as through marriage, divorce, or widowhood (Hecht, 2007; Mwangi, Meinzen-Dick, & Sun,

2011). Thus, in many cases, rural women lacking secure land tenure may depend on common property resources for their livelihoods (Agrawal, 2001).

Secondly, women are frequently limited in decision making with regard to the management of natural resources. Literature reviewed suggests that although women's participation in forest management institutions, such as forest user groups (FUG), raises incomes and promotes resource sustainability (Agarwal, 2009; Upadhyay, 2005; Mwangi *et al.,* 2011), they overwhelmingly tend to be underrepresented in such groups (Agarwal, 2001; Das, 2011). The reasons for women's lack of involvement in organizations dealing with natural resources management may be due to gender biases in technology access and dissemination, women's labor or skills constraints, or due to lack of sanctioning authority (Bandiaky-Badji, 2011; Lewark *et al*, 2011; Nuggehalli & Prokopy, 2009; Reed, 2010).

Most of the facts appearing gender-focused literature are rooted in case studies, and it is unclear how widely generalizable such observations might be. Gender division of labor and contributions to household income are influenced by variables such as age, ethnicity, household composition, marital status class and caste, all of which may have varying degrees of influence (Shackleton & Shackleton, 2006). Location and level of market integration are also important factors influencing the relative roles of men and women in the management, collection, and sale of natural resources (Belcher, et al, 2005; Ruiz-Pe´rez *et al.,* 2004). Gendered relations and responsibilities with respect to natural resources are also dynamic and subject to change (Shackleton & Shackleton, 2000). For example, male out-migration (Giri & Dranhofer, 2010), or the increase in the number of

female-headed households, as is the case in Southern Africa due to HIVAIDS, can lead to greater de facto access to land and resources by women, despite such rights remaining somewhat precarious (Agarwal, 2009).

Women's full participation in natural resource and environmental management is recognized as central to policymaking. For example, their decisive involvement in community forest management bodies yields positive outcomes for both forest sustainability and gender equality (Agarwal, 2010). Further, certain aspects of gender equality, such as female education and women's share of employment, can have a positive impact on economic growth, although this impact is dependent on the nature of growth strategies, the structure of the economy, the sectoral composition of women's employment and labour market segregation, among other factors (Kabeer & Natali, 2013).

2.2 Gendered Division of Labour and Responsibility

Men and women have different roles and responsibilities as it relates to forests and rangelands and therefore the division of labour is largely based on gender, though it is also affected by other characteristics such as age, health status and marital status. For instance: men often are engaged more in physically labourious and heavy work such as felling trees and cutting bigger branches whereas women are engaged in collecting and fetching fodder and fuelwood. This difference also leads to a difference in knowledge about forest resources.

Based on socio-cultural norms and practices, men and women have different rights over land (Private forests, rangelands and trees). Even where men and women have unlimited rights to forestland, their access to forest products may not be guaranteed. This is because forest usufruct does not imply ownership and control of trees and different forest products. In some cases, even private ownership of land does not confer rights to use the trees on that land. Different members of the community or even the household may have established usufruct rights to different parts of the forest or even of a tree. For example non-timber products from trees are often women's responsibility, but the tree itself often lies in the realm of men (Warden, 1992).

Women are traditionally the main collectors of fuelwood, medicinal and aromatic plants and other non-timber forest products (NTFPs) from forest and agroforestry landscapes (Shanley & Gaia 2001; Colfer 2005). Their participation in decision making at household and community levels, although limited, has been demonstrated to improve forest regeneration (Agarwal 2007, 2009), increase crop yields, improve financial management (Acharya & Gentle 2006) and prioritise funding for pro-poor and empowerment programmes (Komarudin *et al.,* 2008). Women in forest communities can generate more than 50% of their income from forests, compared with about one-third for men (World Bank *et al.,* 2009).

Colfer (2013) reported that intra-household decision making is central and should involve women effectively in broader government and management concerns. The implications are that in order to ensure a gender sensitive approach, CSOs must consider household

level gender differences. A number of gender injustices limit women's involvement in forest governance in Indonesia. Women's roles in the forest sector are invisible and informal, leading to poor working conditions and lower remuneration (World Bank, 2009). In many community forestry projects in Indonesia, women are significantly involved in propagation, planting, maintenance, replanting trees, harvesting non-timber forest products (NTFP) and connecting these products to the market. Yet women's participation in the forest farmers groups that form a key forest governance function is non-existent (Gurung *et al.* 2011). Support from government or civil society is necessary to assist women to access markets for NTFP, including information on certification schemes and support to access credit (Marshall, *et al.* 2006).

Non-timber forest products are particularly important for women. In Cameroon, for example, close to 90% of NTFP traders in up to 25 markets were women, while in other cases women have been found to earn up to 30% of their incomes from NTFPs (Ruiz Perez *et al.,* 2002; Lemenih, 2003). In Asia, the sale of NTFPs such as wild fruits and vegetables often provides the only source of cash available to landless women (Carr & Hartl, 2008). Similar results are evident in agroforestry, where women derive substantial cash benefits from indigenous fruits and vegetables (Kiptot & Franzel, 2012). Women's control over income correlates positively with improved food intake and child nutrition status (Smith *et al.,* 2003). Recent global surveys by the Poverty and Environment Network show that women are the primary collectors of wild foods, especially in Africa and Asia (Sunderland *et al.,* 2013). Wild foods supply micronutrients, which are often

deficient in local diets (Howard & Nabanoga, 2007). They also fill gaps during times of food shortage.

2.3 Use of Forest Resources

Both men and women utilise forests, wetlands and other ecological zones and their products in a variety of ways. These uses are influenced by gender relations as well as by age, ethnicity, socio-economic status, location relative to the forests, and exposure to and level of technology (Flintan 2003, 2004). Though men's use may be more visible and have a higher profile, women rely to a greater extent on forests and forest products for both basic and non-basic needs (Naigaga *et al.* 2004). Thus, when talking to household members about resource use, it is important for the researcher to discuss it with *all* members and not only the household head.

Women tend to collect natural resources closer to home, often opportunistically, whilst carrying out other activities, and can be considered to be "generalists". Some activities, such as fish farming, are possible for women only if the resource (fish) is found close to home—because of women's limited mobility (Rutaisire *et al.,* 2004). Women are more likely to work cooperatively to overcome the need for high input of time and labour, and collecting trips may be a social event. On the Ugandan side of Mount Elgon, for example 40 per cent of women's total labour time is spent within the forest (Scott, 1998). There may be restrictions on women's entry into forests, particularly alone; working together can overcome such constraints (Flintan 2001).

In Ethiopia, culture is a dominant factor that influences gender roles, responsibilities, participation, and so on. Jibat, *et al*. (2001) highlight the influence of culture in defining livelihood and agricultural roles. Their study emphasises that we should not assume that gender roles are obvious; there may be changes or adaptation at a local level; and assumed roles may not necessarily fit our preconceptions. Other research by Flintan (2004) has shown that, in Southwest Ethiopia, specifically Bonga forest, cultural restrictions prevent women from collecting non-timber forest products, their husbands collect wild cardamom and firewood, which the women who then sell the cardamom and firewood in the market or use at home. However, in other parts of the region, particularly where coffee growing has increased exposure to traders, women have greater mobility and play a greater role in NTFP collection. Culture can help enforce other rules and taboos. For example, in parts of Kenya, there are taboos that prevent married women from planting certain trees, such as eucalyptus. It is alluded that if a married woman is allowed to plant a tree that will be used for timber, the roots will grow towards her house and overturn it (Mwangi and Houghton 1993).

Due to their different gender roles and responsibilities, men and women use forest products in different ways. For instance the general trend is that women gather forest products for fuel, food, fodder, herbs for medicinal purposes, raw materials for small scale income-generating activities, whereas men gather wood for selling or for construction (Jacobson, 1992; WEDNET, 1991).

The majority of Malagasy people live on under $2 per day; and therefore, they depend heavily on natural resources for their subsistence, for which women play an under-

recognized but significant role. Use of forest for rice agriculture, called 'tavy' , forms the basis of subsistence for many rural communities and is practiced by both men and women, who share rights to ownership and inheritance of forest land (Widman, 201 4) , and participate in working the fields and selling their product in the market. Women also use natural resources to directly provide for their families such as fetching water; harvesting crayfish, fruits, and leafy vegetables for consumption and sale; and collecting non-timber forest species to weave mats and baskets, to be sold in local markets or used by the women's families for their everyday needs (Järvilehto, 2006). Men, on the other hand, may traditionally collect wood for fuel, construction or sale, harvest honey and medicinal plants, tend to cattle, and in some regions, hunt bushmeat for consumption.

While the benefits of women's participation is well established in the Gender, Environment and Development theory, the exclusion of women and other gender-based injustices in forest tenure and forest governance has not been adequately addressed in Indonesia (Siscawati & Mahaningtyas, 2012). Compared to men, women have less involvement in decision making processes that define their access to the forest land and resources on which their livelihoods depend (Gurung *et al.,* 2011). Increasing women's participation in forest and land resource management has been determined to improve governance, resource allocation and the sustainability of forest resources.

Enhancing women's participation in decision making committees in community forest institutions has been shown to improve forest governance and resource sustainability (Agarwal, 2009). For example, research in Nepal found that when women are involved in

community forest user groups, and have decision making positions in those groups, the outcomes lead to more sustainable forest management (Acharya & Gentle, 2006). Forest governance also has the ability to increase women's participation in informal markets, which has welfare benefits. Women's participation in forest governance was also found to mitigate the capture of benefits by elites during Indonesia's process of decentralization, and to improve access to district level budgeting processes (Manfre & Rubin 2012).

As men and women's day-to-day economic roles differ, the effect of industrial development is also felt differently. Gender divisions of labour and roles and responsibilities influence women's and other marginalized groups' ability to participate in forest governance processes. Frequently, women's responsibilities and workloads limits access to decision making processes. Women, for example, often work in the evenings when *adat* (customary*)* forest use decision making meetings are held (de Vries & Sutarti 2009). Socio-cultural factors may also limit women's mobility and participation in forest governance decision making (Gurung *et al.,* 2011).

The pattern in the intensity of use differs between men and women (Byers & Sainju, 1993) for example women gather fodder, fuelwood and other products for household consumption, often in smaller quantities but in a continuous manner whereas men's use pattern of forest resources, while not as continuous, may have more impact on the forest condition. Management and conservation practices of women and men also differ according to the methods and intensity of use.

2.4 Strategies for Sustainable Forest Management

Women and men often have highly specialized knowledge of forest flora and fauna in terms of species diversity, location, harvesting and hunting patterns, seasonal availability, uses for various purposes, and conservation practices. Generally, both women and men derive their knowledge from their specialized roles and the gender-specific ways in which they access forests and trees, which products they harvest and how they use them, what markets they access, and how they rely on forest products for their livelihoods (Shanley and Gaia, 2001; Howard, 2003; Colfer, 2005).

Much of the existing literature, typically based on case studies, paints a stylized picture in which women derive their knowledge from their specialized roles in the collection and processing of forest products for direct household use and some access to local markets, while men tend to specialize in the harvesting of timber products and bush meat for cash income and marketing. However, the extent to which such findings can be generalized is often unclear. Data from 36 long-term studies of forest-proximate communities in 25 countries in Africa, Asia and Latin America, representing more than 8 000 households, confirm that men and women tend to collect different forest products (Sunderland, 2011).

Contrary to conventional wisdom, the data show that both women and men collect non-wood forest products (NWFPs) primarily for subsistence and that men's sale share is generally higher than women's, except in Africa where the share is roughly equal (Sunderland, 2011). This indicates that while gender differences in forest-relevant knowledge exist (particularly on processing and marketing), they may not be as clear-cut

as previously thought, and that other factors (marital status, age, wealth and formal education) co-determine how people use the forest, rather than gender alone.

Colfer (2013) found that intra-household decision making is central to involve women effectively in broader government and management concerns. The implications are that in order to ensure a gender sensitive approach, CSOs must consider household level gender differences. A number of gender injustices limit women's involvement in forest governance in Indonesia. Women's roles in the forest sector are invisible and informal, leading to poor working conditions and lower remuneration (World Bank, 2009). In many community forestry projects in Indonesia, women are significantly involved in propagation, planting, maintenance, replanting trees, harvesting non-timber forest products (NTFP) and connecting these products to market. Yet women's participation in the forest farmers groups that form a key forest governance function is non-existent (Gurung *et al.,* 2011). Support from government or civil society is necessary to assist women to access markets for NTFP, including information on certification schemes and support to access credit (Marshall, *et al*. 2006).

Having no education also has a strong negative effect on women's participation in community organizations. Education and literacy levels are factors inhibiting women's involvement in forest governance. Two-thirds (66.44 per cent) of Indonesian women have only primary education or less, while half (52.27 per cent) of Indonesian men have similarly low levels of education (Beard & Cartmill 2007). However, community governance institutions for forest lands and resources in Indonesia often require that

participants are literate, to the detriment of poorer women who often have only some primary education (Beard & Cartmill 2007). For example, only women deemed to have sufficient levels of literacy were able to participate in the community forestry program in Gunung Kidul, Yogyakarta Province (Siscawati & Mahaningtyas 2012).

Due to their different social and work roles and responsibilities, significant gender differences are evident in forest related knowledge. Women's knowledge of the same area of forest land and resources can vary significantly from men's (Colfer, 2013). Men and women may also organize, receive and transmit their knowledge in different ways. Literature on forest management has emphasized women's knowledge of forest products and resources and how to use them (Mulyoutami *et al.,* 2009). Women's knowledge and skills, such as in seed selection and propagation, provides a crucial function for forest garden development and conservation in East Kalimantan. Women are also often tasked with the role of meeting a family's NTFP needs, such as food, fuel or fodder (Gurung et al., 2011). Due to their dependence on NTFP, women are also often skilled at cultivating and preserving these resources, which can support sustainable forest management. Frequently however, gender differences in knowledge are not accounted for in forest governance decision making.

Nevertheless, women's knowledge tends to be linked more directly to household food and nutrition needs, as well as to health and culture, compared with men's knowledge (Daniggelis, 2003). A study in Amazonia (Shanley & Gaia, 2001) found that, compared with men, women were able to identify a broader range of plant species (for example,

trees, vegetables, vines, bushes and herbs) and usable plant parts (fruit, bark, leaf, seed and root). Such knowledge is particularly important in times of natural disasters and food crises when the collection and sale of forest products by women often become critical for household survival. In many places, women's familiarity with tree products such as fruits and nuts, medicinal materials and fuelwood plays a crucial role in coping with food shortages. Moreover, the nutritive value of wild foods is often substantial and at times of food crises can be used as a substitute for purchased food items.

Traditionally, women have been the primary domesticators of forest-based food and medicinal plants that are now found in home gardens around the world (Kumar & Nair, 2004; Eyzaguirre & Linares, 2004). Rural women play a particularly important role in the cultivation of indigenous fruit trees in humid western and southern Africa such as *Irvingia gabonensis, Dacroydes edulis* and *Sclerocarya birrea* (Campbell, 1987). While men may be the nominal owners of trees, women are often responsible for the marketing of fruits and, importantly, are often able to decide how the income is used. Poulton and Poole (2001) proposed that the domestication of indigenous fruits may be more advantageous to household food and income security than the introduction of exotic fruit trees, which tend to be the domain of men.

Nevertheless, women's participation in tree domestication has been hindered by limited access to and control over land and trees, insufficient information on the requirements and advantages of tree domestication, and substantial periods of production inactivity due to the childbearing and childrearing roles of women and their heavy workloads in the

household (Degrande *et al*., 2007; Degrande, 2009). Available literature (Degrande, 2012b) also suggests that, compared with single women and widows, married women are generally more knowledgeable about tree domestication because they tend to have easier access to land and labour via their husbands.

Men's knowledge is often regarded as knowledge that "counts", but the knowledge held by women is not always properly recognized in forest management plans and forest use. If communities recognize the value for future generations of the "hidden" knowledge held by rural women of forest trees and plants for food and medicine, and if that knowledge is sought out in development learning and programming, it is likely to be retained and to contribute directly to conserving forest biodiversity. Thus, there is a need to support women's knowledge on forestry matters to improve rural livelihoods, foster knowledge transmission between generations and user groups, conserve forest and agroforestry biodiversity, support local-level climate change adaptation, and strengthen the resilience of vulnerable households.

Global comparative analyses confirm the general low levels of women's participation, which have been demonstrated by numerous case studies across different settings over the past two decades. Women participate much less than men in forest user groups, where decision rules regarding forest use, management and benefit distribution are made (Sunderland *et al.,* 2013; Coleman & Mwangi, 2013). In addition, forest user groups with high proportions of women, as against gender-balanced groups, or groups with higher proportions of men, perform less well on key governance indicators (Mwangi *et al.,* 2001, Sun *et al.,* 2011).

Studies show that there is a threshold percentage below which women's effectiveness in leadership of forest user group committees declines, and that there are significant gains to forest sustainability with women's participation in forest governance (Agarwal, 2007, 2009). In agroforestry and tree management, the results are mixed (Kiptot & Franzel, 2012). Overall, however, women disproportionately bear the costs of tree and forest management, realise only a fraction of the benefits and tend to be enlisted for decision making only when forest and tree resources are degraded (Agrawal & Chhatre, 2006). Moreover, women's lack of formal education, employment and personal networks makes them poorly placed to influence resource allocation or research (Ferrier, 2002).

Ensuring that both men and women benefit equitably from conservation and development programs is likely to increase the long-term success of both conservation and development goals. However, despite numerous international agreements and national policies highlighting the important relationship between gender, environment and sustainable development, implementation is often weak and gender is often neglected or inadequately addressed in conservation initiatives (Westerman & Benbow, 201 4) . Since women play critical roles in natural resource use, information transfer, and societal reinforcement of resource use practices (Agarwal, 2009), there is a need to ensure that they are as well integrated into community-based conservation projects as men at all levels, from micro-development projects to management and decision-making structures. Cultural practices and traditional gender roles may make this challenging; however, such

an approach could substantially improve the outcomes of conservation and development actions.

In Madagascar, there is currently an urgent need and also an opportunity to mainstream the integration of gender in conservation planning and implementation. Madagascar holds some of the most unique and biodiverse ecosystems on Earth, but is currently facing an environmental crisis that threatens both its biological wealth and the human livelihoods that depend on it. Madagascar's forests are among the most threatened ecosystems in the world, and support about 1 4.5 million people who rely on forest resources for their subsistence (Chao, 2012).

To integrate the involvement of women in conservation initiatives, there is a need for a clear, strategic, gender-responsive plan that takes into account the specific needs of men and women and the gendered inequities that may prevent women from benefiting from natural resources management (Agarwal, 2009). Gender-responsive policies consider the different societal roles and places of men and women, their interests as well as their cultural and traditional settings (Otzelberger, 2011). Such approaches have been recently outlined at the conference of the parties to the Convention on Biological Diversity (UNEP, 2014), which present valuable tools for natural resources management. The Nature Conservancy (2015) has also developed useful toolkits that outline specific steps organizations can take to create a strategic plan that integrates gender into conservation projects. Essentially, gender integration needs to be made explicit in the development and

implementation of conservation approaches, and frequent assessment during and after the project should be done to ensure its effectiveness.

Women are critical actors in the management of forest resources. Most gender related studies on forest sustainability are dominated by studies from India and Nepal that have focused on analyzing the impacts of community forestry. The relative participation of men and women in various capacities of decision making has been the key variable under study. Women are often excluded from participation for reasons including: the rules governing the community forestry groups, social barriers stemming from cultural constructions of gender roles, responsibilities and expected behavior, logistical barriers relating to the timings and length of organizational meetings, and male bias in the attitudes of those promoting community forestry initiatives (2007). For example, the rules of forest closure, which are designed to regenerate deteriorating forests, forbid entry by humans and animals. Such rules not only burden women, who subsequently have to walk further and spend longer hours collecting firewood, but also prompt them to break the rules (Agarwal, 2007).

Despite these constraints, community forestry groupings, especially those in which women are executive officials, have performed well in regenerating degraded forest lands (Agarwal 2007). Higher proportions of women in forest committees increases their knowledge of group rules; is associated with stricter rules (Agarwal, 2009); has positive effects on regulating illicit grazing and felling (Agrawal *et al.,* 2004); and increases women's membership and effectiveness in community forestry groups (Agrawal, 2010).

The capacity to manage conflicts increases in groups where women are present (Westermann et al. 2005). The security of women's property rights to forest and tree resources also serves as an important incentive for their adopting resource conserving measures (Meinzen-Dick *et al*., 1997; Quisumbing *et al.,* 2001); uncertainty greatly limits women's capacity to undertake action to mitigate degradation or unsustainable use (Yadama *et al.* 1997). Attention to gender differences in property rights can shed light on the sustainability status of forests; it is important to identify the nature of rights to forests and trees held by women and men, and how they are acquired and transmitted from one user to another (Howard & Nabanoga, 2007).

Forest management committees with a higher proportion of women represented have a greater likelihood of improving forest conditions (Agarwal, 2009). Collaboration, conflict resolution, and the capacity for self-sustaining collective action can increase when women are part of a natural resource management group (Westermann, Ashby, & Pretty, 2005). Women's participation in a policy-making group can also lead to choices that promote particular public goods (Agarwal, 2010). This study therefore sought to determine how different gender groups could be integrated into sustainable management of forest resources based on their roles, relations and needs.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology that was used for data collection, analysis and presentation. It also presents the research design, sample frame, sampling procedures, methods of data collection and data analysis. In conducting this study, both primary and secondary data was used, while qualitative and quantitative techniques were used in data analysis.

3.2 Research Design

This study adopted a descriptive survey method. This method is appropriate for data collection in spatially extensive areas. According to Sproul (1995), descriptive survey methods provide a suitable means through which community views, opinions, attitudes, perceptions, aspersions, and suggestions regarding the phenomenon under investigation will be obtained.

3.3 Sampling Frame

The sampling frame for this study comprised of key informants drawn from 3288 households (KNBS, 2009), Government Agencies (Kenya Forest Service), and community forest associations in Kapchemutwa Ward of Keiyo North Sub-County. The study of the area was done to narrow down the research for intensive investigation. The forest is bordered by four locations; Namely; Kapchemutwa, Kamoi and Kokwao and Kamogich locations (Appendix vii). Three out of the four locations; Kapchemutwa,

Kamoi and Kokwao were considered to the process of data collections. Kamogich location was not considered in the process of data collection because the extensive part of the population tends towards the south in the escarpment where utilisation of resources from Kapchemutwa forest is minimal. The sampling frame is represented in Table 3.1.

Table 3.1: Households in Kapchemutwa Ward

Location	Household numbers
Kamoi	537
Kapchemutwa	1,415
Kokwao	1,346
Total	**3,288**

3.4 Sampling Procedures and Sample Size

In order to ensure that representative samples were derived from each of the three location, a multi-stage and-stratified random sampling technique was used in selecting household heads for the interview schedule. Firstly, Kapchemutwa Ward was stratified into three locations or primary sampling units (PSUs), namely: Kamoi, Kapchemutwa and Kokwao. The selection of the PSUs was based on factors such as accessibility, financial resources and time.

From each PSU, two clusters or secondary sampling units (SSUs) were selected This approach according to Bless and Achola (1995) reduces erroneous sampling, facilitateds a way to better represent a population and allows for accurate generalization of results. The sampling technique used in this study was multi-stage cluster sampling. The Ward was taken as a cluster with three locations and 13 sub-locations. The locations namely;

Kamoi, Kapchemutwa and Kokwao had two sub-locations, five sub-locations and five sub-locations respectively. One sub-location in each sub-cluster (location) was selected using simple random sampling technique. Ten percent (10%) of households in each sub-location were selected by simple random sampling technique where the first household was picked by simple random sampling technique followed by systematic random sampling where every 10^{th} household was selected. The total sample size for this study was 167 respondents. In addition three focus group discussions involving the CFA members were also organized.

3.4 Sources of Data

Both primary and secondary data were used in this study. Interviews, questionnaire administration, focus group discussions, observations and photography comprised the main sources of primary data, obtained directly from randomly selected household heads and purposively selected key informants from CFAs and KFS. Secondary data was obtained from review of published and unpublished materials from books, refereed journal articles, unpublished theses and dissertations.

3.5 Data Collection Instruments

The instruments used for data collection were; interview schedules, questionnaires, focus group discussions guide questions and observations sheets.

3.5.1 Interview Schedules

Interviews were held with local leaders, CBO and local village elders in each sub location who acted as key informants. The information gathered from the respondents centred on

their roles in the management of forest resources. Also interviewed were Kenya Forest Service personnel. The information gathered touched on the depth of the influence of gender on access, control on use of forest resources and was used to crosscheck the reliability of household interview. The researcher recorded the above information in the field notebook, synthesized and transferred to the final document

The interview schedule was useful in minimizing the weaknesses of low response return rates to questionnaires, artificial atmosphere and misinterpretation of questions. Furthermore, through careful motivation of the subject and maintenance of rapport, more insightful information was obtained including the negative aspects about the subject. The interview schedule is presented in Appendix III.

3.5.2 Questionnaire

Questionnaires were administered to 167 respondents. The questionnaire consisted of both structured and non-structured questions. The unstructured items captured opinions, feelings and suggestions of the respondents in the space provided. All the questions in the questionnaire were related to the objective and the research questions of the study as indicated in Appendix I.

The questionnaire has more advantages because it allows the collection of a lot of data and it is easy to administer. Less time is required in collecting information from the respondents and information collected from a questionnaire can easily be analyzed. It also helps to ensure that all respondents reply to the same set of questions and that

answers are in the words of the respondents and thus free from the interviewer's bias (Orodho, 2003).

3.5.3 Focus Group Discussions

The importance of focus group discussions was to encourage participants to voice their own opinions on the subject and develop a common understanding on access, control and use of forest resources in Kapchemutwa Ward. Organised FGDs with selected groups of participants, in consultation with the local leadership and were used to generate data related to the opinions of the local residents on access, use and control of forest resources.

3.5.4 Observation and Photography

Direct observation was used to observe and verify the involvement of the community on access and use of forest resources. This technique was used to determine the extent of gender involvement in the access and use of forest resources. In addition, photographs were taken to show mainly the use of forest resources. This technique helps to eliminate subjective bias in questionnaire and interview responses. However, this method has its limitations. According to Kothari (2004), the observation method is expensive, information provided is limited and sometimes unforeseen factors may interfere with the observational task. To overcome this limitation the researcher recorded observations immediately by taking photographs where necessary.

3.6 Data Analysis and Presentation Techniques

The study utilized descriptive analysis techniques. Quantitative data was analyzed by use of descriptive statistics such as measures of central tendencies which included frequencies, and percentages while qualitative data were summarized and interpreted in line with the research objectives and questions. Results are presented using figures and tables.

3.7 Ethical Considerations

In addition to conceptualizing the writing process of the thesis, a researcher needs to anticipate the ethical issues that may arise during a study (Hesse-Bieber & Leavey, 2006). Research does involve collecting data from people and about people (Punch, 2005). The research involved collecting data on income levels and literacy levels, and also involved interviews with local leaders. The research team made sure that the data was handled confidentially. Since the researchers were already familiar with the area, they were able to treat participants in a manner that ensured that their dignity and integrity were protected. Participants were also informed that their names were not to be recorded and only codes were used.

CHAPTER FOUR

RESULTS

4.1 Chapter Overview

This chapter documents the findings based on responses questionnaires and interview schedules on the influence of gender on access, use and management of forest resources. The chapter is divided into two sections, with section one, dealing with the demographic description of participants involved in the study. The second section follows the four specific objectives of the study namely; gender roles in the control, use and management of Kapchemutwa forest and its resources, factors that define gender roles in relation to resources access, use and management, the practical and strategic needs of different gender groups in relation to access, use and management of forest resources, ways in which gender roles affect access to, use and management of forest resources for livelihood improvement and integration of different gender groups into sustainable management of forest resources based on their roles, relations and needs.

4.2 Demographic Information

Among the demographic information sought from the respondents were; gender, age group, marital Status, highest level of education and socio-economic activities they undertake to earn a living. The main purpose for this was to understand the socio-demographic characteristics that have an effect on access, use and management of forest resources in the study area.

A total of 158 out of 167 respondents fully filled and returned the questionnaires and therefore the return rate of questionnaires used for data analysis was 94.6% and this was considered adequate to provide the information on the influence of gender on access, use and management of forest resources. In addition, two interviews were conducted with the KFS zonal manager and the Chairman of CFAs in the area. Three Focus Group Discussions were held where 8 participants involving 4 men and 4 women were selected using simple random sampling technique to participate in the discussions.

4.2.1 Gender of Respondents

The respondents were asked to indicate their gender in the questionnaire. The results of data analysis are presented in Figure 4.1.

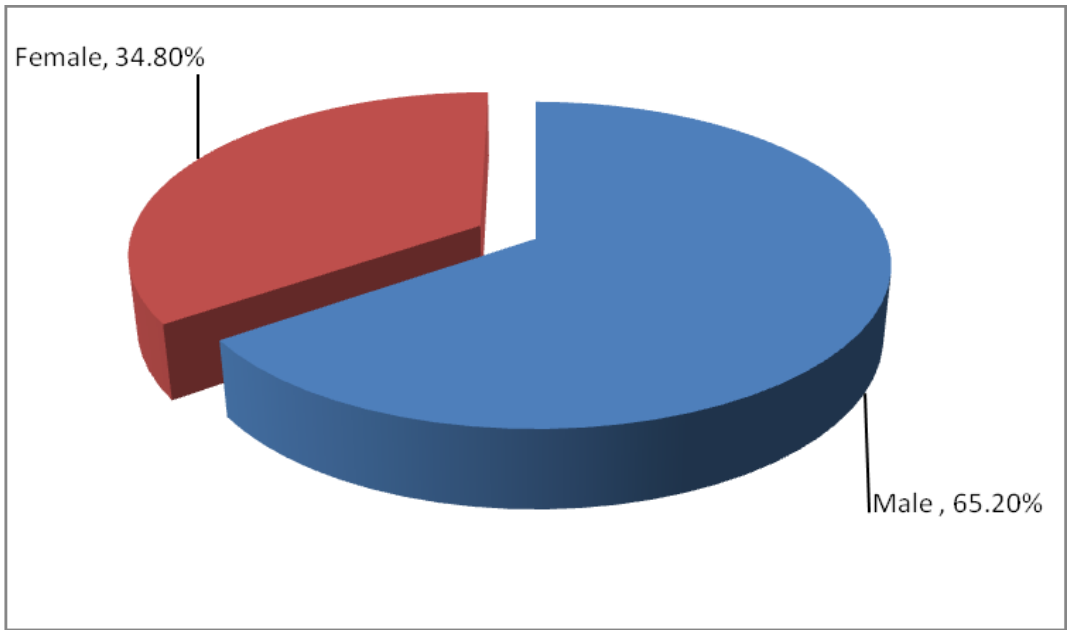

Figure 4.1: Gender of the Respondents

Figure 4.1 shows that 65.2% respondents were male while 34.8% respondents were female. The study findings showed that a majority (65.2%) of the sampled respondents were male as compared to their female counterparts. This implies that there are more households headed by men in the study area as opposed to households headed by women.

It has been argued that women's access to, control over, and use of local natural resources often differs to that of men since women are traditionally the main collectors of fuelwood, medicinal and aromatic plants and other non-timber forest products (NTFPs) from forest and agroforestry landscapes (Shanley & Gaia 2001; Colfer, 2005). Their participation in decision making at household and community levels, although limited, has been demonstrated to improve forest regeneration (Agarwal, 2007, 2009). It has also been reported that women participate much less than men in forest user groups, where decision rules regarding forest use, management and benefit distribution are made (Sunderland *et al.,* 2013; Coleman & Mwangi, 2013). This implies that in male headed households in the study area, women participate less in making decision on forest resource use and management.

4.2.2 Age of Respondents

Results on age of respondents are presented in Figure 4.2.

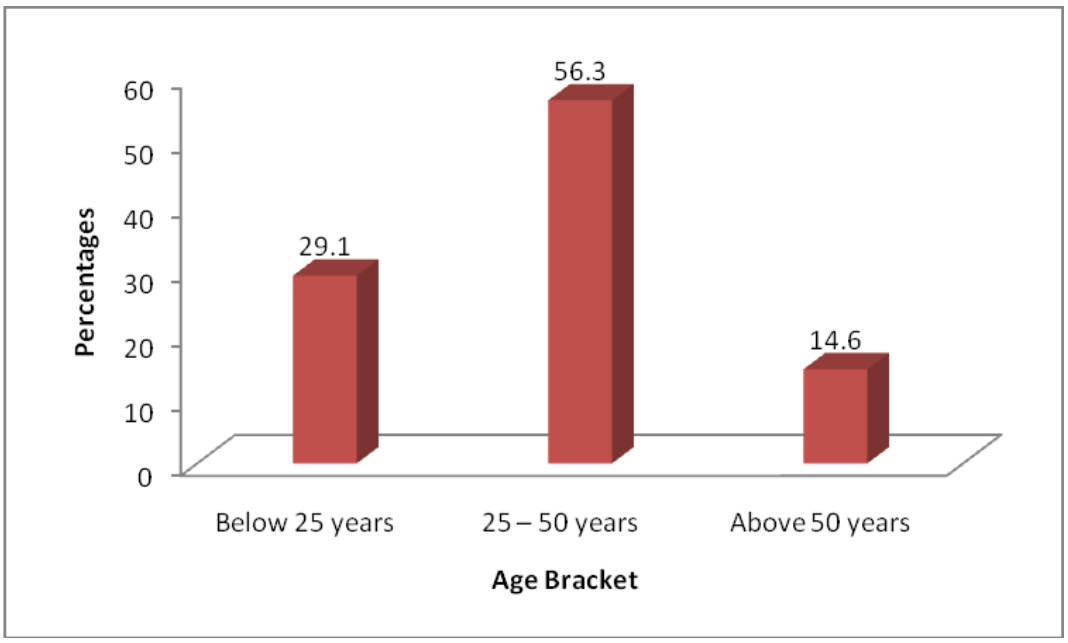

Figure 4.2: Age Group of the Respondents

From Figure 4.2 56.3% of the respondents were aged 25-50 years, 29.1% of the respondents were aged below 25 years while 14.6% of the respondents were aged over 50 years. Since the study findings showed that a majority of the respondents were aged 25-50 years an implication that most of the respondents were at a productive age where resource acquisition and use is a prime factor.

Age is known to have impact and influence on the way of thinking, attitudes and perceptions and behavior of the people toward the adoption of innovations (Hassan *et al.,* 2002; Hassan, 2008). Bogale (2011) found that the age factor affected the respondent choice to pay for forest user rights in Ethiopia. The older residents living near the adjacent forests were significantly willing to pay for the forest user rights more than younger ones.

4.2.3 Marital Status of the Respondents

In addition, the respondents were asked to indicate their marital status. The results are presented in Figure 4.3.

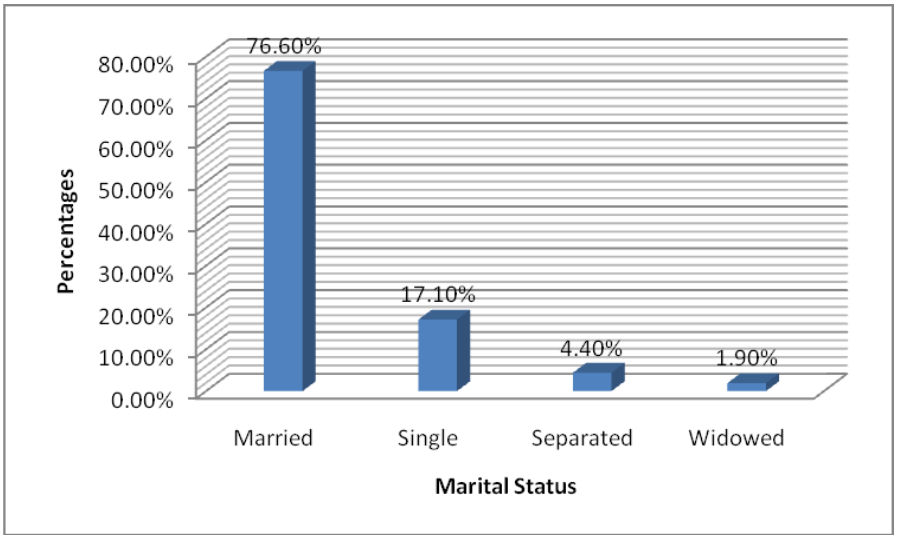

Figure 4.3: Marital Status of Respondents

From Figure 4.3, 76.6% of the respondents were married, 17.1% of respondents were single and 4.4% of the respondents were separated while 1.9% of respondents were widowed. The study findings showed that majority (76.6%) of the respondents were married as compared to the single and those who were widowed. Degrande, (2012) pointed out that, compared with single women and widows, married women are generally more knowledgeable about tree domestication because they tend to have easier access to land and labour via their husbands.

4.2.4 Highest Level of Education Attained

In addition the respondents were asked to indicate their level of eduaction. The results are presented in Figure 4.4.

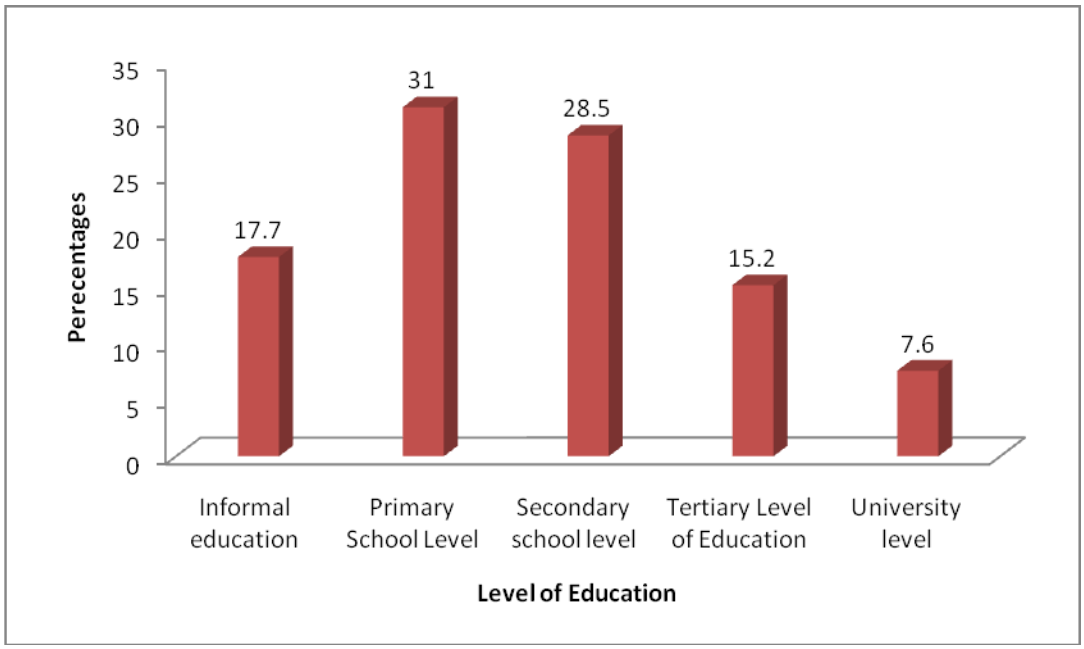

Figure 4.4: Respondents' Level of Education

From figure 4.4 shows that 31.0% of the respondents had primary school level of certificate, 28.5% of the respondents were secondary school certificate holders, 17.7% of the respondents had informal education and 15.2% of the respondents had undergone tertiary education while 7.6% of the respondents had university level of education. The study findings shows that most of the respondents were primary school certificate holders. Beard & Cartmill (2007) noted that having no education also has a strong negative effect on women's participation in community organizations. Education and literacy levels are factors inhibiting women's involvement in forest governance.

Furthermore, Sunderland, (2011) reported that having formal education determines how people use forest resources.

4.3 Gender Roles in Access, Use and Management of Forest Resources

Gender roles in determining the access, use and management of forest resources may vary. The first objective of this study was to determine gender roles in the access, use and management of Kapchemutwa forest and its resources. To achieve this objective, the respondents were asked to indicate the resources they obtained from the forest. The respondents were allowed to indicate as many resources as possible making the response to be multiple in nature. Responses were tabulated and the results are presented in Table 4.1.

Table 4.1: Resources Obtained from Kapchemutwa Forest

Resource	**Male**		**Female**	
	Frequency	**Percentage**	**Frequency**	**Percentage**
Firewood	12	6.6	53	35.6
Charcoal	25	13.7	9	6.0
Poles	52	28.4	11	7.4
Medicine	17	9.3	35	23.5
Timber	42	23.0	7	4.7
Honey	22	12.0	15	10.1
Food (Shamba system)	13	7.1	19	12.8
Total	**183**	**100.0**	**149**	**100.0**

Source: Field Data, 2015 (Multiple Responses)

Table 4.1 shows that 28.4% of the male respondents obtained poles from the forest, 23.0% of the males obtained timber from the forest while on the other hand 35.6% of the women obtained firewood and 23.5% of the women obtained medicine from the forest. Further, 12.8% of the females and 7.1% of the males depended on the forest for food showing that a larger percentage of females depended on forest for food as compared to their male counterparts. This implies that women were more involved in tilling forest land as compared to the males in the study area. The study findings showed that males depended on the forest for poles, timber (Plate V & VI) and charcoal while women mostly obtained firewood, medicine (Plate II) and food from the forest. From the findings, it emerged that males and females differed in the resources they obtained from the forest which shows that there is gender difference in resource use in Kapchemutwa forest.

On interviewing the KFS zonal manager and local leaders, it emerged that men mostly obtained timber, poles and charcoal from the forest area. These resources according to the forest manager depleted the forest more and therefore it can be argued that men are associated with depletion of forest resources in the study area. This was attributed to the fact that men sell timber, fencing poles and charcoal in order to get money and therefore cut down huge trees which depletes the forest more. According to the zonal forest manager, these are illegal activities which have been banned in the forest but men still collude with some corrupt forest officers in undertaking these activities.

On the other hand resources obtained from the forest by women were mostly fuelwood and herbal medicine. The forest officer noted that women collected dry wood to be used in their homes as fuel wood. The collection of dry wood for fuel wood was therefore allowed since it did not have negative effect on forest cover. Herbalists in the area were mostly old women and men and were allowed to collect the herbal medicine since they had adequate knowledge on the conservation of medicinal plants as shown in plate I & II. Further, during the focus group discussion, beehives kept in the forest for honey were mostly associated with elderly men as shown in Plate IV.

The demand for fuel wood in the study area is high owing to high population and low income levels. The income levels in the communities generally forces them to resort to cheaper methods of energy generations. Wood fuel is used in cooking and lighting homes. The residents adjacent to the forest collect firewood from the forest, mainly branches of cypresses (*Cupresssus Luisitanica, Pinus batula, pinus radiata,* podo, cedar and other indigenous tree species. Currently cypress and pinus plantations have been sold to saw millers for harvesting (Plate V & VI). Therefore collection of firewood is done after saw millers have harvested such trees for timber production thus leaving tree branches in the forest. This firewood is often collected when still green as the demand in such those who wait to dry in the bush miss it. The local people also get their fuel wood from the forest after thinning operations by the forest personnel especially from grown trees planted with crops.

Respondents were further asked to indicate the groups that mostly used the forest resources. Results are presented in Table 4.2.

Table 4.2: Groups Which Mostly use Forest Products

Group	Male		Female	
	Frequency	Percentages	Frequency	Percentages
Youth	35	34.0	18	32.7
Women	29	28.2	8	14.5
Men	24	23.3	18	32.7
The elderly	15	14.6	11	20.0
Total	103	100.0	55	100.0

Source: Field Data, 2015

Results in Table 4.2 shows that 34.0% of the males and 32.7% of the females reported that the youth were mostly involved in the use of forest resources, 28.2% of the males and 14.5% of the female respondents reported that women mostly used forest resources, 23.3% of the male respondents and 32.7% of the female respondents cited that men mostly acquired forest resources while 14.6% of the male respondents and 20.0% of the female respondents cited that the elderly mostly acquired forest products from Kapchemutwa Forest. From the results, it is evident that a higher percentage of male respondents cited the youth and women as those who acquire most resources from Kapchemutwa forest while a higher percentage of female respondents cited the youth and men as those who acquired forest resources more. However, a small percentage of both the male and female respondents reported that the elderly accessed and used the forest more. Lastly, study findings showed that all the groups; men, women, youth and the elderly used forest resources but obtained different resources for different uses.

From the focus group discussions, it emerged that men mostly obtained timber and construction poles from the forest, the youths mostly obtained charcoal and timber while some used the forest for recreation. In addition, mostly women obtained firewood and herbal medicine from the forest while the elderly mostly used the forest to get honey and herbal medicine. It seems therefore that women and the elderly obtained non-timber products from the forest while the youth and men mostly obtained timber products and poles from the forest. However, in some instance men worked hand in hand with the youth or women in harvesting forest products. The forest officers interviewed stated that in some instances illegal harvesting of timber products occurred at night and this was done and facilitated by men and youth while women and men work jointly when tilling forest land for food production.

Kapchemutwa forest acts as the source of a number of medicinal herbs for the surrounding communities of Kokwao, Kamoi and Kapchemutwa locations. Many of the herbs collected from the forest are said to cure simple ailments such as cold fever, headache, stomach upsets, skin rashes infertility among women and other diseases that affect livestock such as anthrax, constipation and coccidiosis (in poultry) among others. The residents of the tree locations reported that they extract parts of the plants as the roots, leaves, branches and pods for medicinal use. Extraction of plant parts for medicinal purposes is done by people who have knowledge on herbal medicine. Such community members extract medicinal herbs from the forest with permission from the government through the Ministry of Culture Sports and Social Services

Apart from the local residents, there are also organized herbalists who have registered with the Ministry of Culture, Sports and Social Services and have the authority to extract parts of herbal plants for medicinal purposes from the forest. Among the organized groups of herbalists registered is the Emsot Herbal Organization whose headquarters is in Iten town. This organization has 50 members, both men and women. The role of the herbs organization is to conserve and extract medicinal plants from the forest and forest buffer zone. The organization has three herbs medicine nurseries each with over 300 seedlings of different species.

Forests are the home of wildlife, which was a major impact on tourism. Several wild animals are found in Kapchetumwa forest; they range from monkeys, warthogs, impala, dikdiks and rabbits. Other types of wildlife currently found in this forest include reptiles such as snakes and tortoises. Also found in this forest are insects and birds of different types

According to the elderly members of the local community who were aged between 70-90 years, several other types of big mammals were found in this forest around the 1960s.these included the elephants, lions, leopards, cheetahs and buffaloes. The population of such mammals is said to have been so high that they become a threat to the lives of local people. These animals are said to have reduced in number due to increase in human population in Kapchemutwa, Kokwao and Kamoi locations and the beginning of plantation forestry in Kapchemutwa forest thereby opening up the forest around 1969

thus disrupting the habits of these animals .the reduction in animal numbers has also been partly attributed to poaching.

4.3 Factors that Influence Gender Roles in Relation to Resources

The second objective of this study was to examine the factors that influenced gender roles in relation to resources in Kapchemutwa forest. Gender-differentiated tasks and responsibilities in relation to access, use and management of forest resources often result in different needs, opportunities, priorities, and concerns for men and women (Mai et al., 2011). To achieve this objective, the respondents were requested to indicate in the questionnaire, the factors that define their roles in relation to access, use and management of forest resources in Kapchemutwa forest. Results are presented in Table 4.3.

Table 4.3: Factors that influence Gender Roles in Forest Resource access, Use and Management

Factor	Frequency	Percentages
Resource use	43	27.2
Cultural values	17	10.7
Monetary values	51	32.3
Knowledge on forest resources	26	16.5
Climatic conditions	21	13.3
Total	**158**	**100.0**

Source: Field Data, 2015

From Table 4.3, 32.3% of the respondents cited that monetary values attached to the forest resources defined their roles in relation to forest resource access, use and

management, 27.2% of the respondents cited the use of the resource as a factor and 16.5% of the respondents cited knowledge on forest resources as a factor that defines their roles in relation to forest resource access, use and management while 13.3% and 10.7% respondents cited climatic conditions and cultural values respectively as the predetermining factors. From the results, it can be inferred that the major factors that influenced the access, use and management of forest resources in Kapchemutwa forest were resource use and monetary values attached to the resources. However, knowledge on forest resources, climatic conditions and cultural values also influenced the access, and use of forest resources.

On conducting focus group discussions, it emerged that, firewood is the main source of energy in the study area and therefore most residents collect firewood from the forest as a source of energy in their homes. This is done mostly by women and in some circumstance men. Furthermore, most materials for housing in the study area come from the forest. Such materials include; poles and timber. These forest resources are mostly obtained by men and youth as compared to females.

From the focus group discussions, it also emerged that both male and the female respondents, indicated that the management and use of the forest was embedded in cultural practices and beliefs which implies that programme designers should consider the cultural aspects of conservation when forest resource management programmes are being designed for an area, and try to understand the gender roles and relations embedded in the beliefs of the people, so that they can better involve different gender

groups in these programmes. The respondents stated that examples of forest resource management practices embedded within cultural practices and beliefs included prohibitions against cutting of trees, prohibition against cutting certain trees near homes because those trees provide shade; prohibition against cutting medicinal trees and burning of grass.

Respondents expressed some concern that if gender mainstreaming would be taken too far, it could result in certain cultural aspects of conservation being lost. Gender roles were culturally constructed, and forest resource management activities embedded in cultural practices and beliefs, so that access to, use of and management of forest resources by different gender groups would depend on what was considered the cultural norm.

Other forest resource management activities that were cited by participants of focus-group discussions and were embedded within cultural practices, included water fetching skills; food preservation skills; construction of firebreaks around forest resources; preserving traditional medicinal trees; making hoe handles from small branches of trees; making baskets, mats, chairs and granaries , folk tales and myth telling related to natural resource use and management; wood carving for household tools and house-construction techniques. These cultural practices, techniques and skills were passed on from parents to children based on the gender roles they perform at both household and community levels.

Furthermore, respondents from focus group discussion noted that forest resources contributed to food security in the study area. It emerged that most residents collected fruits and vegetables from the forest. Furthermore, some residents grazed their cows at the forest especially during the dry season enhancing their livelihoods.

On conducting interviews with the zonal forest manager and local leaders, it emerged that those who obtained charcoal and timber from the forest were influenced by monetary values attached to the two commodities. It emerged that the youths who engaged in charcoal trade were earning upto 800 shillings per sack of charcoal making it a lucrative business in the area. The zonal manager noted that they had tried to ban charcoal burning in the area but the dealers transport logs from the forest at night to some distances away from the forest area where they ban their charcoal from. It can therefore be inferred that charcoal has been commercialized in the study area due to its demand in Iten and Eldoret towns.

During the focus group discussions, it emerged that the elderly had better understanding and knowledge on herbal medicine from the forest. The elderly women and men obtained these products from the forest in a sustainable since they harvested only some particular parts of the forest trees. Mostly they targeted tree parks, roots, leaves and stems which are used for treatment of various human and livestock diseases. Indigenous peoples with a historical continuity of resource-use practices often possess a broad knowledge base of the behavior of complex ecological systems in their own localities.

4.4 Practical and Strategic Needs of Different Gender Groups in Relation to Access, Use and Management of Forest Resources

The third objective of this study was to identify and assess the practical and strategic needs of different gender groups in relation to access, use and management of Kapchemutwa forest resources. To achieve this objective, first, the respondents were asked to indicate in the questionnaire their practical needs which motivate them to access and use forest resources in the study area. Results are presented in Table 4.4.

Table 4.4: Practical Needs in Access, use and Management of Forest Resources

Practical Needs	Male		Female	
	Frequencies	Percentages	Frequencies	Percentages
Trees for Furniture	81	27.1	11	6.1
Trees for construction	69	23.1	9	5.0
Animal fodder	24	8.0	29	16.2
Fuelwood for domestic use	6	2.0	53	29.6
Water for domestic and animal use	9	3.0	49	27.4
Land Tillage for food production	47	15.7	11	6.1
Grazing of Livestock	63	21.1	17	9.5
Total Responses	**299**	**100.0**	**179**	**100.0**

Source: Field Data, 2015

Table 4.4 shows that among the males, 27.1% were engaged in cutting trees for furniture from the forest especially the carpenters and saw millers, 21.1% grazed their animals (cows) at the forest due to drought or small land sizes while 15.7% of the male

respondents believed that they needed to be food secured and therefore tilled forest land for food production in terms of the shamba systems. From the responses, it emerged that most of the males practically were engaged in furniture making (27.1%), grazing of livestock (21.1%), (Plate, VI) house construction (23.1%) (Plate, VII) and land tillage for food production (15.7%) (Plate, VIII). This implies that among the practical needs for men in the study area were making of furniture, house construction, animal grazing and land tillage for crop production.

Furthermore, the table 4.4 showed that 29.6% of women respondents reported that they collected firewood from the forest for domestic use while 27.4% cited getting water from the forest for domestic and animal use as shown in Plate IX. This implies that women engaged more in fuelwood for cooking and water for domestic and animal use. The findings showed that there is gender differences in the practical needs of men in relation to forest resources in Kapchemutwa area.

Women collect fuel wood and carry them on their backs for domestic use and also use donkeys for sale in the urban market and sell to communities far from the forest (Plate X), while men on the other hand use motor bikes and bicycles to carry their fuel wood and charcoal to the market. Men carry a strap of between 40-60kgs using donkeys mostly to the market, when sold at local market centers fetches between Kshs150-200. This business of selling fuel wood increases each time and has changed the habit of local youth especially those who dropped out of school to take up the business instead of idling

for most of the days in the year. Women on the other hand use donkeys to ferry firewood far to the peri-urban markets to earn an extra income for their families.

From observation women who engaged in the collection of fuel wood used between 2-6 hours each day to collect fuel wood from the forestwhile those at a distance of 4 kilometers way from the forest used approximately six hours to gather firewood and deliver them at their homes. One strap of fuelwood collected weighs 10-15 kgs for young girls and between 20-30kgs for women (this being dry wood).

On undertaking a focus group discussion, it emerged that forests and trees are a direct source of food, income and a range of subsistence benefits to a lot of people in the study area. However, forest resources are often used differently by men and women and therefore understanding and taking into account the differences in use and interaction with the forest by women and men is not only an essential condition for achieving sustainable management of forests but also vital for enhancing the contribution of forests to food security and sustainable livelihoods and for agricultural development in the area.

Men's practical needs listed during focus group discussions included tree seedlings, employment and farming facilities. Respondents also mentioned beekeeping as well as men's desire to be employed so that they could stop charcoal making, which is destroying the environment. The men's needs were thus related to their gender roles as breadwinners and providers of shelter. Men needed all these things so that they could

generate more income from resources for example, more trees meant more charcoal and timber production, which would need transportation by tarmac roads.

Further, the respondents were requested to indicate in the questionnaire their strategic needs. The results are presented in Table 4.5.

Table 4.5: Respondents' Strategic Needs in Relation to Access, Use and Management of Forest Resources

Strategic needs	**Male**		**Female**	
	Frequency	**Percentage**	**Frequency**	**Percentage**
Conserve biodiversity	43	21.8	27	18.5
Safeguard wildlife	37	18.8	31	21.2
Protect land and watersheds	56	28.4	34	23.3
Food security	61	31.0	54	37.0
Total	**197**	**100**	**146**	**100**

Source: Field Data, 2015

Results from Table 4.5 showed that, 37.0% women and 31.0% men reported that food security was an important factor in the access, use and management of forest resources, 28.4% male and 23.3% female respondents reported that in the utilization of forest products, they also aimed at protecting land and watersheds within the forest area. In addition, 21.8% male respondents cited they intended to conserve biodiversity as compared to 18.5% of the female respondents.

Addressing these natural resource challenges requires an understanding of their underlying causes. According to the Millennium Ecosystem Assessment (MEA), the

main drivers of change include the following: Climate change led by the burning of fossil fuels Habitat and land-use change, primarily due to the expansion of agriculture, overexploitation of resources, especially overfishing, deliberate and accidental introduction of invasive alien species Pollution, particularly nutrient loading, leading to a loss of biodiversity, agricultural productivity, and increased human health problems. Understanding and changing forest resource tenure and governance as well as unequal patterns of access to and management over natural resources lie at the heart of reversing forest resource degradation. These issues are crucial to addressing the gender dimension of forest resources. Climate change, biodiversity loss, land and water degradation and desertification, and natural disasters share many common causes. Because a worldwide consensus recognizes the acceleration of climate change, efforts to mitigate and adapt to climate change promise to have major consequences for forest resource availability and use.

From the responses, it emerged that among the strategic needs of most significance to both male and female respondents was food security and protection of land and water sheds. FAO (2010) report indicated strategic approach is needed to optimize the capacity of forests to mitigate climate change, conserve biodiversity, safeguard wildlife and protect land and watersheds. Trees and forests are more important to rural women's livelihoods than to those of men.

4.5 Integration of Different Gender Groups into Sustainable Management of Forest Resources Based on their Roles, Relations and Needs

The fourth objective of this study was to determine how different gender groups could be integrated into sustainable management of forest resources based on their roles, relations and needs. This is due to the fact that unsustainable forest resource use can lead to depletion leading to desertification. To achieve, this, respondents were asked to indicate the strategies they thought were adequate to address the integration of different gender groups into sustainable forest resource management. Results are presented in Table 4.6.

Table 4.6: Integration of Different Gender Groups into Sustainable Management of Forest Resources Based on their Roles, Relations and Needs

	Male		Female	
Strategy	Frequency	Percentages	Frequency	Percentages
Strengthening of forest users association	32	31.1	19	34.5
Planting more seedlings where trees have been cut down	11	10.7	7	12.7
Enhancing capacity building on the importance of forest resources	13	12.6	7	12.7
Participation in forest protection activities	16	15.5	6	10.9
Enhancing community participation in forest use decision making process	31	30.1	16	29.1
Total	103	100.0	55	100.0

Source: Field Data, 2015

Results from Table 4.6 showed that 31.1% male and 34.5% female respondents cited that there was need to strengthen forest users association in order to integrate different gender

groups into sustainable management of forest resources based on their roles, relations and needs, 10.7% male and 12.7% female respondents cited reported that there was need for planting of more tree seedlings where trees have been cut down while 30.1% male and 29.1% female respondents cited that there was need for enhancement of community participation in forest use decision making process. In addition, 12.6% male and 12.7% female respondents cited enhanced capacity building on the importance of forest resources while 15.5% male and 10.9% female respondents believed that there was need for participation in forest protection. The study findings suggested that for effective integration of different gender groups into sustainable forest use based on their roles, relations and needs, there was need for strengthening of forest users association and enhancement of community participation in forest use decision making process based on majority of the respondents. Despite this, some respondents stated that there was need for planting more tree seedlings where trees have been cut down (reafforestation), enhancing capacity building on the importance of forest resources and community participation in forest protection activities.

The interviewing with the Zonal Forest officer, revealed that involvement of communities living around the forest in the management of forest resources was paramount in sustainable management of forest resources based on their roles, relations and needs. The involvement of communities in the management of forest resources ensures that all individuals benefit from the forest resources in a sustainable way. Furthermore, it emerged that where forests had been cleared initially for agricultural

activities, the communities can be engaged in planting crops and trees. This will ensure that there is adequate plant cover within the forest area.

From the focus group discussions it emerged that the inhabitants needed adequate training and skills in the management of the forest resources. They argued that training community members on proper management of the forest will ensure sustainability of the available forest resources. Furthermore, from the focus group discussion it was found out that involvement of men and women in decision making on matters concerning the use of forest resources was a key element in achieving forest resource management and sustainability.

CHAPTER FIVE

DISCUSSION

5.1 Introduction

This chapter focuses on the discussion of the findings of the study undertaken on influence of gender on access, use and management of forest resources in Kapchemutwa Forest, Elgeyo Marakwet County, Kenya. Specifically, the discussion focuses on gender roles in the access, use and management of forest and its resources, examine the factors that influence gender roles in relation to resources use, practical and strategic needs of different gender groups in relation to access, use and management of forest resources and gender groups that can be integrated in sustainable management of forest resources.

5.2 Gender Roles in the Access, use and Management of Forest Resources

Study findings showed that males depended on the forest for poles, timber and charcoal while women mostly obtained firewood, medicine and food from the forest. From the findings it was evident that males and females differed in terms of resources they obtained from the forest which shows that there is gender difference in resource use in Kapchemutwa forest. This finding is consistent with the findings of other researchers such as Shanley and Gaia (2001) and Colfer (2005) who indicated that women are traditionally the main collectors of fuelwood, medicinal and aromatic plants and other non-timber forest products (NTFPs) from forests. Further, it has been shown that in non-timber forest products (NTFPS) such as fruits and vegetables are particularly important for women (Ruiz Perez *et al*. 2002; Lemenih, 2003; Kiptot & Franzel, 2012) while local men have rights to trees and use its timber to make furniture (FAO, 2010). However, the work of collecting fuel wood for domestic use by the communities bordering

Kapchemutwa forest was done by women and this trend has changed whereby men are now involved in the collection of firewood, mainly for sale.

Cultural norms differentiated the way men and women are allowed to use forest resources. Results along gender lines revealed that forest resources were the resources that most respondents felt were predominantly accessed by males. Thus, forest resource components for which gender-related data were gathered, forests were accessed mostly by men, while females accessed less. This means that women's access to key forest resources was limited by their gender roles, which were in turn determined culturally. According to Meinzen-Dick *et al.* (1997), gender differences faced by women in access to forest resources affect natural resource use in terms of enhancing environmental sustainability, efficiency of resource use, equity of resource allocation among users, and empowerment of users, particularly women. Women have use rights but not full access rights to most forest resources like sawmills for timber resources. This had implications on their livelihoods, since the resources that women accessed have low economic value compared to those that men accessed, for example timber and poles. Access to and Management of resources is one of the principal factors determining the economic and social wellbeing of women (Bashaw, 2004).

During the focus group discussion, it emerged that men did some illegal hunting in the forest whereby they trap some specific wild animals for meat. Despite this, it was noted that women do not participate in hunting or trapping of wild animals for meat. This finding further supports those of Sunderland et al., (2014) who in some contexts, men

tend to focus more on hunting and collecting building materials while women focus more on collecting edible and medicinal plants.

In some instances, it was evident that men collected firewood which was mostly meant for sale but not for domestic reasons. This supports the arguments put forward by Sunderland et al., (2014) which indicated that, both men and women collected firewood from forests. However, Agarwal (2009) posited that gender roles determining the collection of forest products may also vary for example where women and girls, typically collect firewood in parts of Africa and Asia.

On the gender groups which were mostly involved in the management, acquisition and use of Kapchemutwa Forest resources, it emerged that all the groups; men, women, youth and the elderly used forest resources but obtained different resources for different purposes. However, women and the elderly obtained non-timber products from the forest while the youth and men mostly obtained timber products and poles from the forest. This concurs with the World Bank (2009), report which noted that in many community forestry projects in Indonesia, women were significantly involved in harvesting non-timber forest products (NTFP) and sending these products to market.

However, in some instances men worked hand in hand with the youth or women in harvesting forest products. The forest officers interviewed noted that in some instances for example illegal harvesting of timber products occurred at night and this was done and facilitated by men and youth while women and men work jointly when tilling forest land

for food production. This is consistent with the findings of Bechtel, (2010) who showed in his study that men and women worked jointly or in complementary ways while obtaining forest resources. Further, Duchelle, et al., (2011) and Stoian, (2005) for example reported that men and women worked jointly in harvesting and selling of high-value products such as Brazil nuts in Latin America.

Even though most respondents indicated that they felt forest resources were controlled by both men and women, further analysis revealed that most respondents felt that forest resources were mainly controlled by men. Although women were free to use and access the different forest resources, the extent to which they did so was less than that of men. Women generally did not have rights to control forest resources; while men commonly had full disposal rights of forest resources, women only had use rights. People in society are known to hold beliefs about appropriate structures, domestic authority, decision-making, and spheres of responsibility, authority and division of tasks. These, in turn, shape and are shaped by beliefs about rights of access to and control of forest resources (Francis 1995). Thus, in the study area, women had use and access rights to most forest resources but no control over them. Francis (1995), in a study of Luo households, found that women had fewer spheres of decision-making power than what men had. Also in the present study the differences between the two sexes were considerable when it came to control of the different forest resources, especially those that had economic benefits, such as timber and poles.

Kapchemutwa forest was also found to provide food leading to food security in some households. This is due to the fact that some households cultivate crops in the forest area

where trees have been harvested. Furthermore, some household members obtain fruits like *Dovyalis abbysinica* (mindililwa) and *ficus sycomorus which* provide nutrition values to these members. This finding is consistent with the findings of Brondizio, (2008) who reported that food from forests provides micronutrients and contributes to dietary diversity, thereby supporting a shift away from calorific intake as the primary metric for food security, towards a broader understanding of nutritionally-balanced diets (FAO, 2012).

5.3 Factors that Influence Gender Roles in Relation to Resources

The study found out that the major factors that influenced the access, use and management of forest resources in Kapchemutwa forest were resource use and monetary values attached to the resources. Despite this, knowledge on forest resources, climatic conditions and cultural values also influenced the access, use and management of forest resources. On conducting focus group discussions, it emerged that, firewood is the main source of energy in the study area and therefore most residents collect firewood from the forest as a source of energy in their Homes. Furthermore, most building materials in the study area were obtained mostly by men from the Kapchemutwa forest. These materials included poles, roofing materials, and timber. These forest resource are mostly obtained by men and youth as compared to females.

Results further showed that forest resources contributed to food security in the study area. It emerged that most residents collected fruits and vegetables from the forest. Furthermore some residents grazed their cows at the forest during the dry season

improving on their livelihoods. FAO (2010) report noted that the most direct way in which forests and trees contribute to food security is through contributions to diets and nutrition. Forest foods; wild leaves, fruits, roots, tubers, seeds, nuts, mushrooms, saps, gums, and forest animals and their products, such as eggs and honey which supplement the foods produced by agriculture and obtained from other sources. Forest foods can assist in coping with seasonal food shortages and shortages due to extreme weather events, natural disasters, human-made conflicts and other shocks (Arnold *et al.*, 2011). The study further found that charcoal burning and timber harvesting have been commercialized in the study area despite charcoal trade being illegal. Charcoal is one of the most commercialized resources in sub-Saharan Africa. FAO (FAOSTAT, 2014) estimates official charcoal production for Africa to be 30.6 million tons in 2012, worth between US$9.2 billion and US$24.5 billion annually (UNEP 2014). Despite this huge value of production, policies to effectively govern the sector are lacking in most African countries.

Further, it emerged that men and the male youths were more involved in the charcoal burning and trade as compared to their female counterparts. This shows that women may not be actively engaged in charcoal burning which was found to be consistent with the findings of Zulu & Richardson, (2013) which indicated that women are especially marginalized in the charcoal sector due to unequal gender relations surrounding charcoal production. Male labour is often diverted away from agriculture to charcoal production, which overburdens women with food growing in an attempt to make up for the labour gap, thus undermining agricultural productivity (Zulu & Richardson, 2013). Furthermore

FAO (2009) noted that women have an indigenous knowledge of forest resource planning, management and conservation but they are still at underprivileged position in environmental decisions at households as well as society level. Women's labour in agriculture and the collection of firewood and fodder were recognized at the 1970s. Then a few gave importance that indigenous women's knowledge also play an important role in the management, conservation and sustainable use of forest resource.

5.4 Practical and Strategic Needs of Different Gender Groups in Relation to Access, Use and Management of Forest Resources

Findings pointed that women were engaged more with food and other food related forest resources such as fruits and vegetables while men were more engaged with construction and furniture making. This shows that men could have a destructive forest resource use as compared to females due to their practical needs. Cutting down of trees for construction and furniture making could have some devastating effects on forest resource management owing to the fact that management and conservation practices of women and men also differ according to the methods and intensity of use. Byers and Sainju (1993) pointed out that the pattern in the intensity of use differs between men and women. For example, women gather fodder, fuelwood and other products for household consumption, often in smaller quantities but in a continuous manner whereas men's use pattern of forest resources, while not as continuous, may have more impact on the forest condition.

Study findings were further found to be consistent with those of Ardayfio-Schandorf (2007) which noted that both men and women have access to forest resources, but the

types of product they collect from the forest reserve are different. Most women use their forest produce to support household needs, whilst the men perceive them as personal resources of finance. In this study it was found out that women acquired household needs like fuelwood and food items from the forests while men obtained timber, logs and charcoal for sale indicating that men obtained financial resources from the forest. This is further supported by Järvilehto, (2006) who argued that women used natural resources to directly provide for their families such as fetching water; harvesting crayfish, fruits, and leafy vegetables for consumption and sale; and collecting non-timber forest species to weave mats and baskets, to be sold in local markets or used by the women's families for their everyday needs.

Results from key informants overlooked the most important need of women, which was long distance and time used by women in search of fuelwood. This could have been due to the fact that local leaders were mostly men. Only one woman was encountered as a local leader in the FGD conducted in Kamoi area. However she did not mention what women mostly indicated as their number one priority in the area, namely time used and distance travelled by women in search of fuelwood and these could have been because it was mostly men who were able to articulate and promote issues relevant to them. A consequence of this was planners failing to recognise women's needs and also the fact that women and men have different needs, preferences and priorities (Flintan 2003). Furthermore Chesire (2007) noted that women who engaged in the collection of fuel wood used between 2-6hours each day to collect fuel wood from the forest while those at a distance of 4 kilometers way from the forest used approximately six hours to gather

firewood and deliver them at their homes. One strap of fuelwood collected weighs 10-15 kgs for young girls and between 20-30kgs for women (this being dry wood). According to Chesire 2007, the residents of Kokwao location who border the forest on the eastern side however do not sell fuel wood as much as their counterparts in Kapchemutwa and Kaimoi locations. This is largely due to steep terrain and poor transport network as opposed to the other two locations which are in the highland zone where the terrain is flat. The road network is poor, so the residents use motorbikes and bicycles as alternative means of transport. This limitation has partly been overcome by men who carry fuel wood on their shoulders.

On strategic needs of both men and women, it was found out in this study that among the strategic needs of most significance to both male and female respondents was food security and protection of land and water sheds. FAO (2010) report indicated strategic approach is needed to optimize the capacity of forests to mitigate climate change, conserve biodiversity, safeguard wildlife and protect land and watersheds. Trees and forests are more important to rural women's livelihoods than to those of men.

5.5 Sustainable Management of Forest Resources Based on gender Roles, Relations and Needs

Study findings revealed that the involvement of men and women in decision making on matters concerning the use of forest resources was a key element in achieving forest resource management and sustainability. This supports the findings of Agarwal, (2009) who found out in his study that forest management committees with a higher proportion

of women represented have a greater likelihood of improving forest conditions. Further, Westerman & Benbow, (201 4) argued that ensuring that both men and women benefit equitably from conservation and development programs is likely to increase the long-term success of both conservation and development goals. Involvement of women in forest resource management has been reported to be an important element in sustainable forest management (Agrawal & Chhatre, 2006) since women disproportionately bears the costs of tree and forest management.

Kiragu (2002) notes in her study of Mt. Elgon forest area noted that 71.4% of those interviewed indicated that the local communities living around the forest were not involved in any form of forest management issues. She further notes that the fuel wood is an important resource to the forest adjacent community. Participatory management of forest resources has worked well in other parts of the world where communities and the forest department Currently Kenya Forest Service have collaborated in the management of the forest resource. In west Bangal-India for instance, communities have been involved in forest management by being given more access to forest

In addition, the study found that capacity building in terms of training of communities on the importance of forest resource management was an important element for Kapchemutwa forest resource management and sustainability. This was found to be consistent with the study findings of Siscawati and Mahaningtyas (2012) who reported that training of men, women and youth on forest resources management ensures adequate and sufficient levels of literacy in community forest management and resource sustainability.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the conclusions and recommendations of the study on the influence of gender on access, use and management of forest resources in Kapchemutwa Forest, Elgeyo Marakwet County, Kenya. These are guided by the study objectives and the findings of the study.

5.2 Conclusions

The following conclusions were made based on the study findings

The study concluded that males depended on the forest for poles, timber and charcoal while women mostly obtained firewood, medicine and food from the forest. This shows that males and females differed in the resources they obtained from the forest leading to gender difference in resource use in Kapchemutwa forest. Furthermore each group used different resources for different purposes. Despite this, in some instance men worked hand in hand with the youth or women in harvesting forest products.

The major factors that influenced access, use and management of forest resources in Kapchemutwa forest were resource use and monetary values attached to the resources. However, knowledge on forest resources, climatic conditions and cultural values also influenced the access, use and management of forest resources.

Forest resources contributed to food security in the study area. From the findings it was evident that most residents collected fruits and vegetables in the forest. Some residents also grazed their cows at the forest during the dry season thus improving on their livelihoods. The study further showed that among the practical needs of men in the study area were making of furniture, house construction, animal grazing and land tillage for crop production while women engaged more in fuelwood collection for cooking and water for domestic and animal use. The strategic needs of most value to both male and female respondents were however food security and protection of land and water sheds.

The study further concluded that for effective integration of different gender groups into sustainable forest use based on their roles, relations and needs, there was need for strengthening of forest users associations and enhancement of community participation in forest use decision making process.

5.3 Recommendations for the Study

The following recommendations were made based on the study findings;

i. There is need for the community to be actively involved in the management of forest resources through formation community based organizations which comprises of the youth, women, men and the elderly.
ii. There is need to identify of people who have indigenous knowledge on different forest resources like herbal medicine to enhance better conservation and management of medicinal plants within the forest.

iii. Unsustainable activities like charcoal burning, pole and timber exploitation should be discouraged and/or minimized since they accelerate forest depletion and degradation.

5.4 Suggestions for Further Research

i. There is need for a similar study to be undertaken in other forest areas both within and outside the county to allow for the generalization of the study findings.

ii. There is need for a study on effects of community involvement in forest resources management in the study area.

iii. There is need for a study to be undertaken on the attitudes and perceptions of local herbalists towards the exploitation, conservation and management of Kapchemutwa forest.

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APPENDICES

APPENDIX I: QUESTIONNAIRE FOR HOUSEHEADS

Good morning/afternoon. My name is Magrine J. Serem, I am a student at The University of Eldoret, School of Environmental Studies, Department of Applied Environmental Social sciences. I am carrying out a research on "**Influence of Gender on Access, use and management of Forest Resources in Kapchemutwa Forest".** I would be very grateful if you accord me a few minutes to discuss some questions which I am going to ask you. The responses are only meant for research purpose and nothing else. I will be very grateful for your cooperation and patience during that period.

1. What is your gender?

(i) Male ☐ (ii) Female ☐

2. What is your age group?

(i) Below 25 years ☐ (ii) 25 – 50 years ☐

(iii) Above 50 years ☐

3. What is your marital Status?

(i) Married ☐ (ii) Single ☐

(iii) Separated ☐

4. What is your highest level of education?

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5. What socio-economic activities do you undertake to earn a living?

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6. List down the resources you obtain from the forest

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7. Who mostly uses the forest resources listed above amongst the community members?

(i) Youth ☐ (ii) Women ☐

(iii) Men ☐ (iv) The elderly ☐

8. (a) What roles do you use the forest resources for?

☐ ☐

(i) Construction ☐ (ii) Firewood ☐

(ii) Charcoal making ☐ (iv) Medicine ☐

(iv) Cultivation ☐

(b) What factors determine the roles above?

i. Resource use ☐

ii. Cultural values ☐

iii. Monetary values ☐

iv. Knowledge on forest resources ☐

v. Climatic conditions ☐

9. (a) What are your gender group's practical needs in relation to access, use and management of forest resources? (List)

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(b) What are your gender group's strategic needs in relation to access, use and management of forest resources? (List)

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10. In your gender group, how do gender roles affect access to, use and management of forest resources at;

(i) Household level for livelihood improvement?

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(ii) Community level for livelihood improvement?

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11. In which way can your gender group be integrated into sustainable management of the forest resources, based on your roles, relations and needs?

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APPENDIX II: FOCUS GROUP DISCUSSIONS

1. What socio-economic activities do you undertake in this area in order to earn a living?

2. List down the resources you obtain from the forest both as an individual and as a community?

3. Who mostly uses the forest resources amongst the community members?

4. (a) What do you use the forest resources for?

(b) What factors determine the use of forest resources?

5. (a) What are your gender group's practical needs in relation to access, use and management of forest resources? (List)

(b) What are your gender group's strategic needs in relation to access, use and management of forest resources? (List)

6. In your gender group, how do gender roles affect access to, use and management of forest resources at;

(i) Household level for livelihood improvement?

(ii) Community level for livelihood improvement?

7. In which way can the different gender groups be integrated into sustainable management of the forest resources, based on the different roles, relations and needs?

APPENDIX III: INTERVIEW SCHEDULE FOR KENYA FOREST SERVICE PERSONNEL

1. What forest resources do you allow the community members to obtain from the forest as an individual or as a community?

2. Who mostly uses the forest resources amongst the community members?

4. (a) What do they use the forest resources for?

(b) What factors determine the use of these forest resources?

5. How do gender roles affect access to, use and management of forest resources at both household and community level?

6. In your opinion, which ways can the different gender groups be integrated into sustainable management of the forest resources, based on the different roles, relations and needs?

APPENDIX IV: KAPCHEMUTWA FOREST RESOURCES

Plate i: A Man and a Woman collecting Herbal medicine from Kapchemutwa Forest

Plate ii: Man collecting Medicinal plants

Plate iii: Beehives at Kapchemutwa Forest

Plate iv: Grazing of animals at the Forest

Plate v: Wood for timber at Kapchemutwa Forest

Plate vi Timber from Kapchemutwa Forest

Plate vii: Land cultivation for Food Production at the Forest

Plate viii: Building Materials from the Forest

Plate ix: Water source from Kapchemutwa Forest

Plate x: A boy using a donkey to carry firewood

Plate xi: Women carrying firewood

APPENDIX VII: MAP OF THE STUDY AREA