

**ASSESSMENT OF DRIVERS OF COMMUNITY PARTICIPATION IN
PARTICIPATORY FOREST MANAGEMENT: A CASE OF KESSUP FOREST,
ELGEYO-MARAKWET COUNTY, KENYA**

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DECLARATION

This is my original work and has not been presented to any other university.

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DEDICATION

This dissertation is dedicated to my lovely sister Caro, grandma, father and my entire family members. Special dedication goes to my late mum for the special role she played in my achievements. Further dedication goes to my beloved ones, Jared, Dorcas, Lorna, Robert, Simeon and my nephews Eugene and Kirwa for all their tireless support during the entire process.

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LIST OF ABBREVIATIONS

BNS	Basic Necessity Survey
CBOs	Community Based Organizations
CFAs	Community Forest Associations
CSOs	Civil Society Organizations
EIA	Environmental Impact Assessment
FACs	Forest Adjacent Communities
FCMA	Forest Conservation and Management Act
GoK	Government of Kenya
KEFRI	Kenya Forest Research Institute
KFMP	Kenya Forestry Master Plan
KFS	Kenya Forest Service
KFWG	Kenya Forests Working Group
KWS	Kenya Wildlife Service
MoU	Memorandum of Understanding
NCFA	Non- Community Forest Associations
NEMA	National Environment Management Authority
NGO	Non-Governmental Organization
NTFPs	Non-Timber Forest Products
PELIS	Plantation Establishment for Livelihoods Improvement Scheme
PFM	Participatory Forest Management

ABSTRACT

The Forests Act 2005 enacted in 2007 revised 2016 has brought a paradigm shift in forest management as it upholds the principles of public participation in forest resources. The study examined the drivers of community participation in Participatory Forest Management (PFM). It examined the drivers on households near indigenous and plantation forest within the same forest block in Kessup forest in Elgeyo-Marakwet County. The objectives of the study were to assess the households' drivers to participate in PFM, community forest associations (CFA) composition and level participation in and to assess the stakeholders and their roles in Kessup forest. Data were collected through structured questionnaires, key informant interviews and the focus group discussions. Data collection were done along 15Km transect, sampling 96 households after every 5th households within 0-5km from the nearest edge of the forest. Descriptive and inferential statistics were used for the data analysis. Summative content analysis was used to analyze qualitative data. The results indicate that socio-economic and biophysical factors drive the community involvement in PFM. The age, distance, gender, education level, awareness of the forest act, products derived from the forest, ownership of livestock and fodder sources all at ($p < 0.05$). The involvement of the community members in PFM is mostly driven by tangible material gains regardless of the forest type. Besides Kenya Forest Service, other stakeholders involved in the management of Kessup forest were, the community members, Kenya Wildlife Service (KWS) and Non-Governmental Organizations. Despite lack of coordination of forest activities among the aforementioned stakeholders, their undertakings were mostly geared towards community empowerment. There was low involvement of community in decision-making processes. The community participation in PFM was therefore driven by tangible material gains for example the PELIS land for cultivation and the firewood. The study therefore recommends the Kenya Forest Service to ensure meaningful involvement of the community members in forest management activities and decision-making processes; review of the

management plan and the management agreement so as to maximize the decentralization of the forest governance. Additionally, harmonization of the various forest stakeholders' activities should be coordinated to enhance community participation. This should be geared towards the community empowerment, gender sensitization regarding forest management and forest conservation.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the study

The significance of forests cannot be underscored in the dire need for conservation of the biodiversity, soil resources, and water. Vitality of conserving these resources owes itself to their significance in the lives of the communities that stays adjacent to the forest. Local community participation is the key strategy to current forestry conservation and management. A number of stakeholders, including local communities, are involved in conserving and managing natural resources for the expected success of enhanced conservation efforts (Purnomo *et al.*, 2005).

Community participation is now universally recognized as an effective strategy in effective handling of forests resources. This is because of paradigm shift that has promoted the devolution of the powers in management of forest from the state to the local communities (Agrawal *et al.*, 2008). Basic understanding of participation is simply the inclusiveness and collective sharing with a mutual sense of togetherness. The World Bank (1996) defined the same concept as the procedure in which the effect is felt in the course of the influence of stakeholders and the initiatives of share controls over development with regard to their decisions and available resources that determines them.

Several African and Asian countries promote the involvement of communities in their suburb localities in controlling and making use of such natural resources in deploying some principles of Participatory Forest Management (PFM) (Schreckenber *et al.*, 2006). The majority of these community-based organizations came up as a result of mutual desire to preserve the forests,

besides the need to enhance the living standards of local benefactors. In 1991, Kenya adopted a Forest Master Plan that promoted people centric approach following the pressure from the civil society and donors (KFMP, 1991; Thenya *et al.*, 2007; Chomba *et al.*, 2015). The ultimate objective of the Forest Act 2005 (revised in 2016) was to propagate contribution of forest sector in the provision of social, economic and environmental services and goods. It provided for the legal framework of Participatory Forest Management, which underscored the significance of including communities in managing forests as partners with government and other stakeholders (GoK, 2005). The introduction of PFM was aimed at reducing one of the main challenges of forest management through increased involvement of wide stakeholders.

The Forest Act 2005 (revised 2016) has provisions for the community involvement in government and management of forest resources with the KFS through the Community Forest Associations (CFAs). Additionally, they benefit from deriving some of the forest products such as firewood, herbal medicine, timber collection, besides harvesting thatching grasses and grazing their animals. They are also entitled involvement in establishment of plantation through non-resident cultivation, educational among other activities.

Some research has been undertaken to investigate the stretches to which this villagers'/local participation could go in forest management in Nepal (e.g. Chhetri, 2005; Engida and Mengitsu, 2013). However, the socio- economic conditions of Asia differ significantly from those of Africa. Most studies on PFM in East Africa tend to concentrate on the impact of PFM on rural livelihoods e.g. Kajembe *et al.*, 2002; Bekele and Kassa, 2009; Mutune *et al.*, 2015). However, the drivers that influence community members to participate in PFM are scantily documented.

Additionally, the drivers that influence the community participation in regard to a heterogeneous forest; forest with both the plantation and the indigenous vegetation is scantily documented. Community participation is important because it is presumed that the merits of decentralization

of environmental policy is based on critical measures of wide participation in the structures created by the government in her bid to decentralize deliberations geared toward resource management (Agrawal *et.al.*, 2005).

1.2 Statement of the research problem

The enactment of the forest Act (revised 2016) has led to a paradigm shift in the management of forests. The revised forest Act 2016 provides for the decentralization of the forest management to the forest adjacent communities through community forest associations. Understanding reasons for community members' participation in forest activities is important in assessing the degree of devolution of the forest governance at the grass root level.

Participation of the community members in PFM has been witnessed regardless of the forest type. It is worth understanding the drivers of their involvement in PFM within a heterogeneous forest setup in the same block as the case of Kessup forest. The comparative study of the drivers of community involvement in PFM necessitated the current study.

Previous studies undertaken to assess the level of community participation in PFM was documented to be minimal (Musyoki *et al.*, 2013; Mutune *et al.*, 2015). However, these studies did not specify the forests' vegetation type as the current. The participation of the forest adjacent communities in PFM in heterogeneous forest ecosystem varies since the forest offers different forest products. Participation in PFM in both indigenous and plantation forest types could be influenced by various socio-economic and biophysical factors. However, it remains imprecisely documented what drives the community participation in indigenous and plantation forests under the same forest block. The findings from the study will help the forest management department in

establishing proper management objectives especially through the involvement of the community members in the two forests.

1.3 Research Questions

The study was guided by the following research questions:

- i. How do socio-economic and biophysical factors determining the participation of community members in indigenous and plantation forest differ?
- ii. What is the CFA composition and levels of participation in Kessup Forest co-management?
- iii. Who are the stakeholders of Kessup Forest and what are their roles?

1.4 Objectives of the Study

1.4.1 Overall objective

The overall objective was to assess the drivers of community participation in participatory forest management in the Kessup Forest Reserve, Kenya.

1.4.2 Specific Objectives

- i. To analyze the socio-economic and the biophysical factors determining community participation in participatory forest management (PFM).
- ii. To assess the community forest association (CFA) levels of participation in Kessup Forest management.
- iii. To evaluate the stakeholders' role in Kessup forest.

1.5 Justification of the study

Decentralization has been a key enhancement to effective execution of public policy, environment and democracy. There are numerous advantages of decentralization, including and not limited to efficiency in public service delivery, greater equitability of outcome, and promoting participation of community in public affairs and heightened flexibility of the government policies (Lind and Cappon, 2001). Decentralization promotes the local capacities of institutions and government accountability (Lind and Cappon, 2001). The significance of promoting forest management participation among community residents has continued to be key objective of the policy makers in the arena of tropical forestry (Brown *et al.*, 2002). The PFM has come in handy to enhance public participation in forest activities unlike the command and control that alienated community members. The effect of community participation in forest management could increase the local ownership of the forest resources and reduce inequalities among community members. Moreover, a spillover effect could be increased thus carbon sinks that counter the effects of climate change.

The study therefore aimed at investigating the drivers of PFM in the Kessup Forest in Elgeyo-Marakwet County, Kenya. The results will help to facilitate the governance of Kessup forest resources besides informing the policy on utilization and CFA participation.

1.6 Scope and delimitations

The study assessed the drivers of community participation in PFM among the forest adjacent communities of Kessup forest.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 History of Participatory Forest Management.

The devolution of the forest governance has become widespread in most parts of Tropical America, Southeast Asia and Africa; registering immense achievements evident in Nepal, Philippines, Mexico and Thailand (Monsi, 2014). This has resulted to wide acknowledgement of the involvement of surrounding communities in managing and utilizing government-owned forest resources, contrary to the traditional governance in its central form that excluded the locals in the management processes (Mutune *et al.*, 2015). This aspect has been promoted through decentralization of the forest management. Decentralization of these forest resources has been done through the Participatory Forest Management (PFM), and has been adopted by more than 21 African states as an optional mode of forest resource management (Wily, 2002; Mutune *et al.*, 2015).

Participatory forest management (PFM) as a forest management tool allows the involved stakeholders to enter into mutually enforceable agreements that define the respective roles, responsibilities, benefits and authority in the management of defined forest resources (Matiku, 2011 in Ongugo *et al.*, 2017). The tool involves mobilizing of local people for group action in managing specific forest area adjacent to their settlement in order to ensure socio-economic development of community and reduce pressure on forests (Ongugo *et al.*, 2017). This involves sharing responsibilities and benefits according to a well-defined and mutually agreed on set of rules and regulations. The agreed rules and regulations are planned, implemented, maintained and monitored by the village institutions (Ongugo *et.al.*, 2009 in Ongugo *et al.*, 2017). The main

objective of PFM is to ensure a wider local ownership of forests and support to forest conservation (Ongugo *et al.*, 2017).

The PFM therefore devolved rights to local communities over the harnessing of forest resources so as to strike the double objective in biodiversity conservation and poverty alleviation. In addition, PFM is an empowerment tool for the communities' participation in the management of the resources important for their livelihoods (Blaikie 2006; Kellert *et al.*, 2000 and Agrawal and Ribot, 1999). PFM initiates the process for accelerating the participation and offer of incentives for local people, in a bid to seek a level ground between the interests from within and without the community and of enhancing local responsibility in such management (Sarre 1998, in Merino *et al.*, 2011). PFM has undertaken a well-blended attribute of equity, inclusion and democratization in the governance of forest resources (Agrawal and Gupta, 2005 in Mutune 2015).

The trend of community-based forest management has recorded its preference during the last thirty years (Agrawal *et al.*, 2008). The emergence of community forest management was necessitated by; the failure of top-down approaches which excluded the community involvement in the management practices, increasing numbers of stakeholders, national legislation and international obligations as well as the insufficient financial resources of the public forest sector investment (Sikor and Nguyen 2006 in Rosan, 2010). Additionally, the government's recognition of the role played by the community members in the ensuring the forest cover increase to the recommended 10% (MENR, 2007 in Agevi *et al.*, 2014) and to reduce forest destruction and degradation (DSRS and KFWG, 2006 in Agevi *et al.*, 2014).

Participatory forest management often takes a multi-stakeholder approach involving government institutions; private sectors and the local communities in sharing of the benefits accrued from the

forests (Ngece *et al.*, 2007). This calls for the enhancement of partnership between the state and local communities in the bid to properly utilize the resources from the forest. This community inclusion in managing forests is a strategy that aims at promoting forest sustainability and biodiversity conservation at the same as promoting socio- economic objectives; which includes forest production, poverty reduction and sustainable utilization (Ongugo *et al.*, 2008). To enhance the dual benefits towards forest conservation and the community benefits, mechanisms are to be adopted to ensure that there is sustainable co- existence between the communities in these areas and the resources in the forested areas in order to ensure that the communities do not engage in activities that are destructive to the forests.

In 1991, therefore the Kenya Forestry master plan (KFMP) identified some environmental challenges that included minimal community involvement in the conservation and management of forest resources (Mugo *et al.*, 2010). This master plan was therefore a platform aimed at reducing the destruction as well as enhancing the forest-derived benefits to the communities. Additionally, multi-partism in 1992 resulted to increased awareness on forestry issues that led to the awareness particularly on environmental issues by civil society organizations among the communities (Thenya *et al.*, 2007). The heightened forest destruction in 1990s and the concern to protect and improve the forest management led to the enactment of the Forest Act 2005 (revised in 2016), and part IV section 45 legally recognizes such involvement of the communities in forest resource management through participatory forest management (Thenya *et al.*, 2007).

Community participation in forest resources in Kenya has therefore undergone various stages, this resulted from the exclusion of the communities in forest management and utilization leading to forest destruction of due to lack of ownership by the community members. The involvement of communities in the management of forest resources in Kenya is done through the PFM, under

whose arrangement the state reserves the ownership of forests while the neighboring communities (organized in CFAs) acquire user rights of the same (GoK, 2005 in Ongugo *et al.*, 2017).

User rights are granted under the condition that CFAs are registered with the Society Act. In addition, CFAs are registered with the chief conservator of forests to be involved in forest management (Mutune *et al.*, 2017). The CFAs together with the KFS are required to develop a forest management plan and sign a management agreement. The plan outlines the forest activities that the community will undertake while the agreement confers management rights and responsibilities to the CFA (Mutune *et al.*, 2017).

The first PFM site in Kenya was established in 1997 at Arabuko-Sokoke forest, although established without supportive legislative framework (Thenya *et al.*, 2007). There are more than one hundred CFAs today that are broadly scattered across Kenya (Ongugo *et al.*, 2008). Kessup forest is one of those forests in Kenya which has members registered at CFAs. The participation of the community members in addition to other stakeholders in the co-management activities was undertaken among the other objectives of the study. This follows the anticipated objective of PFM as projected by Fisher 2000; that community forest management is expected to offer more effective management by local participation and it is expected to be enhancing the desired equity and social justice (Fisher, 2000). The participation of local people is aimed at producing high dividends to the local community, to utilize the available knowledge, promote efficient resource use and allocation and motivate volunteers to comply so as to foster innovation, besides their contribution to sustainable forests management, which yields social, economic and ecological benefits (Blaikie, 2006). Despite devolving of the forest governance, some community members fail to have active and meaningful participation towards the management of the forest resources.

2.2 Participation in Participatory Forest Management

Participatory forest management involves multi-stakeholders approach in forest management. Participation of all the stakeholders is therefore paramount to achieve effective decentralization of forest resources management. There is need for the active involvement of all the stakeholders in the management of the forest resources. The participation of people in forest activities is dependent on some life aspects.

In Nepal, Maskey researched on social and economic factors that determine participation levels in the management of community forest by adopting a well organized probit and two stage least square model (Maskey *et al.*, 2006). There is an association between community forest management and the social/economic status of individual; this is affected by the gains from the forest. Without such the disadvantaged groups members of the community will be involved in the decision-making and the distribution of the derived gains (Maskey *et al.*, 2006). Again, this is a vulnerable state for non-wealthy community members who have a high opportunity cost to incur in their participation, because their time and energy invested in this venture is what is supposed to be invested in feeding themselves elsewhere. On the other hand, the medium-class household had highest benefit compared to their low and high-class counterparts, due to the opportunity costs.

There are a few studies that dwell on issues of inclusiveness in community participation in forest management. A study conducted in Nepal employed almost purely qualitative methods to examine how collective institutions performed especially from perspective of more

disadvantaged (Agrawal, 2001). It demonstrated the likelihood of participatory institutions excluding vital sections like women. Community participation is important for forest management but most often than not the collective groups may exclude some important sections of the community. According to the studies by Agrawal (2001) it argued that, participation is determined by rules, norms, perception and endowments. Such factors could work against the most vulnerable section of the society for instance the poor and women, yet such categories are most dependent on forest resources.

There are limited studies on the factors that affect participation of household decision in PFM in the Kenyan context. However, a study carried out by Musyoki *et al.*, (2013), that analyzed the factors influencing households' decision to join Community Forest Association in the forests of Ngare Ndare and Ontulili in Kenya; included, household possession of animals, size, farm size, age, knowledge of PFM under Forest Act 2005, proximity to forest products, and accessibility of their training in the subject of managing forests. The larger household sizes were among members of CFA, as opposed to non-CFA.

2.3 Stakeholders in Participatory Forest Management

According to Rosan (2010), the term stakeholders refer to resource users as well as policy shapers and service providers (including education and research), who undertake or facilitate community forestry processes. Broadly, there are two groups of stakeholders, namely internal and external. Internal stakeholders are organizations of the network, which form the specific community forestry (Rosan, 2010). Internal stakeholders can play the role of direct forest users, the committee and forest user groups and sub-committees. External stakeholders are

organizations of the network, which lies outside of the community forestry such as; government forest agencies, users 'networks, NGOs, donors and wood industries (Rosan, 2010).

Stakeholders in Participatory Forest Management conceptually fall into five broad categories namely, the private sector, the donors, the civil society, the state and local communities (Dahal, 1996; Hobley, 2004; Sharma and Acharya, 2004). All five groups are critical for sustaining participatory forest management. The study by Barrow *et al.*, (2002) argues in favor of state having a more dominant and stronger role in managing forests, hence their powers of allowing and restricting the kinds of use to various groups at different moments, which at times disregards how this impacts on other groups. However, this is being changed by structural adjustment by states through the inclusion of private sectors and communities. The Kenya Forest Service (KFS), as a stakeholders in forest management, is mandated to initiate conservation, development and control of the base of public forest resources in Kenya, besides helping in the development and management of forest resources by county government within communities, as well as enhancing equitability in the benefit of both generations today and that of the future. Among the core issues in KFS is the promotion of involvement of the communities through the principle of shared participation. Besides, there is need for enhancement of the approaches of participatory forest management so as to be certain that various agencies of government, private sectors, county government, communities and civil societies are brought on board.

The significance of participation is its resourceful involvement of stakeholders who have various responsibilities and interests geared toward project success by decision-making, collaboration, empowerment and consultation (Njandome, 2014). When stakeholders are empowered, they develop a sense of ownership to the project, which motivate them to boost their initiative toward

the desired success of the project. This will also go a long way to enable them to acquire necessary knowledge and skills in the course of their training (capacity building).

The community as one of the stakeholders is involved in the conservation activities as well as benefiting from deriving the forest products derived from the forests. The KFS is the main stakeholder in the forest department whose mandate is to preserve, manage and protect public forests according to the provisions of the revised forest Act 2016. The current study therefore investigated the various stakeholders affiliated with Kessup forest management, their motivation to participate and their degree of involvement in participating in all related forest issues. This research study was seeking to acquire a deeper understanding of how policies of decentralization should be cascaded to local forest users. There are some interactions between these policies (decentralization policies) and some of the demographic, social, economic and biophysical features that include age, educational variables, gender, wealth status and other variables which were initially postulated to have some impacts.

The role of community members as the stakeholders involved in the management of forest resources was carried out and how other stakeholders influenced the participation of the locals. While several studies have attempted to identify the key stakeholders in participatory forest management, few studies have analyzed the drivers or motivators for participatory forestry. The roles of various stakeholders at Kessup forest were identified in addition to the benefits they are entitled to as FACs. To achieve the objective of the study, among the stakeholders whose roles were assessed included the KFS, which is the main stakeholder with the mandate to manage and conserve the forests. In addition to KFS, NEMA, KWS, local communities and the county administrators; chiefs and the schools adjacent to the area of study were identified.

2.4 Community Forest Associations

The Forests Act of 2005 revised in 2016 has clear provisions for the recognition and role of CFAs (Mwangi *et al.*, 2012). It requires members of a forest community to enter into partnerships with the KFS through registered CFAs. These partnerships are applicable for both state forests and forests under local authorities (Mwangi *et al.*, 2012). The associations are registered only if their objectives; composition of their management committee, election procedures, and purpose for which their funds may be used are considered satisfactory by the KFS (Mwangi *et al.*, 2012).

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 (Mwangi *et al.*, 2012). The associations are also granted user rights to the forest resources on the condition that these rights do not conflict with the conservation of the forest (GoK, 2007 in Mwangi *et al.*, 2012). Therefore, local communities can possibly participate directly in conservation, management and protection of particular forest area based on forest management plan (World Bank Report, 2007).

Many communities are trying to come up with forest associations according to the expectations of the forest Act. Expectations of such groups are quite high, based on the clear objectives, regardless the fact that they are still in the primary stages of formulation. There are those that are still disorganized, as well as those others whose purpose is not forest management based but they purely driven by personal-interests (Ongugo *et al.*, 2008). The slow pace in embracing PFM has negatively affected successful implementation of participatory forest management.

The study by Ongugo *et al.*, (2008) showed that different CFAs in different forests in the country have different structures. For instance, the study at Kakamega forest showed that the CFA

comprised of eight-member committee including six men and two women formed by individual initiative. This was a clear indicator that community members have resourceful knowhow of the significance of forming associations for forest sustainability. The study in Meru showed that Meru Forest Environmental Conservation and Protection (MEFECAP) association has a structure comprising of nine-member committee. It is therefore clear that the existence of different CFAs came as a result of different interests and all have different structures. The above-mentioned study did not address the activities and the level of participation undertaken by the CFAs. Additionally, the study by Ongugo didn't consider the factors to be considered for the selection of the CFA committee and reasons for inequity in power sharing in regard to gender, leaving a the gap addressed by the current study.

Kenya's PFM has the government retaining autonomy of the forest, while the communities adjacent to these forests obtain user rights after being organized in CFAs (GoK, 2005). The user rights are granted under the condition that CFAs are registered by Societies Act, thereby applying to the chief conservator of Kenya Forestry Service (KFS) to be involved in forest management. The CFAs together with the KFS are required to develop a forest management plan and sign a management agreement. The plan outlines the forest activities that the community will undertake while the agreement confers management rights and responsibilities to the CFA. In Kenya, the first PFM site established in 1997 was at Arabuko-Sokoke Forest, although it never had supportive legislative framework (Thenya *et al.*, 2007). Today there are more than one hundred CFAs scattered across Kenya (Ongugo *et al.*, 2008).

2.5 The forest management trends in Kenya

The forest management in Kenya has undergone many stages since 1902 with an aim to promote the conservation of forest resources in the country. The changes were aimed at alienating the communally owned forests to central government ownership (Ongugo & Njuguna, 2004). The alienation process happened in 1908 and 1932 (Ongugo & Njuguna, 2004). Between 1933 and 1982 the development of forest policies and legislation aimed at ensuring that the department functioned well and was able to bring the alienated forests under the control of the central government (Ongugo & Njuguna, 2004).

The colonial government in 1902 created the forest department in Kenya. The communities who were previously owning the forests (communally owned forests) were affected by the government transfer of forests (communally owned forests to central government ownership process) as the forest department took control of forests within the borders governed by conservation policy. The forest department used the command and control approach at all levels by using armed Forest guards to police the forest boundaries and enforce management rules and procedures (Matiru, 2003 in Ongugo & Njuguna, 2004).

Forest Department lands were managed with no consultation outside of the agency. There was minimal interaction between the forest officers with other stakeholders (Ongugo & Njuguna, 2004). All decisions pertaining to forest management were made at the headquarters and passed down to the forest officials for implementation (Oyugi, 2000 in Ongugo & Njuguna, 2004). With minimal interaction with the local communities, the communities were affected by the restricted firewood access among other forest products resulting to conflicts between the community and the forest department. Conflicts increased in the late 1980s between communities, who needed fuelwood from neighboring forests, and the agency (Ongugo & Njuguna, 2004 in Coleman *et al.*,

2010). Following independence, a series of donor-funded forestry programs focused on afforestation and reforestation on farms, with the goal of alleviating fuel shortages resulting from restricted access to forest products (Ongugo & Njuguna, 2004 in Coleman *et al.*, 2010). With exclusion of the community members in the forest sector, there have been reforms on how to incorporate them in the forest management, as they are key personnel as long forest resources are concerned. Among the reforms include the formation of the Kenya forest Service (KFS) to replace the forest department and community association in the forest sector.

Kenya Forest Service (KFS) was then formed by the Forest Act of 2005 (revised in 2016) being a government agency that was partly autonomous and had various representatives from the state ministries. Subject to this Act, the devolution of powers to CFAs, private sector and forest conservation committees, remained the responsibility of KFS. The achievement of community participation is primarily through CFAs (Ongugo *et al.*, 2007). The Kenya Forests Working Group (KFWG) and the Kenya Forest Action Network (FAN) through sensitizing communities neighboring major Kenyan forests (Ongugo *et al.*, 2007) have then done formation of CFAs extensively. The Kenya Forest Service has been spearheading the formation of CFAs in its bid to meet the threshold of the Forest Act 2005 (revised in 2016). CFAs are majorly funded by subscription by members (Kinyanjui, 2007).

2.6 Benefits of community participation in PFM

Transformations in the institutional frameworks of forest governance, through the devolution of rights enacted through participatory forest management (PFM), have become widespread in the global south over the past three decades (Kairu *et al.*, 2018). Such apparently paradigmatic shifts in governance regimes reflect aspirations to sustainable forest management, enhanced livelihoods

through access to forest benefits, and reduced rates of deforestation, as well as concerns with equity and the myriad limitations of the state (Kairu *et al.*, 2018).

Participation of local communities in management and utilization of forest resources through collective action has been widely accepted as a possible solution to failure of centralized top down approaches to forest conservation due to community exclusion of the community in benefit sharing (Okumu & Muchapondwa, 2017). Participatory forest management therefore achieved both community inclusion and the utilization of the forest derived benefits. This is based on the principle that forests provide both tangible and intangible, direct and indirect benefits to those communities who participate in their management (Ongugo *et al.*, 2009). Tangible benefits to the CFAs from the forests contribute to the cohesiveness of the CFA members. The benefits ensure the sustainability of the groups involved in PFM activities (Ongugo *et al.*, 2009). Furthermore, most CFAs has been formed with the hope that the government would in future allow them to reap benefits such as harvesting of forest products for instance timber among other highly beneficial products (Ongugo *et al.*, 2009).

In the devolution of the forest resources, where participatory forestry is concerned, the goal of decentralization policies, as for example in the case of PFM, has often been to increase participation of rural households in decision making and benefits related to all aspects of forest management (Schreckenber *et al.*, 2006 in Mutune *et al.*, 2015). Community forestry therefore focuses on improving the livelihood and welfare of rural people and conserving natural forest systems through local participation and cooperation (Bhattarai 1985 in Okumu & Muchapondwa, 2017). Through the user groups formed by the community forest associations, the local community groups negotiate, define, and guarantee among themselves an equitable sharing of the management functions, entitlements, and responsibilities for a given set of natural resources (Okumu & Muchapondwa, 2017).

There are both formal and informal rules safeguarding user rights and benefits and prevent outsiders and or noncontributing members from benefiting from the group's management activities. Individuals thus share the uses, benefits, and responsibilities of their common resource (Okumu & Muchapondwa, 2017). In Kenya, a case of Kakamega forest, the study showed that the involvement of the community members in the CFA were effective in enhancing the conservation and the management activities of the forest. The community members interviewed on the perception of the effectiveness of the CFA in the conservation activities strongly agreed that there has been reduced poaching due to the CFAs formation in the area (Agevi *et al.*, 2014).

There has been need for the local community inclusion in the management and benefit sharing of the forest resources so as to offset the degradation of the forest resource and enhance the benefits to the forest adjacent communities. A study in Gambia revealed the need for the return of forests to the people so as to allow for the direct control of the forests by local communities, besides accessing the benefits that comes along with it (Odera 2008). The community involvement should be two-way; to improve the community livelihoods and be geared towards the achievements of conservation (Agrawal & Gibson, 1999; Ostrom, 1999; Ferraro, 2002; Wiggins *et al.*, 2004; Robertson & Lawes, 2005, in Guthiga 2008).

Through PFM, the local communities are recognized as the custodians of information and responsible for proper management of the resources within their dependency (Johnson 2001; White & Martin, 2002 in Guthiga 2008). The above information is necessitates the involvement of the local communities in forest management for both the improvement of their livelihoods sustaining the management of the same. Among the countries undertaking the PFM, research done in Kenya showed positive impact between community members involved in PFM activities and benefits derived from the forest resources compared non-participating members (Matiku *et al.*, 2012; Mutune *et al.*, 2015). The findings by Mutune further highlighted the economic

benefits of the members in PFM; the CFA members had higher forest-related incomes than non-members due to market opportunities and labor that are funded by donor institutions (Mutune *et al.*, 2015).

A study that was done in Nepal concerning the community forest management had significant role in meeting rural community needs. This was attributed to the benefits that the communities were getting from the forests because of their participation in the management (Chhetri, 2005). Heavily used local forest have their ecological sustainability dependent on the structures set up by local management that is taking care of such forest (Gautam & Shivakoti, 2005).

Participation of local people is determined by the resources' physical properties together with the deployment of local institutions in the initiative to conserve forests (Smith *et al.*, 2003). A research by Chhetri *et al.*, (1993) also found out that the regular supply of forest products could be increased by activation of forest management by local users with limited degradation of forest resources (Chhetri *et al.*, 1993). Based on the study by Agrawal (2001), the findings showed that there is an inverse relationship between outsiders' control (stakeholders from outside) and decision-making participation by the local communities at crucial stages in decision-making. The greater the former, the lesser the latter; it is then evident that the high involvement of the community members in forest resources enhances better management.

The current study interrogated the role/influence of the external stakeholders in the decision-making processes that affecting the community members' involvement in PFM. The study in India by Bihar *et al.*, (2000) showed that social and the economic characteristics of the households determined the participation of people in the community forest management. Additionally, the findings also realized that high quality forest products and the high dependence

on the forest resources are motivating the people to take part in the management role of forests (Bihar *et al.*, 2000).

A similar study carried out on the forest management of Nepal's community opines that participation level in forest management of the community is determined by the profiles of individual users' social-economy, alongside the benefits retrieved from the forests (Maskey *et al.*, 2003). Regardless the fact that forest management devolution in Nepal succeeded to manage forests, there is an argument that there is failure in achieving similar participation in the entire community sections. The failure attributed itself to the evident systematic exclusion of the lower caste, poor and various vulnerable groups from benefits of these forests and decision-making participation. There is also a very limited benefit from community forest among poor households in comparison to their rich counterparts (Agrawal, 2000). This therefore brings out an aspect of the role of the social class in the community.

The use of econometric models in a recent research of Nepal's Terai locality's protected area opined that there is greater likelihood of community participation among those who are well off economically and socially (Gupta, 2005). It was also discovered that there is more likelihood of participation in state-created user groups among individuals with more access to government offices concerned with decentralization policy, as compared to those individuals with the lower access to the government offices. Broader environmental, socio-economic and political concerns have necessitated the issues of community forestry (Timsina *et al.*, 2004). It is very crucial to effectively participate in decision-making processes, protection of forests and resource utilization.

Various forest resource user rights have been granted to CFAs by the forest act, the utilization of the rights should not conflict with the conflict with the conservation of biodiversity (GoK, 2016).

Among such granted rights include honey harvesting, medicinal herb collection, fuel wood and timber harvesting, grass harvesting, grazing their animals, gathering inputs from forests for community-based industries, recreational and ecotourism activities, educational and scientific activities, establishing plantations through nonresidential farming, contracts that aid in the enhancement of silvicultural operations, building of industries which are both wood-based and non-wood based, and other advantages that may be adventitiously agreed between KFS and association (GoK, 2016).

To assess the importance of PFM in forest conservation and community benefits; the research interrogated the community benefits derived from the plantation and indigenous forest types of Kessup forest. In addition, the levels community participation in forest conservation activities undertaken through PFM were investigated. The research findings will contribute to the literature of the same.

2.7 Theoretical framework

2.7.1 Participation theory

This is representing a strategic flow from top to down, which is dominant in the initial development endeavors to methodologies that are sensitive locally that involves the local people in the projects implementation and the related activities. It came into existence as a result of the limitations of the state in top-down approach that excluded the locals in the conservation practices (Claridge, 2004). Its criticism to the theory of modernization argues that it elevates a top-down view of ethnocentrism and authoritarianism in development. This theory realized the suffering of the poor due to economic civilization, including the need of everyone's involvement in making decisions for development, benefits and implementation. On the other hand, participatory theory takes bottom-to-top direction in planning, as well as being people-based in

development, upholding the concept of the fact that simple and ordinary individuals are capable of managing development activities of their own.

This theory encourages every stakeholder to be involved in development process (Fitano, 2003). The matter is very vital in the efficient administration of resources of the forests because of its need for all the members so as to succeed in the objective of promoting the conservation and the livelihoods of the community members. Decentralization of the forest resources has therefore achieved this, as it has enhanced the local community's involvement in the co-management in contrast to the state-centric, whereby the locals were seen as the rivals in the forest management matters. Participation of all the stakeholders is therefore important in the success of promoting the sustainability of the forest resources yet the drivers of the members participating remains to be questioned. This framework was used to identify and analyze drivers of community participation in PFM in Kessup forest block.

2.8 Conceptual framework

The analysis of drivers of PFM was based on the assumption that community participation is driven by a number of social, economic and bio-physical factors as shown in the (Fig. 1). The participation of the more powerful community members is likely to influence forest-derived benefits in proportion to the power they exert on the community forest association. The various drivers therefore are believed to have an effect on the participation as well as the outcomes of the participation.

The conceptual framework shows the variables that may affect the community participation in PFM. These include demographic characteristics; age of household head; education level of household head; gender of household head; household size among others. The age of the

young households is expected to have a higher participation rate as those of older households because of the expectations that older people may have less time and physical strength to engage in such forest activities.

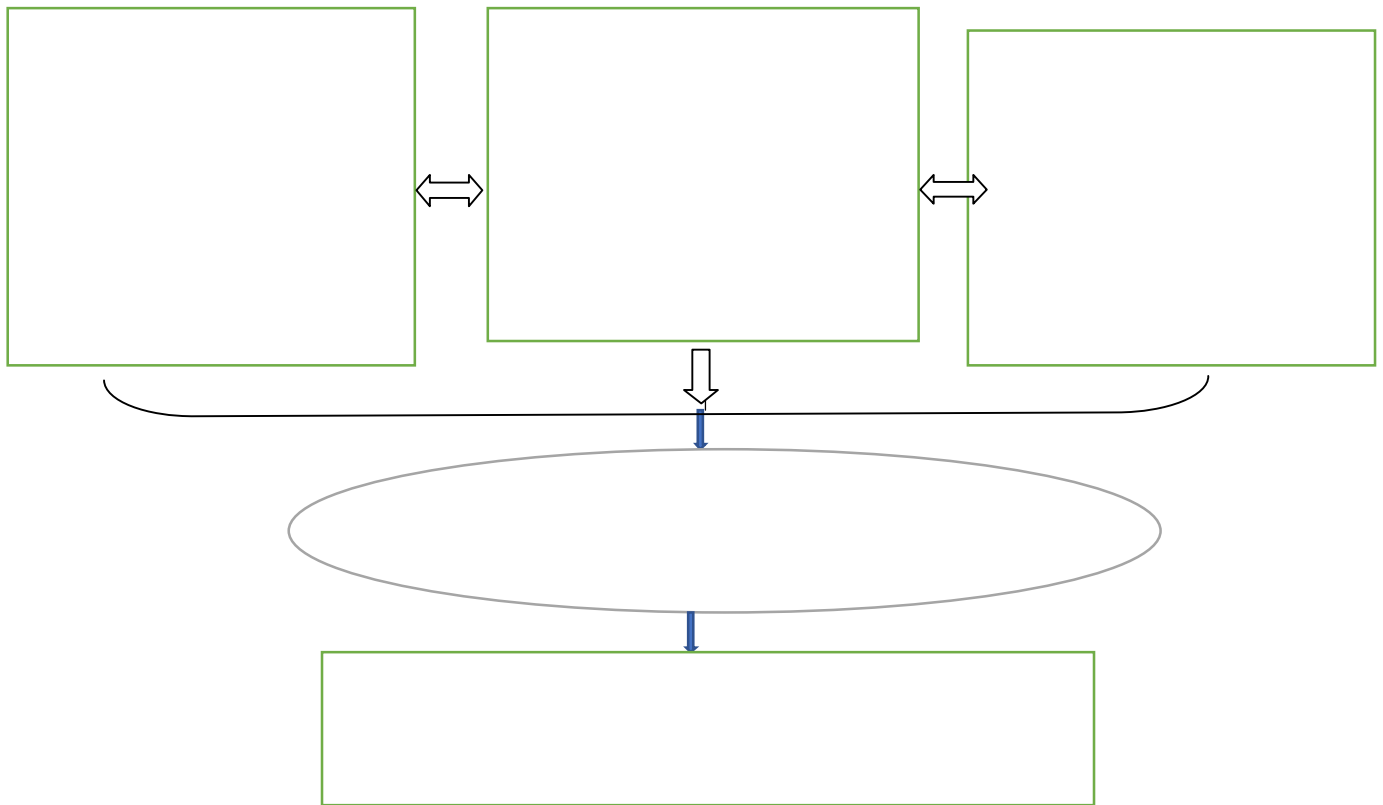


Figure 1: Conceptual framework source

Conceptual framework-Drivers of PFM in study area (Adapted with modification from Chhetri, 2005)

Households head level of education is postulated to reduce the extraction of the forest resources if its higher in contrast to the lower literacy level. This is because education is believed to give way to other employment opportunities. Education may be considered as a

cultural factor where going to the forest is considered backward and not for the elderly or the well-educated.

Households head gender is included to test whether participation in the PFM is significantly different between male-headed and female-headed households. It is expected that women participate more in some activities for example the firewood collection, gathering of the vegetables and fruits from the forest than men who may be more involved in land cultivation under PELIS, timber and posts extraction among others.

The number of people in a household (household size) is hypothesized to have a significant correlation with the dependence of forest resources. This is believed that the bigger the household, the more the labor to be spread across various activities that the household may derive from the forest. The biophysical characteristics is also anticipated to determine the participation in the fact that, those households adjacent to the forest are likely to participate more in PFM activities compared to those who are further away from the forest; distance affects time and other resources that may be incurred during the participation period. Among the economic variables postulated to impact the community involvement in PFM are; the land size, the number of livestock owned and the fodder sources, the income levels of the community members among others. The interaction between the socio-economic variables are also postulated to impact the community involvement in PFM; the gender and land ownership with land size may have the implication in that where female are not entitled to land ownership, they can be highly involved in the participation of forest related activities so as to sustain their livelihoods in contrast to men.

2.9 Research gaps

From literature reviewed, the information on the drivers influencing participation of the stakeholders in participatory forest management for the forests of heterogeneous vegetation in the same block is scantily documented. In addition, no studies has been done in Kessup forest and therefore the research findings from the study will provide a better understanding and knowledge for the management of the Kessup forest resource in particular, in addition to adding some more knowledge on the literature.

CHAPTER THREE

3.0 MATERIALS AND METHODS

3.1 Study Area Description

3.1.1 Location of the study area

The study was carried out among households adjacent to Kessup forest. The Kessup Forest Reserve is part of the larger Cheranganyi Hills Forest ecosystem and is located within Keiyo North Sub-county in Elgeyo-Marakwet County at geographical coordinates 0°34'60" N and 35°30'0" E (Fig. 2). The Forest's altitude rises to 2,700m above sea level and occupies an area of 2647.2 ha 1703.9 ha being under indigenous cover, and 643.3 ha under plantation and the rest under grassland and marsh (KFS, 2012).

A homogenous ethnic community composed of Kalenjin unlike many other forest areas in Kenya surrounds the forest area. The forest area is also undergoing rapid degradation due to illegal activities as a result of high demand of wood fuel for energy and the construction materials for example the poles and timber for the mushrooming sawmills in the region among other products derived from the forest. The forest area is important because it serves as a water source for many rural and urban households. Part of Kaptagat forest has a waterfall (Torok waterfall), which is a tourist's attraction site. The Kessup River, which originates from the forest, provides water that is used by wildlife at Rimoi game reserve.

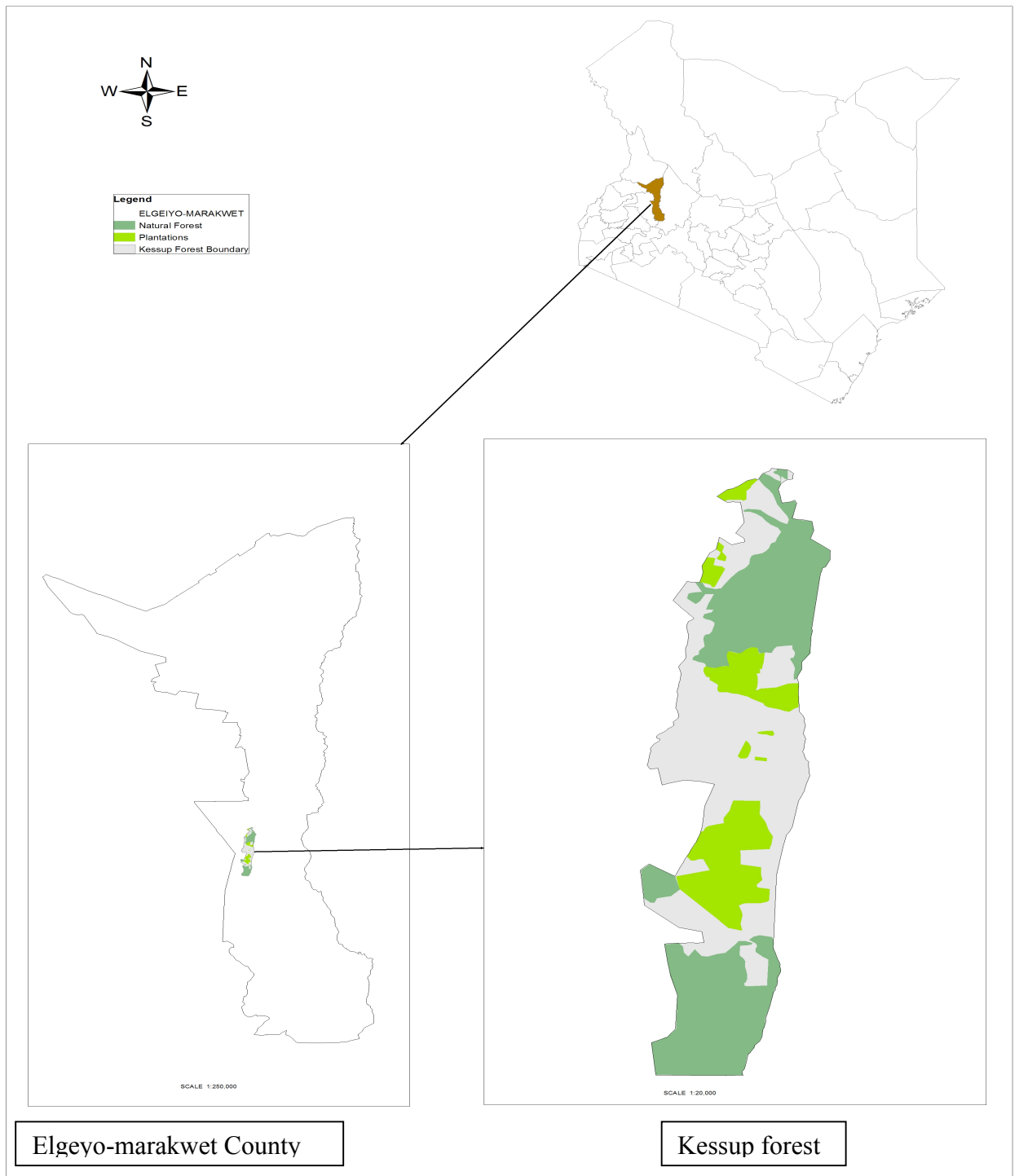


Figure 2: Location of the study area

(Source; KFS headquarters, Karura, 2017)

3.1.2 Background information

Geographical Location

The Kessup Forest Reserve is on the hilly terrain of the Cheranganyi Hills. This is as an old fault-block formation of non-volcanic origin (Birdlife International, 2009). The Elgeyo escarpment that drops abruptly to floor of the Kerio Valley borders the Forest. The Kessup Forest Reserve is part of the larger Cheranganyi Hills Forest ecosystem and is located within Keiyo North Sub-county in Elgeyo-Marakwet County at geographical coordinates 0°34'60" N and 35°30'0" E. The Forest rises to an altitude of 2,700m above sea level (KFS, 2012).

Climatic conditions

The Forest has a typical highland climate with a mean minimum temperature of 12⁰C and average maximum temperatures of 18⁰C. The average annual rainfall varies between 1,000mm and 1,200mm. The two long rain seasons are from March to May and September to November with maximum amount of rainfall in May and October, and short rains occurs during November and December followed roughly by a dry season of hot usually rainless weather from mid-December to March. The topographical zones are; the highland plateau which lies on the west, the escarpment at the centre and Kerio Valley on the Eastern Side. The highland plateau rises gradually from an altitude of range of 2,400 to 2,700m ASL (CIDP, 2013) on the Metkei Ridges in the South and runs Northwards parallel to Elgeyo Escarpment culminating into Cheranganyi Hills which rises to 3,350m at the northern boundary with West Pokot County (KFS, 2012).

Soils and hydrology

The soils are well-drained humic friable clay, with small part having deep humic friable clay. The two permanent rivers originating from the forest are Kerio River and Kessup rivers. Additionally, there are some springs and wells. Several dams including Yokot dam have been constructed along the from the rivers originating from the forest. The catchment is under intense human pressure as evidenced by deforestation, and encroachment (KFS, 2012).

Vegetation type

The Kessup Forest has both exotic plantations and indigenous natural forest with the total area being 2,647ha. The study area has three main vegetation zones with 1,704ha under indigenous cover, 643ha under plantation and 200ha under grassland and marsh. The main trees species are *Podocarpus falcatus*, *Juniperous procera* and *Olea europaea* among others the vegetation from the plantation forest are, *Cupresus Lusitanica*, *Pinus Patula* and *Eucalyptus species*. Among the plantation in the indigenous forest are, *Podocarpus latifolius*, *Podocarpus falcatus* and *Cyathea manniana* (KFS, 2012).

Fauna

The fauna is comprised of mammals, including the hare (*Lepus californicus*), Mongoose (*Mungos mungo*), Honey Badger (*Melivora capensis*), Porcupine (*Erethizon dorsatum*), Tree Hyrax (*Dendrohyrax arboreus*) and other rodent species. Primates include: The Black and white Columbus Monkey (*Colobus guereza*), Olive Baboon (*Papio anubis*). The carnivorous are the Leopard (*Panthera pardus*), and Serval Cat (*Leptailurus Serval*). Others include reptiles, insects, amphibians and mollusks (KFS 2012).

3.1.3 Forest adjacent communities

A homogenous ethnic community of Kalenjins surrounds the forest. Land use around the forest mainly comprises agricultural land. The total population of the study area is 25,245 comprising of 5,211 households. The number of males is 12,497 while that of females is 12,748. The level of the dependence on the forest resources varies among the adjacent communities as the forest vegetation types among other resources vary (KFS, 2012).

3.2 Methodology

3.3 Study design

The research design employed descriptive design which refers a systematic and empirical investigation where the researcher has no or little control independent variables due to their inherent nature, thus non-manipulated (Mugenda & Mugenda, 2003).

3.4 Econometric Model and Data Needed

The probit model was used to determine the relationship between household socio-economic and demographic characteristics and CFA participation. Whenever modeling of two alternatives the probit model is appropriate (Hoetker, 2007). The model has been used in categorical analysis such as severity analysis, behavioral analysis and level of participation (Maskey *et al.*, 2006; Hoetker, 2007; Ogada, 2012; Musyoki *et al.*, 2012 Mutune *et al.*, 2015). In this model, the dependent variable is a binary response i.e. household members' participation in PFM is 1 and 0, otherwise. PFM participation was hypothesized to be influenced by the social, economic, demographic and the biophysical variables.

To describe the observed variation in participation, logistic model in which the dependent variable community member's participation in PFM regressed as a function of the explanatory variables, demographic, social and economic was used. The response of the participants as to whether they participate in PFM was outlined as a binary choice model, with an outcome (decision of households) of participation high or low level of participation. The decision of households whether participates actively or less actively in PFM depends on economic, social, demographic and biophysical factors. The logistic model, Y_i represents the dependent variable, participation, which equals a household coded 0 if a household member rarely participates in a particular community forestry activity. A household is coded 1 if any one of the household members always participates in a particular

community forestry activity 1 if the respondents participate actively in PFM and 0 if participate less actively). The probability of household participation in PFM, $\Pr (Y_i = 1)$, is linearly related to a vector of observable independent variables $X_i\beta$; where β is the coefficient of the independent variable explaining the change in the dependent variable as a result of a unit change in an independent variable and X_i , are the independent variables investigated; household size, gender, education level among other independent variables.

The estimation forms logistic transformation of the probability of participants opinions in favor of participation in PFM $\Pr (Y_i = 1)$ can be represented as: $\Pr (Y_i=1) = \frac{\exp (X_i\beta)}{1+\exp (X_i\beta)}$ The above equation can be reduced to: $\Pr (Y_i = 1) = \frac{B_0 + B_1X_1+ B_2X_2 + \dots + B_iX_i}{1 + \exp(B_0 + B_1X_1+ B_2X_2 + \dots + B_iX_i)}$ Where: P is the probability of presence of the characteristic of interest, community participation. Where B is the coefficient of the independent variables and is estimated from calibration data using maximum likelihood technique. X is a host of explanatory variables.

The dependent variable: The outcome variable is participation of households in PFM, which is coded 1 to signify active participation in PFM and 0 if community participates less actively (less participation).

Independent variables: refers to a host of explanatory variables assumed to influence respondent's' decision to participate in PFM. The model, which represents participation (coded 1 if the household has actively participated and 0 if less participated) and a host of explanatory variables, is given by:

$$P (P)=B_0+B_1(G)+B_2(AG)+B_3(DM)+B_4(DF)+B_5(HHZ)+B_6(LE)+B_7(H)+B_8(EB)$$

Where:

P is a binary dependent variable indicating participation in PFM= 1 and 0 otherwise

G is dummy variable indicating gender

AG is a continuous variable indicating age of the respondents of forest users

DM is a continuous variable indicating the time to reach the nearest market in minutes

DF is a continuous variable indicating the time to reach the nearest forest in minutes

HHZ is a continuous variable indicating the number of people who live in a house and/or are economically dependent on the members“ living in that house

LL is a dummy variable indicating the literacy level.

H is a dummy variable indicating the distance the household’s lives from the forest reserve.

EB is a dummy variable indicating benefit derived from forest

3.4 Hypothesized variables

a) Distance of homesteads from the forests and market

The study findings from Thoai and Rañola (2010) showed an indirect relationship between the distance between the farmers house to the forest area to be managed and probability of participation. This was attributed to the transportation costs, which is directly proportional to the distance and thus becomes more expensive, especially because their activities related to protection of the forest require more of their regular presence. In contrast to this, the study findings by (Musyoki *et al.*, 2012) revealed that distance is not a determinant factor in household decision to participate in forest management. Scholars of common have also mixed thought about the effect of distance from market on participation. Among the findings on the effects of roads and markets found a positive relationship between distance from market and conservation of forest (Agrawal and Chhatre, 2006).

b) Household sizes

There are either positive or negative associations between household size and community involvement in forest management (Agrawal, 2006). The number of members in a household is a key driver of household to decide whether to participate in forest management; this echoes the observation made by Chettri (2005) that large-sized households are better utilizers of forest resources in contrast to small-sized households. This therefore makes them better participants in related forest activities. The study in Haiti by Dolisca *et al.*, (2006) identified size of a

household to be having a positive effect on social level participation. The studies by Mutune *et al.*, 2015 also agrees with this statement. This indicates that households with fewer members are less likely to participate in social forestry activities.

c) Household ownership of domestic animals and fodder sources

The current study wanted to find out whether the respondents who domesticated animals were more involved in the forest related activities or not. It was hypothesized that households who owned domestic animals were more likely to participate in PFM so as to maintain access to forest grass following for their demand on the product. The larger the number of the livestock owned by the households therefore, the higher their chance of participation in CFA (Mutune *et al.*, 2015).

d) Level of education of forest adjacent communities

It is hypothesized that households with higher levels of education are less dependent on forest resources and thus, less likely to participate in PFM activities. a higher literacy level provides a range of job opportunities therefore makes the forest derived livelihoods unprofitable due to greater opportunity costs of collection (Adhikari *et al.*, 2004; Dolisca *et al.*, 2006). The study findings by Coulibaly-Lingani *et al.*, 2009 and Musyoki *et al.*, 2013 revealed contradicting outcomes regarding education level and the conservation activities. It showed that there is no linkage between the two variables. The findings by Chettri 2005 showed that education supports the awareness creation of forest conservation and therefore influences the way people are involved in conservation activities

e) Gender of the household head heads

The findings by Musyoki *et al.*, (2012) revealed that gender as a demographic factor had a significant influence on participation of community members in forest conservation. Moreover, another finding by Coulibaly-Lingani *et al.*, (2011) in Burkina Faso, echoes this observation. It stated that there is a highly significant relation between gender and participation in forest

conservation. This implies that gender is indispensable for some aspects of participation in forest conservation just as reported for developing countries such as Burkina Faso and Kenya. According to this study, two genders experiences diverse situations that affect their involvement in the conservation of forest activities. The personal households' attributes to women hinder their involvement in the community organizations (Coulibaly-Lingani *et al.*, 2011). This therefore makes women disadvantaged in PFM participation, as they are obliged to social and household responsibilities

f) Age of the household heads

Age has been studied to be an important determinant factor in household decision to participate in PFM. Some communities respect the decision of the aged and the young people having various commitments that they value more than participating in PFM activities (Musyoki *et al.*, 2012). Studies done at Vietnam showed that the younger upland farmers have more options therefore do not usually participate in the forest management program (Thoai and Rañola, 2010). The older may also be interested because they have time to participate and also their value for forests and interests in conserving them. In contrast to the above study, the finding by Chhetri (2005), *Determinants of User Participation and Household Dependency in the Hills of Nepal*: indicates that the older people are less likely to participate compared to the younger ones as a result of the forest related work requires more physical strength and the younger people remained more active while the older people may find themselves unable to perform.

g) Products / Benefits derived from forest

Financial gains derived from forests among other sources of environment related plays an important role to the livelihoods of the rural communities in the developing countries (Bedru, 2007). Studies by Alemtsehay (2010) showed that the forests economic value has affected individual decision-making regarding participations in forest resources management and other common resources.

In most countries Villagers naturally use the forest products as an open access resource due to weak management activities. For example, in Tanzania local people use wild forest whether as a source of products primarily to be consumed at home, such as non-timber forest products (NTFPs) such as fuel wood, forest fruits and vegetables and medicine, and building materials, or for income generating activities such as timber and charcoal production this mainly influence their participation in PFM practices (Bedru, 2007).

3.5 Data sources

The study utilized both primary and secondary data. Primary data was collected through structured questionnaires, interviews, FGDs and participant's observations. The Kmacho application was used for the data collection; administration of the questionnaires and the taking of the GPS locations for the households surveyed. Additional records, informal interviews and direct field observations complemented the interviews. Secondary data involved the utilization of published journals and other literature, both local and international on the same context. Materials from the KFS and other forest partnering organization were also used.

3.6 Sampling

Household surveys were conducted from 96 households adjacent to the two forest blocks. The survey instrument administration followed a systematic random sampling such that every 5th household was selected for the survey. However, in a case where the targeted 5th household was not there, the next household was considered for the study.

3.7 Data collection

Kessup forest was purposively selected because it has both indigenous and plantation forests that aided in achieving the comparative study for the drivers of community participation in participatory

forest management activities in a heterogeneous forest block. Data collection was done between March to April 2017. Different research methods were applied; both primary and secondary data collections were used in the study. Among the primary methods of data collections were; household's surveys, key informant interviews and focus group discussions. Additionally, the study included in-depth interviews with key informants, including officials from KFS, KWS, CFA and two saw millers. The informants were purposely selected for their ability to inform the study objectives.

The interview guides specific for each main stakeholder group was prepared in advance of the interviews. In all cases detailed notes were taken. Focus group discussions, participants' observations, informal talks with villagers were used to triangulate the information gathered. Secondary data and information was obtained from review of published journals, grey literature, books and CFA documents.

3.8 Focus group discussion

Focus group discussions (FGDs) were conducted to gather additional information on the drivers of community participation in PFM. These were conducted with community members currently active in PFM activities, including PELIS and tree nursery user groups identified during the mapping process. A list of questions (relevant to the objectives) was used to guide the FGDs.

3.9 Sample size computation

The sample size of 96 households for the study was drawn from the villages adjacent to the forests of study whose members were involved in the Participatory forest management activities. The calculation of the sample was achieved by Cochran (1963) formula that is also quoted in Israel (1992). From the formulae, a total number of 96 households were picked from 2874 households in Mutei and Irong Locations as per 2009 Kenyan populations census. To identify the current number of households, the chiefs and the assistant chiefs of the area acted as the reference point for clarification purposes in cases where there were new households into area and to tell about those

who migrated out. This approach was necessary because the data from Kenya National Bureau of Statistics may not be up to date. The corresponding number of households that were surveyed from each village were obtained through proportional allocation method; under which the sizes of the samples from the different strata are kept proportional to the sizes of the strata. That is, if P_i represents the proportion of population included in stratum i , and n represents the total sample size, the number of elements selected from stratum i is $n \cdot P_i$; sample size for Village I therefore becomes,

$$n_1 = n \cdot P_1. \text{ (Kothari C.R, 2011.)}$$

Computation of study sample size

$$n = \frac{N}{1 + N(e)^2}$$

Whereby;

N = population size

n = Sample size

e = the desired level of precision (margin of error) (The margin of error is taken to be 10% for economical convenience purposes).

$$n = \frac{2874}{1 + 2874(0.1)^2}$$

$$n = 96$$

n = sample size was 96 households

3.10 Data analysis

The quantitative data from the household survey was organized in SPSS from where descriptive statistics (means and the percentages) and inferential statistics (Pearson correlations analysis) were

used to analyze the data. Tables, figures, frequencies and percentages were used for the data presentations. The qualitative information gathered through interviews, focus groups and informal discussions was transcribed, coded and interpreted in the context of participation and analysed using the thematic approach of analysis.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Household Characteristics

The households surveyed involved 96 respondents involved in the PFM activities adjacent to the two forests. Among the surveyed respondents, 51% were adjacent to the plantation and the rest from the indigenous forests. These communities adjacent to the indigenous and plantation forests were from Irong and Mutei location respectively. The involvement of the male respondents was higher at 71% and 57% compared to female respondents who were at 29 and 43% from the plantation and the indigenous forest respectively.

Male members dominated household heads of the respondents adjacent to the two forests of studies at 83% and 78% among the respondents adjacent to the indigenous and plantation forest respectively. Like the plantation forests, the average household size was 5 members for the households adjacent to the indigenous forest. Most of the respondents belonged to the active age brackets of 20-50 years (60% and 84%) for the indigenous and the plantation forests respectively and 40% and 16% for the respondents above 60 years from indigenous and the plantation forest respectively.

Some of the demographic characteristics of the respondents are illustrated in Table 1 below.

Table 1: Demographic characteristics of the respondents.

VARIABLES			PLANTATION FOREST n=49		INDIGENOUS FOREST n=47			
VARIABLE	Mean	Std. Dev	Std. Error Mean	p-value	Mean	Std. Dev	Std. Error Mean	P-Value
Distance in Km to the nearest edge of the forest	1.92	1.0	.230	.000	1.46	2.824	.602	.000
Household size	4.96	1.6	.231	.000	5.21	1.667	.243	.000
Land size in acres	4.52	6.1	1.234	.001	3.80	3.654	.636	.000
Land size under tree cover in acres	.56	.71	.153	.001	.36	.431	.102	.002
Number of cows	5.91	5.7	.860	.000	5.64	2.870	.478	.000
Number of sheep	6.43	8.2	1.238	.000	7.28	7.733	1.289	.000

Household survey triangulated with participants' observation revealed that crop and livestock production and business are the major economic activities in the study sites. Thus, land ownership is an important aspect to households for agricultural undertakings. The mean land size for the respondents adjacent to the two forest types is shown in table 1 above.

Ownership of household gadgets was important for the communication and awareness creation among the respondents. Radios, both classical and mobile phones radios were the common communication gadgets owned by the respondents to receive the PFM related information. Awareness of such information was critical in enhancing the participation community members.

4.2 Factors affecting community Participation

The socio-economic drivers that influenced participation in CFA of both indigenous and plantation forest included distance to the forest, land size, household size, ownership of livestock, products derived from the forest, gender and education. The results of the aforementioned factors and their significant levels are presented in the following section.

a) Distance to the nearest forest edge in Km

Among the respondents surveyed from indigenous and plantation forest, 87% and 69% of the members resided between 0-2Kms; The mean distances from the two-forest type edge was 1.92 and 1.46 km respectively. The mean for the respondent's adjacent the plantation forest was higher and this was attributed to the location of the PELIS land from their homesteads. The study showed a significant positive correlation between distance and the participation in CFA ($r= 0.949, P=0.014$ and $r=0.762, P=0.011$) among the respondent's adjacent to plantation and indigenous forest respectively. This implied that household members more adjacent to the forest were more likely to participate in CFA activities. The drive to CFA participation by proximity to forest was their exposure to the forest related activities besides ability to derive forest products like firewood. There was no significant statistical difference in regard to distance to nearest edge of forest and participation among the respondents from the two-adjacent forests.

b) Household Size and forest type

The survey showed that the average household sizes were 5 members for the two-forest adjacent communities. The household survey data revealed that there were non-significant positive correlation between the household size and the decision to participate in PFM activities ($r=0.100$, $p=0.495$ and $r=0.189$, $p=203$) among the respondent's adjacent to plantation and indigenous respectively. This therefore shows the households will participate in forest related activities regardless of their family sizes, contrary to what other studies have shown.

c) Land size and forest types

Nearly all households surveyed, 99% of them owned lands of various sizes. Inheritance was the main land acquisition procedure. The mean land sizes for the two forest adjacent communities were 4.52 and 3.8 acres for the plantation and the indigenous forest respectively. The land sizes owned by the respondents adjacent to the plantation were higher in contrast to those adjacent to the indigenous forest. This may be attributed to the land allocated for the PELIS, accounted as part of own acreage, which is only available in the plantation forest type. The total land size owned in acres was directly proportional to the land allocated for the tree planting activities. The mean sizes of land allocated for the tree planting activity among the respondents adjacent to plantation and the indigenous forests were 0.56 and 0.36 acres respectively. There was positive correlation between the total household land size owned and the land allocated for the tree planting activity ($r= 0.646$, $p=0.05$ and $r=0.449$, $p=0.05$) for the respondents' adjacent plantation and the indigenous respectively.

d) Ownership of Livestock, fodder sources and the forest type.

Most of the livestock kept by the respondents were utilized for both the domestic and the commercial purposes. The main livestock kept were cattle, sheep and poultry. The study considered the sheep and cattle because of the fodder sources. The respondents from both indigenous and plantation forests keeps an average of 6 cows. There was slight difference in the number of sheep

kept with a mean of 6 and 7 sheep by the respondents adjacent to plantation and indigenous forest respectively.

Households obtained their livestock fodder from diverse sources with majority of the respondents having more than one fodder source as shown in Fig. 3.

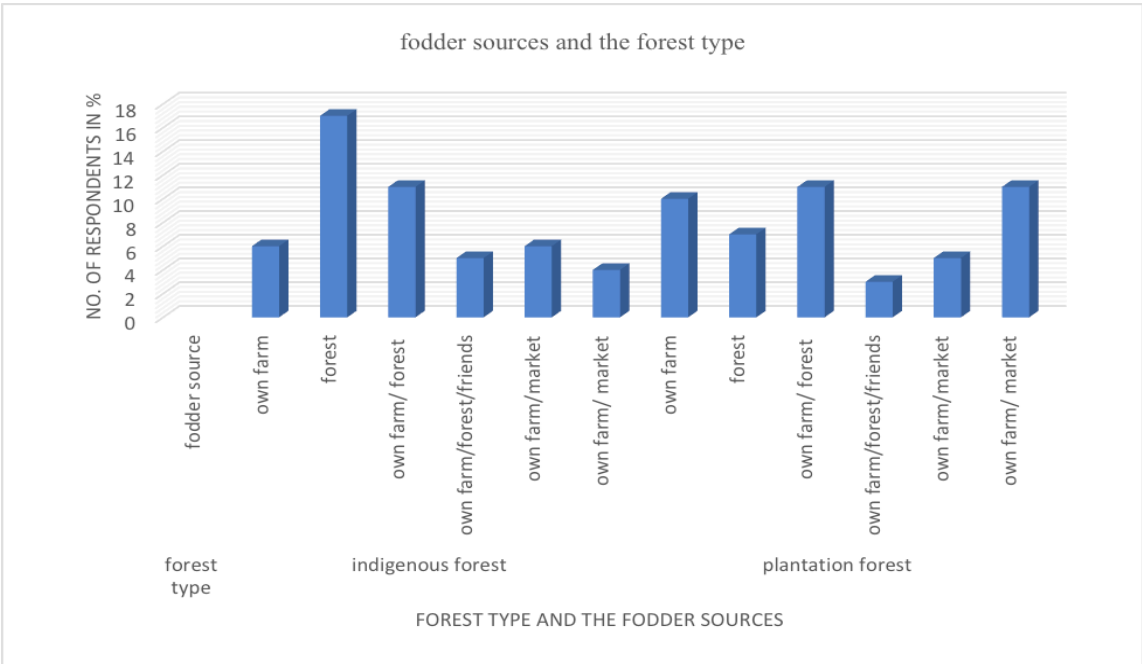


Figure 3: Fodder sources for the forest adjacent communities

There was significant positive correlation between the number of the livestock and the products derived from the forest; fodder ($r=0.281, P=0.035$ and $r=0.337, p=0.045$) among the respondent’s adjacent to plantation and indigenous forest respectively. Among other fodder sources, respondents adjacent to the indigenous forest were more involved in deriving the fodder from the forest in contrast to those adjacent to the plantation forest at 17% and 10% respectively. This aspect of utilizing the fodder can be interrelated with the small land sizes owned by the respondents adjacent to the indigenous forest in contrast to those adjacent to the plantation forest because of the PELIS system.

e) Level of Education level

Residing adjacent to any of the forests has no role with respect to influencing the education level of the forest adjacent communities. The education level of the respondents surveyed ranged from primary, secondary and the tertiary at 51%, 31% and 18% and 51%, 35% and 14% for the respondents adjacent to the indigenous and the plantation forest respectively. The majority of the respondents had primary level of education and the least were those with tertiary level of education either certificate, diploma or the degree. Table 2 shows the number of meetings against education level of the households surveyed.

Table 2: Education and the number of meetings

Education level	Number of meetings							Total
	Once	2 times	3 times	4 times	Above 5 times	None	NA	
Primary Level	4	7	4	3	1	4	24	47
Secondary Level	8	1	1	0	3	1	20	34
College Diploma	1	1	2	0	1	1	6	12
NA	1	0	1	0	0	0	1	3
Total	14	9	8	3	5	6	51	96

The findings showed a significant negative correlation between the highest education level and the number of the CFA meetings attended ($r = -0.580$; $P = 0.019$ and $r = -0.528$, $p = 0.008$). The CFA members who had tertiary education level were not residing in their home areas and therefore they never had enough time to participate in the CFA meetings activities among other activities. The results were similar among the respondent's adjacent to the two forests.

f) Gender of the respondents and the forest type

Forest product extraction differenced by gender between plantation and indigenous forests indicate that about 71% and 57% males were involved in the extraction of forest products. Men were therefore more involved in the participation of the PFM activities in contrast to women. The distribution of gender, forest activities and forest type are shown in table 3 below

Table 3: Gender distribution, activity undertaken and forest type

Forest products	The forest type			
	Forest type deriving the products			
	Indigenous		Plantation	
Gender	F	M	F	M
Firewood	10	2	13	3
Fodder	1	5	1	2
Thatching/Roofing materials	0	3	0	3
Timber	0	0	1	2
Tree nursery establishment	2	0	5	1
Vegetables	1	0	0	2
Manure/Organic fertilizers	0	2	1	0
Cultivation of PELIS land and land for tree nursery establishment	0	0	8	16

The findings showed a significant positive correlation between the gender and the participation in PFM activities ($r=0.736$, $p=0.049$ and $r=0.687$, $p=0.041$) for the plantation and indigenous forest respectively. This infers that some of the CFA related activities were gender specific; for instance, nursery establishments and firewood collections were dominated by the women whereas men dominated the cultivation of the PELIS allocated farms, collection of roofing materials among other.

Plate 1 below shows women involved in tree nursery establishment.



Plate 1: Women establishing a tree nursery

g) Age and participation in PFM activities.

Age played an important role in determining the respondent's level of participation. The findings showed that many of the respondents between the ages of 20-40 years were more involved in forest related activities as compared to the respondent's > 40 years. The survey showed that there was a significant negative relationship between the elderly respondents and the participation in PFM activities ($r=-0.265$, $p=0.032$ and $r=-0.166$, $p=0.027$) between the respondent's adjacent to plantation and the indigenous forest respectively. This shows that the young were more involved compared to the older respondent's irrespective of the forest type.

4.3 Community access to forest products

Forest adjacent communities are privileged to have access to forest resources. The community members adjacent to the area of study were benefiting from the forest products. This was relative on the forest type and the households needs.

a) Products access and the forest type

The involvement in PFM activities among the respondent's adjacent to indigenous and plantation forests were driven by the tangible benefits derived from the forests. Irrespective of the forest type, 100% of the households surveyed said that access to the forest products is not restricted by membership to the CFA. However, community members had to pay for appropriate KFS permits to access forest products. The two forest adjacent communities mentioned proximity to the forest was their main reason to their participation in deriving the products. Among the products derived by the respondents adjacent to the indigenous forest, firewood and fodder were among the most extracted resource than thatching/roofing materials, vegetables, manure/organic fertilizer, medicinal plants as shown in (fig. 4).

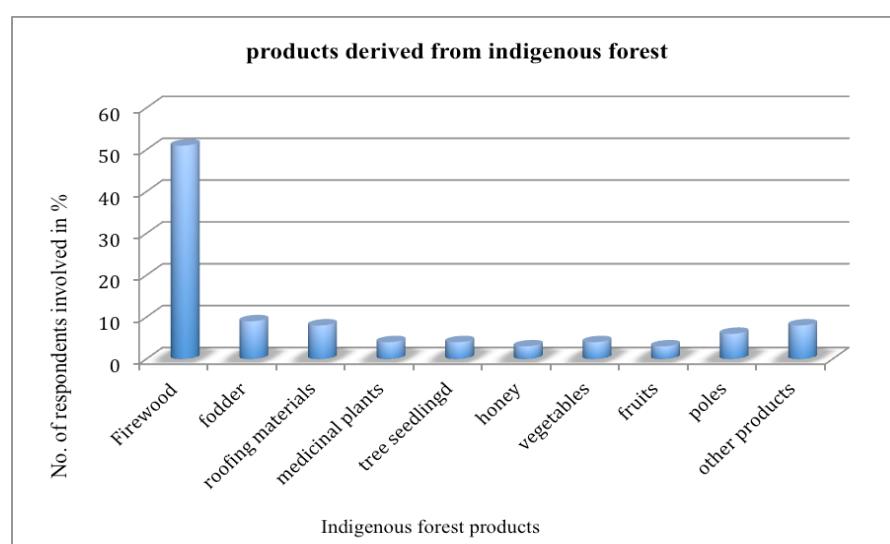


Figure 4: Products derived from the indigenous forest

The plantation forest activity included PELIS land cultivation, and products collection like firewood, timber, fodder collection among others as shown in (fig. 5).

The products derived from the plantation forest is represented in the (Fig. 5 below)



Figure 5: Products derived from the plantation forest

The study showed a significant positive correlation between the products derived from the last 12 months and the forest type ($r=0.371$, $p=0.010$ and $r=0.931$, $p=0.030$) for plantation and indigenous forest respectively.

b) Plantation Establishment and Livelihoods Improvement Scheme (PELIS)

Plantation Establishment and Livelihoods Improvement Scheme (PELIS), is always allocated after the KFS has done the harvesting of the mature trees in the plantation forest. In contrast to other activities, PELIS was only availed to the community members adjacent to the plantation forest types. A community is considered for PELIS land allocation if he/she is registered in a CFA. The respondents surveyed were either primary or secondary allottees. A respondent was considered a primary allottee when allocated the land by KFS whereas secondary allottees were the respondents who leased or rented the land from the primary allottees. Despite the law requirements for the PELIS land allocation that should be CFA membership, the community members were utilizing the land

irrespective of the membership. The PELIS land beneficiaries complained of the asymmetry in land allocations by the KFS, saying that CFA leaders are given large parcels of land contrast to the other members. The number of years the respondents involves in the PELIS activity varied among the households surveyed in the plantation forest type. The highest number of the respondents had been involved in the PELIS system between 3-4 years (35%).

The Fig. 6 shows the distribution of the other CFA members in PELIS user group and the number of years involved in PELIS land cultivation.

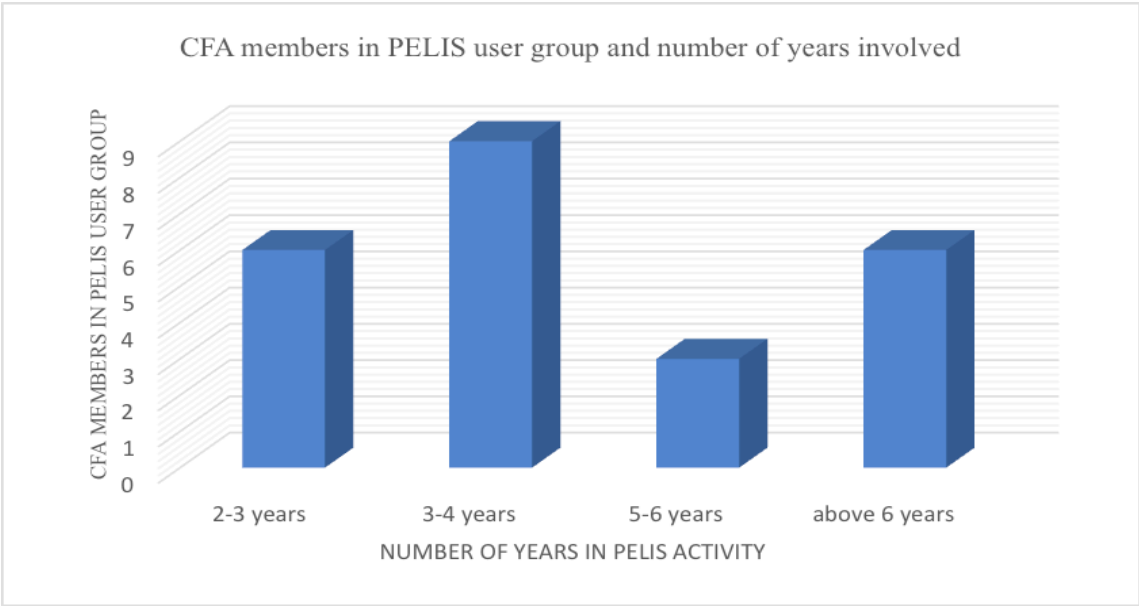


Figure 6: PELIS user group membership and years of involvement

However, other members even cultivated the land more than 5 years forming a major gap in PELIS implementation. The findings found asymmetry in the allocation of the forestland for PELIS. The PELIS members revealed that whereas a normal CFA member receives 0.25 acres of PELIS land, the executive officials received about 5 acres of PELIS land. This therefore presents inequality, exclusivity and lack of accountability therefore weakens the governance in regarding the PELIS implementation.

b) Challenges to access Forest products

Challenges in accessing the forest products were recorded by the respondents adjacent to the two forest sites. The responses varied depending on the forest type and use.

(i) Challenges faced by plantation forest users

Among the challenges raised by the respondents adjacent to the plantation forest were; inaccessible roads to their allocated lands especially during the harvesting season when one has to transport the harvests to their homesteads, this was echoed by the key informant interviews and the FGD conducted to the members adjacent to the forest site. In addition to that, boundary disputes have been another challenge that was witnessed by the respondents allocated the PELIS land.

Human-wildlife conflicts; this is through the crop invasion by wild animals (baboons, monkeys, porcupines and warthogs) especially at night and during the rainy seasons when no one is on farm. Invasions of farms were also common with the domestic animals especially the goats; this was a major challenge especially for the PELIS users at the peripheral lands.

Long distances to the KFS offices for the payments of the permits, this is because the offices are located adjacent to the indigenous forest. Another challenge was high payment rates for the allocation of the land and the annual subscription especially for the PELIS. Some of the members mentioned the time given to cultivate the lands (3-4 years) being a challenge, as they wanted more lands so as to enhance food security within their households. Some of the members quoted that some of the CFA officials are given large parcels of lands because of their relationship with the KFS officers. In addition, some members said that the registration of CFA membership in order to gain the land is a challenge especially when someone does not have the money required; the officers gives out the land to those who can afford the membership fees.

(ii) Challenges facing community members adjacent to the indigenous forest.

Some of the challenges raised were; high restrictions by the KFS authority in regard to the harvesting of firewood, the interviewed respondents said that the officers had restricted them to collect the dead wood that is almost impossible to get as the community members have over utilized the forest. Whenever a member is found with non-dead wood fuel, they are imposed with penalties, for instance, a member can pay up to Ksh.1500 or their user rights are suspended for one month to impose the penalty. This as reported by five of the members, four adjacent to the indigenous forest and one adjacent to the plantation forest.

Overgrazing of livestock by the community members due to pro-longed dry seasons and during the planting seasons. These two seasons makes the community members to look for alternative fodder sources for their livestock; ending up in the indigenous forest and this results to overgrazing. Detained livestock may be a challenge especially when grazing is done without the monthly subscription by the community members. The community members adjacent to the indigenous forest attributed these KFS strictness to the closeness of the KFS officials. Some of the members wished that the KFS station were adjacent to the plantation forest so as to monitor the PELIS and leave them do their grazing peacefully.

4.3 CFA Composition and Levels of Participation

Decentralization of the forest activities to the local level is witnessed through the acceptance of the community members' involvement in CFA. Their membership in the CFA and related roles undertaken is key in evaluating the community's willpower towards devolved forest governance. The number of individuals registered in a given registered CFA also demonstrates the level of community acceptance to the devolved system of forest management. A well-organized structured CFA shows high level of devolved forest governance in contrast to a CFA with less members against the population of the surveyed respondents.

i) Gender distribution of the CFA members and forest type.

Membership of CFA is regardless of an individual gender and the forest type. The community members adjacent to either forest were involved in the CFA membership. The study revealed that more men were registered in the CFA membership in contrast to women. From the surveyed households, about 40% and 20% male populations were from the plantation and indigenous forests respectively. Females were about 27% at plantation and about 11% from the indigenous forest. The involvement of women in other household chores might have contributed to their less participation in forest related activities. This therefore allowed men to lead in the CFA membership and general participation in related forest related activities with as shown in the (fig. 7).

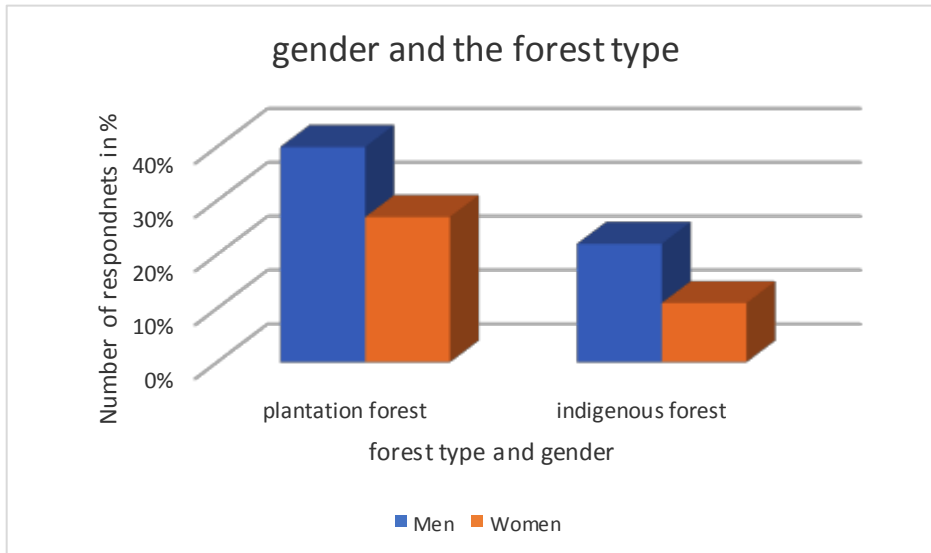


Figure 7: Gender and the forest type

The findings showed a significant positive correlation between the gender and the participation and the CFA membership ($r=0.736$, $p=0.049$ and $r=0.687$, $p=0.041$) for the plantation and indigenous forest respectively. Gender therefore played an important role in determining the respondents' participation in forest related activities irrespective of the forest type.

ii) Number of years in CFA membership and the forest type

The survey showed variability in CFA membership registration and the forest type. Majority of the community members adjacent to the plantation forest were registered in CFA (59%) in contrast to those adjacent to the indigenous forest (32%). This variability was also manifested in the number of years a household head has been a CFA member. The higher membership number among the respondents adjacent to the plantation forest may be attributed to the PELIS registration of the members in CFA. The number of years in CFA varied among the surveyed respondents.

The distribution of respondents against the number of years in the CFA is shown in Table 4 below.

Table 4: Number of years in CFA and the forest type.

Number of years in CFA	Frequency in the Plantation forest	Frequency in the indigenous forest
0-2	2	2
3-4	8	7
5-6	7	4
7-8	5	1
Above 8 years	7	1

Awareness of the forest law may be an attributed driver to the higher number of the households' heads in the CFA among the respondents adjacent to the plantation forest against those who were adjacent to the indigenous forest.

iii) Number of meetings attended by the CFA members and the forest type

In attendance of the CFA meetings was important as the community members were addressed on some matters arising in regard to the forest resources management. The meetings attended by the community members varied with the forest type. High attendance was recorded among the respondents adjacent to the plantation forest against those adjacent to the indigenous forest. Majority of the respondents surveyed from the two-forest showed that they had attended the CFA meetings once.

The number of respondents attending the meetings declined as the frequency of meetings increased as shown (Table 5)

Table 5: Number of meetings attended by the CFA members by forest type

Frequency of meetings attended per year	Respondents in the plantation forest	Respondents in the indigenous forest
Once	13	6
2 times	9	4
3 times	6	3
4 times	2	2
5 times	1	0

iv) CFA membership, PFM activities and the forest type

The CFA members from the two adjacent forests were involved in a wide range of activities. The activities undertaken were both beneficial to the households and the forests sustainability. Some of the respondents were involved in undertaking one activity for instance, CFA meetings whereas others were involved in multiple activities; CFA meetings, nursery establishment and tree planting. Although the activities undertaken in the two forests were similar, the number of respondents varied depending on the forest type. For instance, the respondents adjacent to the plantation forest were more involved in the CFA meetings. Those adjacent to the indigenous forest were highly involved in the tree nursery establishment and forest.

The distribution of the respondents and activities undertaken in each of the forest sites is as shown (fig. 8 below)

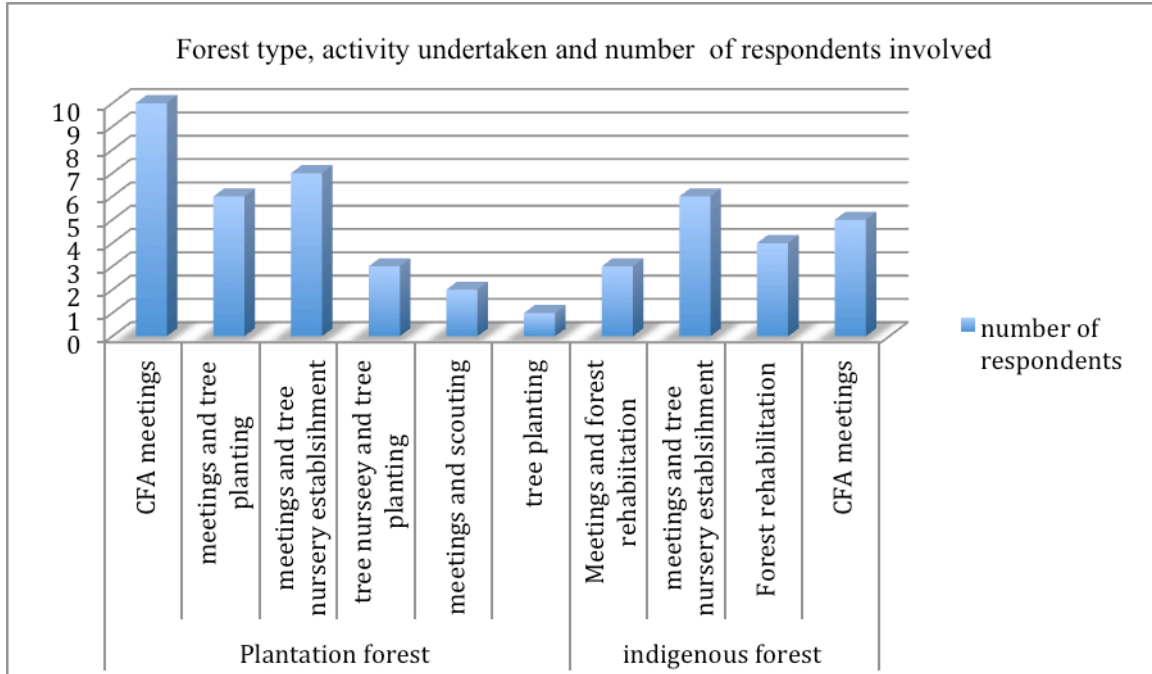


Figure 8: Forest activities undertaken by respondents' adjacent plantation and indigenous forest

Those respondents involved in a joint activity of meetings and tree nursery establishment were many in contrast to those undertaking other forest related activities.

4.4 Kessup Forest Stakeholders and their Roles

Forest resources as a natural resource deserves many stakeholders to be involved in its management process in order to achieve the sustainability and enhance the benefits that has to be derived in the same resources. Many studies that have been done shows the stakeholders involved in the forest management are the KFS; they have the mandate to enhance the conservation of the forest and all the resources.

a) Management of the Forest resources

The KFS is the overall authority with the mandate to enhance development, conservation and management of forest resources base. The study findings showed that the KFS coordinated the other stakeholders in activities relating to the use of the forest resources. They are working with the KWS and the local communities in enhancing the conservation and management of the wildlife habitat. The FAC obtain the extraction permits from the KFS offices at Kessup forest station. The KFS manager with the assistance from the other staff are establishing the reforestation and afforestation programs which promote the participation of the communities in the management, utilization and the conservation of the forest resources. The KFS also supports the community members with the trainings through the bench marking activities. The study findings showed that some of the community members were taken to Kakamega forest for CFA exchange programs and trainings.

Additionally, the KFS are working with the KWS in the protection of the biodiversity; flora and the fauna of Kessup forest. Among the fauna found in the forest were; the hare (*Lepus californicus*), Mongoose (*Mungos mungo*), Honey Badger (*Melivora capensis*), Porcupine (*Erethizon dorsatum*), Tree Hyrax (*Dendrohyrax arboreus*), The Black and white Columbus Monkey (*Colobus guereza*), Olive Baboon (*Papio anubis*), Leopard (*Panthera pardus*), among others. The KWS therefore promoted the conservation of the wildlife in the forest reserve. The KFS are also working with the

KWS in managing the Human-wildlife conflicts caused by problematic animals. The most common problematic animals mentioned in the study area were; Monkey (*Colobus guereza*), Olive Baboon (*Papio anubis*) and warthog (*Erethizon dorsatum*) among others. These animals are negatively affecting the community members by invading the farms and thus affecting the farmers. The local community members were also involved in wide range of forest management activities. The community through the CFA members was consulted in some of the issues relating to the forest; for instance, they were involved in the tree planting activities, harvesting of the forest resources and in the establishment of the tree seedlings. The FACs were very helpful to the KFS especially during the establishment of the tree nurseries and the tree planting activities organized by the KFS. They provided labor required during these operations. Some community members are forest scouts and are helping the KFS authority by undertaking the patrols and ensuring compliance by the community members especially by checking on the boundary for the lands allocated for the PELIS activities.

The NEMA is working with the KFS and they are promoting the rehabilitation activities of the indigenous forest. This enhanced the conservation of the water towers in the region that was used by the wildlife at Rimoi Game reserve. They review the Environmental Impact Assessment (EIA) reports submitted before any harvesting of the plantation trees in done in the forest. The county government of Elgeyo-Marakwet is also working with the KFS through the County Director of Environment. The director in charge was responsible to enhancing the conservation and the sustainable use of the resources in the area.

The Chiefs are involved in the management of the forest. They are guarding the forest resources indirectly; through monitoring of illegal harvesting of the forest products. They confirmed the issue of the licenses with the KFS authority. The chiefs are organizing the barazas whenever there need for public participation for the community members regarding the forest issues for instance, informing the community members about tree planting activities. The idea of devolution of the forest roles was made aware to the community members through the chiefs and the schools around;

the schools are always the avenues where the meetings are held. The research institutions and other academia are involved in the research activities in the region. The KEFRI, though have not visited the area advised the KFS in the species suitable to be planted in the area.

b) The role of stakeholders in community empowerment

Donors and non-government organizations are useful to the FACs as shown by the study survey. Nature Kenya is one of the stakeholders that have promoted community empowerment in the study area. The Nature Kenya trained the community members on the following areas; income generations through the establishment of the indigenous tree seedlings, seeds and seedling collection the bee keeping activities. The Nature Kenya also assisted the KFS staff with some transport logistics; purchasing the motorcycle, which facilitates the movement of the staff to other places as the forest, was large and could not be operated by one vehicle that was allocated to the station. The saw millers who were majorly involved in the harvesting of the mature trees worked with other community members in their daily activities and therefore they provided the employment opportunities to the locals. Although various stakeholders were involved in Kessup forest, their activities were not coordinated although geared towards forest management and community empowerment.

4.6 DISCUSSIONS

The distance to the nearest edge of the forest is an important driver in determining the respondents' level of participation in PFM activities. The study showed a positive relationship between the distance and the higher number of participants in PFM activities for instance, the attendance in the meetings, among the respondent's adjacent to the two forests of study ($P < 0.05$). The respondents closer to the forest were more involved in the PFM activities as compared to those who were further apart from the forest. This echoes the findings from (Thoai and Rañola, 2010) who observed an inverse correlation and attributed it to increased transport costs with increased distance to the forest.

The study findings showed that household size was not significant in determining the respondents' participation in PFM and other forest related activities ($r = -0.077$, $P = 0.445$). The study contrasts with the findings by Dolisca *et al.*, (2006) in Haiti and Mutune *et al.*, 2015, in Kenya who identified household size to be having a positive effect on social level participation in forest management.

The study showed a significant positive relationship between the number of the livestock and the participation in deriving the forest products; fodder ($P < 0.05$) among the respondent's adjacent to two forests of studies. The respondents with more livestock needed more resources therefore the corresponding household has to look for an alternative fodder source. The study agrees with the findings by Mutune *et al.*, (2015) that the larger the livestock herd, the higher the chances of household participation in CFA activities. Similarly, findings by Musyoki *et al.*, 2013; Chhetri *et al.*, 2005; Adhikari *et al.*, 2004) supports the findings that the more the livestock a household has the higher the chance of involvement in activities related to forests.

The products gained from the forest played a role in determining the community members' involvement in the related forest activities. The study showed a significant positive correlation between the participation in CFA related activities and the forest products derived ($p < 0.05$) for two forests studied. Fodder and the PELIS land demonstrated this aspect from the two community members adjacent to the forests. This therefore showed that the community members participated in

forest activities because of the benefits gained from the forest, which improved their livelihoods. The study concurred with the finding by (Alemtsehay 2010) that showed that the forests economic value has affected individual decision making regarding participations in forest resources management and other common resources.

Gender as a demographic driver played an important role in determining the participation of the respondent's in the forest related activities. The study showed a positive correlation between respondents' gender and the participation in forest activities for instance, the higher involvement of women in the establishment of the tree nurseries and firewood, men in the cultivation and tree planting ($p < 0.05$) among the respondents involved in these activities from the two forests of study. Although both genders were involved in the PFM activities, the participation of male respondents was higher as compared to the females. The low participation of women may have been affected by their household chores therefore less time available for the PFM activities. Additionally, some cultural norms also can affect the participation of women in the forest management.

The current research is supported by the findings by Musyoki *et al.*, (2012) which showed that gender as a demographic factor had a significant influence on participation of community members in forest conservation. Moreover, another finding in Burkina Faso showed that there is high relationship in gender and involvement in conservation of the forests (Coulibaly-Lingani *et al.*, 2011). This implies that gender is indispensable for some aspects of participation in forest conservation just as reported for developing countries such as Burkina Faso and Kenya. According to these studies, different genders experiences diverse situations that affect their involvement in the conservation of forest activities. The personal households' attributes to women hinder their involvement in the community organizations (Coulibaly-Lingani *et al.*, 2011). This therefore makes women disadvantaged in PFM participation, as they are obliged to social and household responsibilities. This has also been witnessed in the current study.

Age played an important role in determining the respondent's level of participation in PFM. The findings showed a significant negative correlation between the age of the respondent's and the number of meetings attended among other PFM related activities ($p < 0.05$) between the respondents adjacent to plantation and the indigenous forests. The young respondents were more involved in the PFM activities in contrast to the older respondents. The young ones are energetic and have more family needs and responsibilities for their families in contrast to the elderly whom can be taken care of by their elderly children. The study resonates the finding by (Chhetri 2005) in Nepal that indicated that the older people are less likely to participate compared to the younger ones as result of more physical strength needed for the forest related work. Moreover, the findings from (Dolisca *et al.*, 2006) supports the study as the findings showed age had an inverse impact to participation levels in forest related activities. Therefore, the younger people are more active in contrast to the older community members. Some findings have reported conflicting findings regarding the impacts of age and involvement in forest management. Age has no influence regarding participation of forest activities (Thacher *et al.*, 1996; Zhang and Flick, 2001). The findings by Musyoki *et al.*, (2013) illustrated that the old people were more active in activities related to forest in contrast to young community members. This was attributed to the fact that the young had various engagements they consider important than taking part in forest management.

Additionally, (Thoai and Rañola, 2010), from Vietnam found that young have higher paying jobs as alternative income sources and therefore consider the management of forests as low pay; this contrasts with the older who may be interested because they have the time and they also value the conservation of the forests. There was no observable difference in age in regard to participation among the respondents from the two forests. This therefore means that irrespective of the forest type, variables affecting participation in PFM are constant.

The study showed a negative correlation between education level and the participation in PFM activities ($p < 0.05$) among the respondent's adjacent to plantation and the indigenous forest

respectively. Members with tertiary education usually move away from the communities to pursue other more rewarding economic activities and therefore have limited participation in CFA meetings and other activities among other PFM activities. This study resonates with the findings of Mutune *et al.*, (2015) that the lower the education level of the community the higher their chances to participate in the forest activities and the vice versa. Higher level of education provides a wider range of job options, hence making forest-related activities e.g. wood collection unprofitable due to greater opportunity costs of collection (Adhikari *et al.*, 2004); Dolisca *et al.*, 2006). In contrast, findings by Coulibaly-Lingani *et al.*, (2009) and Musyoki *et al.*, (2013) showing that education level does not relate with level of participation in forest conservation. Additionally, findings by Chhetri, (2005) and Tadesse *et al.*, (2017), showed education is an input/support in awareness creation about forest conservation and increase the participation of the people. There was no observable difference in education among the respondents from the two forests.

CHAPTER FIVE

5.0 Summary of findings, Conclusion and Recommendations

5.1 Summary of findings

The study revealed that, the drivers that influenced community members' participation in PFM activities were, biophysical, socio-economic and demographic. Among these variables were age, distance, gender, awareness of the forest act, products derived from the forest, ownership of livestock, fodder source and the forest type all at ($p < 0.05$). There was no significant difference in the significant drivers from the respondents adjacent the two forests. The involvement of the community members in decision-making processes, development of management plan and the management agreement was low ($< 1\%$ and $< 2\%$ among the respondents adjacent indigenous and plantation forest respectively). The level of participation in deriving the products (firewood production at 50% and 25% and fodder production at 9% and 8% among the respondents adjacent indigenous and plantation forest respectively). The involvement of the men respondents was higher in contrast to the female respondents 71% and 57 among members adjacent to plantation and the indigenous forest

The revised forest Act 2016 provides for the decentralization of forest resources to the community members. The Act further enhances the implementation of national forest policies and strategies, deepening the community participation in forest management by strengthening of CFAs and the introduction of benefit-sharing arrangements (Forest Act 2005, revised in 2016). The Act provides a framework for improved forest governance, resource allocation, partnerships and collaboration. However, the current study found weak implementation of the Act in regard to the community involvement in decision-making process and PELIS implementation process. The community members exclusion in decision-making processes regarding the preparation of the management agreement and the preparation of the management plan was witnessed despite the management plan

being a key tool in the implementation of the CFA activities so that PFM is actualized. The findings showed that (<5%) of the respondents from the two forests adjacent communities were involved in the decisions regarding the development of the management plan. The study also revealed that (<3%) of the community members were involved in decision regarding the development of the management agreement in contrast to their involvement in other PFM related activities.

There was management gap on some aspects related to the PELIS whose main objective is to improve the livelihoods of the forest adjacent communities. The CFA members are allocated land for PELIS usually for a period of 3-4 years. However, interviews with the PELIS members reported that the alotees could cultivate the land for even more than 5 years forming a major gap in PELIS implementation. PELIS land is always allocated after the KFS has done the harvesting of the mature trees in the plantation forest. However, there was found to be asymmetry in the allocation of the forestland for PELIS. The PELIS members revealed that whereas a normal CFA member receives 0.25 acres of PELIS land, the executive officials received about 5 acres of PELIS land. This therefore presents inequality, exclusivity and lack of accountability therefore weakens the governance in regarding the PELIS implementation. This finding also shows that local authorities do not represent the local population or their space of decision is so narrow that they have little effect on management. It further contradicts with the democratic decentralization that involves the transfer of powers to democratically elected local governments as the community concerned is excluded in the management aspects that are vital to the management of the forest resources adjacent to them.

Despite the Forest Act 2005, revised in 2016, provisions in granting the forest users rights through CFA participation, the Act is not clear on decision making power for communities. Lack of interest and awareness in the CFA relates to lack of real decision-making power. To enhance this therefore, the KFS personnel should create awareness and have meaningful involvement of the community members in the decision-making processes in addition to their participation in the PFM activities. The involvement of women in regard to the forest management should be promoted.

5.2 Conclusion

The conclusions drawn from the study were that socio-economic and biophysical factors are the main drivers determining the community participation in PFM irrespective of the forest type. The community members were mostly involved in the activities that had direct tangible benefits for instance in deriving the firewood, fodder, cultivating the PELIS land allocated. The community involvement in PFM activities for instance, the decision-making process through the development of the management plan and the management agreement was minimal. Despite the enactment of the Forest Act 2005 (revised in 2016) and its implementation, there is little transition of real decision-making power from KFS to the local communities. Devolution of the rights has to be further heightened in order to achieve meaningful decentralization of the forest laws to the local communities. Devolution of the decision-making processes at the local level will enhance actualization of the devolved forest resources and will promote the sustainable use of the forest resources.

5.3 Recommendations

1. There should be meaningful involvement of the community members in management of the forest resources. The KFS should actively involve the CFA members in decision-making processes regarding the management of the forest resources. The study revealed a big gap in the community involvement in the decision-making process and in the development of the management plan and the management agreement. The KFS should ensure meaningful involvement of the community members in decision-making process during the development and review of the management plan and the management agreement. Additionally, their opinions should be integrated in the PFM management tools as they have the local knowledge of how community forests can be better managed.

2. The policies regarding Plantation Establishment and livelihoods Improvement Scheme (PELIS) should be properly implemented. Trees should be established on time so as to minimize the time taken to undertake the PELIS cultivations. Instead of the members cultivating the land up to 6 years, early PELIS establishments will reduce the number of years taken by the community members to establish the plantations.

3. Community members should be sensitized on the importance of their involvement in PFM through CFA and also for the sustainability of the forest.

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APPENDICES

1. QUESTIONNAIRE

ASSESSMENT OF THE DRIVERS OF COMMUNITY PARTICIPATION IN PARTICIPATORY FOREST MANAGEMENT: A CASE OF KESSUP FOREST, ELGEYO-MARAKWET COUNTY

Overall objective of the study

To assess the major drivers of stakeholders' participation in PFM in the Kessup Forest Reserve

Specific Objectives

- 1.3 To analyze the drivers of community involvement in PFM
- 2.3 To assess the CFA composition and levels of participation in Kessup Forest co-management
- 3.3 To analyze the stakeholders of the Kessup forest and their role

HOUSEHOLD LEVEL QUESTIONNAIRE

1. Introduction

My name is '*name of enumerator*' and I am representing *Sylvia Jemutai Rotich* from the University of Nairobi. We are carrying out a research on participatory forest management in relation to drivers of community participation in participatory forest management in Kessup Forest Area. I am therefore going to ask you questions concerning your household, Community Forest Associations and forest use. I would kindly request you to allocate some of your time into helping us respond to questions regarding your household. The information that you provide for this study is only for academic use and will be treated with confidentiality. Your participation to this exercise is voluntary. Thank you for your time.

Identification of the household

Household ID	
Name of respondent	
Village	1= Kiptingo 2= Chepsigot 3=Kipsoen 4=Tibino Kapkerer 6. Kapsisi 7. Kapteren, Others, specify
Location	1=Irong, 2=Mutei 3= others, specify
Sub-location	1=Katalel 2=kapchemutwa 3=Kipsoen 4=Chelingwa Kapkoi 6= Others, specify
Ward name	1=Katalel 2= Kamariny 3=others, specify
What is the distance (in KM) the nearest edge of the public rest	

A. HOUSEHOLD INFORMATION

HOUSEHOLD INFORMATION		
1	Name of respondent	
2	Gender	1=Male 2=Female
3	Is the respondent the head of the household?	1=YES 0=NO
B	Relationship of the respondent to household head if is not the head of the household	
5	Age of the respondent in years	1=Below 20 2=20-30 3=30-40 4=40-50 5=50-60 6=Above 60
6	What is the highest education level of the respondent? <i>Never attended school; 2= Nursery 3=; Primary school (1-8); 4= Secondary school (1-4); 5= college diploma 6= university degree 7=others, specify</i>	
7	How many members does your household have?	

B. Land size and livelihoods

1	What is the size of land that you own in acres /Hacters	
i.	What is the tenure system of the land that you own? 1. Inherited 2. Rented 3. Bought 4. Other specify	
ii.	Do you have trees on farm?	1=YES 0=NO
iii.	If YES, who planted?	
iv.	If NO why?	
v.	If yes, what size of land in (acres) do the trees cover	
vi.	Which species do you have on your farm? (ketik chebo tumo nda ebo kaa) a) List Indigenous--- b) List Exotic----	
vii.	What do you use the trees for? a) Indigenous trees- List b) Exotic trees- List	
viii.	Who decides on use of the trees on farm? 1= Household head 2= Spouse 3=Other (specify)	
2	Do you keep livestock?	1=YES 0=NO
i.	If YES indicate type and number for each Types 1. Cows 2. Sheep 3. Goats 4. Donkeys 5. OTHERS, specify	
ii.	Which breed of cattle is your herd 1. Exotic 2. Indigenous 3. Mix of the two	
iii.	Who decides on the use of the livestock and its products? 1= Household head 2= Spouse 3=Other (specify)	
3	What is the source of fodder for your livestock? i. Own farm ii. Friends iii. Public Forest iv. Market /bought	

	v. Others, specify	
i.	Which months of the year is your HH insufficient of the fodder?	
ii.	Where do you get the supplements in these months? 1. Market 2. From other farmers 3. Public forest 4. relatives Others, specify	
C	Which months of the year is your HH is insufficient of firewood?	
6	a) Where do you get the supplements in these months? 1. Own farm 2. Forest 3. Sellers 4. Switch to energy saving jikos 5. Others, specify	
7	What are your sources of income? 1. Crop Farming 2. Forest derived Products 3. Livestock farming 4. Business activities 5. formal employment 6. Others, specify	
B	what are the average annual income in Ksh. from the sources above? 1. Crop Farming 2. Forest derived Products 3. Livestock farming 4. Business activities 5. formal employment 6. Others, specify	
C	From the above mentioned, which is your MOST important income source?	
	Why is it most important income source?	
D	What is the average HH income per year?	
FOREST DERIVED LIVELIHOODS		
8	Do you get any products from the forest?	1=YES 0=NO
b)	YES , which products did you get from the forest in the last 12 months? 1. Firewood 2. Tree seedlings 3. Timber 4. Fodder 5. Vegetables	

	6. Thatch materials/ roofing materials 7. Manure / organic fertilizers 8. Medicinal plants 9. animal fodder 10. Others Specify	
c)	If NO , why are you not involved in forest derived products? a. I stay far away from the forest b. I can buy them from the market c. I have the alternatives from my own farm d. I don't have the time to go to the forest e. The forest rules/regulations are strict f. The forest belongs to a few in the community g. Others, specify	
d)	If YES in 8a above, do you derive any forest products for commercial purposes?	1=YES 0=NO
	i) If YES, which ones? 1. 2. 3.	
	ii) If NO, why are you not involved in deriving forest products for commercial purposes? 1. I have enough money to sustain my household 2. I do not have the time 3. I can't access the market 4. The KFS permits are expensive 5. It is only CFA members allowed to do so 6. others, specify	
e)	From which part of the forest do you derive the above forest products? 1. Plantation 2. Indigenous 3. Both	
f)	From your own opinion, which part of the forest does the community derive most of the forest products? 4. Plantation 5. Indigenous 6. Both	
g)	What are the reasons for the above?	
h)	Are there any challenges associated with forest products you derive above?	1=YES 0=NO
i)	If YES, which one?	
j)	From your own opinion, what do you think can be done to overcome the challenges above?	
k)	Are the forest products you derive influenced by the CFA membership or Nonmembers?	1=YES NO
l)	If YES, how does the CFA membership affect the members deriving the products?	
m)	Are none CFA members restricted from accessing forest products	1=YES NO
n)	If Yes, How do the Non- CFA members obtain the forest products?	

	1. buying for the CFA members 2. Getting them from the relatives/ friends 3 Obtaining the products illegally 4. Others. Specify													
9	Are CFA members involved in any income generating activities in the forest?	1=YES0=N												
	i) If YES, which income generating activities do you MOSTLY undertake in the forest? 1= PELIS 2= beekeeping 3= firewood 4= timber 5=Others, specify													
	ii) If NO, why are you not involved in forest related income generating activities?													
C	What are the main reasons for your high involvement in b above ?													
D	How often are you involved in the above activities? <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">ACTIVITY</th> <th style="width: 50%;">DURATION</th> </tr> </thead> <tbody> <tr> <td>Firewood</td> <td></td> </tr> <tr> <td>Grazing</td> <td></td> </tr> <tr> <td>PELIS</td> <td></td> </tr> <tr> <td>Timber</td> <td></td> </tr> <tr> <td>Others, specify</td> <td></td> </tr> </tbody> </table>	ACTIVITY	DURATION	Firewood		Grazing		PELIS		Timber		Others, specify		
ACTIVITY	DURATION													
Firewood														
Grazing														
PELIS														
Timber														
Others, specify														
E	From which part of the forest were the above activities undertaken from? i. Plantation forest ii. Indigenous forest iii. Both forests													
F	Is the involvement in the above activities associated with CFA membership?	1= YES0=NO												
	If YES, how does B the Non-CFA members get involved in forest related income generating activities?													

D. CFA composition, participation and drivers of participating in PFM.

COMPOSITION		
1.	Are you a CFA member?	1=YES0=N
2.	b) If YES, how did you gain the membership to the CFA? 1= individual, 2= community organization. If 2 above, which organization?	
3.	Any reason for this approach in joining?	
4.	If NO, why are you not a member?	
5.	Which CFA do you belong? (Name of the CFA)	
6.	How long have you been in CFA as member?	
7.	How many members are you in your CFA?	

8.	How many men and women are there in your CFA?	
9.	What is the average age of the members in your CFA? High average and low numbers 1=20-40 2=40-60	
10.	From your own opinion, what is the average level of education of CFA members?	
11.	Do you hold any leadership position?	1=YES0=N
12.	If YES, which position in the CFA do you belong? 1= Chairperson, 2= treasurer, 3= secretary.	
13.	What is your role as CFA official with the above position?	
14.	How many years can you be in an executive position?	
15.	Does your household make any payments to the CFA?	1=YES0=N
	b) If YES, how much did you pay for the last 12 months?	
	c) If NO, why are you not making any payments?	
16.	Have you received any contributions as an CFA member/ official?	1=YES0=N
	b) If YES, how much have you received for the last 12 months?	
	c) If NO, why are you not receiving any contributions?	
PARTICIPATION		
1	Were you aware of the law that allows community participation in forest management before joining the CFA?	1=YES 0=NO
b	IF YES, how did you know about it? 1. Through KFS 2. Through a CBO 3. Through Civil Society Organization 4. Through Media 5. Others, specify	
c	How has your awareness about the law above influenced your participation?	
d	From your own opinion, do you think the community members are aware of the law above?	1=YES 0=NO
e	If YES, what is the average population that you think are aware of the law?	
f	If NO, what do you think can be done to promote awareness of the law that allows community participation?	
2	Have you participated in CFA/ PFM activities?	1=YES0=N
b	If YES, what have you participated in? 1. CFA meetings 2. Nursery establishment 3. tree planting activities and management 4. Scouting/ guarding 5. Forest rehabilitation 6. Others, specify	
c	If NO, why have you not participated?	

	i) I am not interested ii) I am not a member iii) I don't afford the time iv) I was not aware v) others, specify	
3	Are you a member of a user group?	1=YES0=N
b	If YES, how many user group are in the CFA? List them 1. 2.	
c	Which user group do you belong to? 1= Beekeeping; 2=Firewood; 3=Tree nursery; 4= Fish farming; 5= Grazers; 6= Seedling collection; 8=PELIS; 9=Other (specify)	
d	Did you belong to any group e.g. CBO or CSO in the community before joining CFA?	1=YES0=NO
e	If YES what group did you belong to?	
f	If NO, why are you not a member of a group? i) there are no social groups in my village ii) I don't have the time iii) I can't afford the money iv) others, specify	
g	Did the group influence you join the CFA?	1=YES0=N
h	If YES in 6b , is the organization affiliated to CFA?	
i	If YES in 6d , in what ways?	
j	From your own opinion, does the CBO or CSO played a role in influencing you or other members in joining the CFA?	
k	If YES in 6f , what are its contributions?	
4	How many meetings or any other CFA activities have you attended in the last 12 months?	
5	Who normally attends CFA meetings and participates in CFA activities? 1= head of household; 2= spouse; 3=both wife and husband;4= son; 5= daughter; 6= other specify	
6	Were you involved in the development of the management plan?	1=YES0=N
b	If YES, how were you involved? 1. zonation of the forest 2. identifying the activities to be undertaken 3. as a committee member 4. Public baraza 5. others, specify	
d	If NO, WHY?	
7	Where you involved in the development of the management AGREEMENT?	1=YES0=N

a	If YES, how were you involved?	
c	If NO, WHY	
8	Does the CFA management involve you in decision making regarding the forest issues?	1=YES0=N
b	If YES, in what forest issues has the CFA involved you for decision making	
c	If NO, why are you not involved?	
9	Does KFS involve you in decision making regarding the forest issues?	1=YES0=N
b	If YES, in what forest issues has the KFS involved you for decision making	
DRIVERS OF PARTICIPATION		
	From your own opinion, has forest derived benefits motivated you participate in PFM?	1=YES 0=NO
	If YES, what are those benefits? 1. 2.	
	What have you benefited MOST for being a CFA member 1. More access to the forest derived products 2= more social network 3= training on new income generating activities 4= training on expanding existing income generating activities 5= acquisition of crop land 6= increased exposure through exchange programmes with other As 6= Others, specify	
	If You don't participate why? 1. There is no CFA in my village 2. Its far away from my home area 3. I'm new in the village 4. I am not interested in CFA 5. CFA members generally belong to other villages, then I do 6. Cannot afford to contribute the time 7. Cannot afford to contribute the required cash payment 8. I don't believe CFA is very effective in managing the forest 9. Not interested in the activities undertaken by existing CFA 10. CFA exists in village, but household is unaware of its presence 11. Corruption in CFA 12. Interested in joining but needs more information 13. Others, specify	

E. Plantation Establishment and Livelihood Improvement Scheme involvement under

PFM

	Are you involved in PELIS?	1=YES 0=NO
b	If YES, what is the size of land in acres have you been allocated under LIS.	
2	What criteria is used for the allocation of land under PELIS? 1. CFA membership 2. Those close to the forest edge 3. Others, specify	
3a)	Is the land size allocation equal for all community members?	1= YES 0=NO
b)	If YES, what is the standard size of allocation?	
c)	If NO, what are the reasons for unequal allocation?	
3	How long have you been involved in PELIS- number of years	
4a)	What type of allotment are you entitled to?	1=Primary 2=Secondary
b)	What are the reasons for you being a secondary allottees? 1. I don't stay close to the plantation part of the forest 2. I have a smaller parcel of land at home 3. others, specify	
5	How much money do you pay for the allocation above per unit acre?	
6	How long are you allowed to cultivate the land under PELIS as a primary allottee?	
7	What happens after the trees has established in the land you were primary allocated? 1. Shifted to another parcel 2. PELIS agreement ends 3. Others, specify	
8	What management activities do you undertake in the land allocated? 1. Tree plantations 2. Tending the seedlings 3. Others, specify	
B	In 7 ABOVE , which one do you mostly participate in?	
c	Reasons for the response in 7 above ?	
9	How often do you participate in the above-mentioned activities?	

10	What other opportunities are you enjoying in addition to land under PELIS?																					
11	What challenges do you experience while undertaking the above activities?																					
12	Who controls the allocation of the farms under PELIS? 1. KFS 2. CFA officials 3. CFA members 4. Others, specify																					
13	What are the reasons for your participation in PELIS?																					
14	What other benefits do you obtain alongside PELIS as a CFA member?																					
15	What crops do you grow under PELIS? 1. 2. 3.																					
16	How much did you harvest in the last 12 months? <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Type of crop</th> <th>Quantity harvested</th> <th>Quantity consumed</th> <th>Quantity sold</th> <th>Total earnings from the sell in K.S.</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>	Type of crop	Quantity harvested	Quantity consumed	Quantity sold	Total earnings from the sell in K.S.																
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17	What was the total cost of production in the last 12 months? <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Production</th> <th>Quantity invested</th> <th>Quantity sold</th> <th>Quantity consumed</th> </tr> </thead> <tbody> <tr><td>Labour</td><td> </td><td> </td><td> </td></tr> <tr><td>Fertilizer</td><td> </td><td> </td><td> </td></tr> <tr><td>Transport</td><td> </td><td> </td><td> </td></tr> <tr><td>Pesticide</td><td> </td><td> </td><td> </td></tr> </tbody> </table>	Production	Quantity invested	Quantity sold	Quantity consumed	Labour				Fertilizer				Transport				Pesticide				
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1. The stakeholders of Kessup forest and their roles

KEY INFORMANT INTERVIEWS

A. KFS FORESTER

1. What is the role of KFS in forest management particularly under PFM regime?
2. Who should manage the forest reserves?
 - a) What benefits do you derive from the various stakeholders?
3. In your own opinion does community participation from all the villages adjacent to Kessup forest differ?
4. What benefit do the CFA members derive from the forest?
5. What do you think are the main drivers for the community member's participation in CFA?
6. Who are the other stakeholders whom you work together?

7. What is the role of these stakeholders in regard to forest management and improving the community participation in PFM?
8. How was this CFA formed?
9. How do you work with the CFA members?
10. What is the level of CFA members participation in Kessup forest?
11. From your own opinion, does gender play a role in the level of participation among the community members?
12. Is there any challenge working with other stakeholders? Which stakeholder? What are the challenges associated?

B. CFA OFFICIALS

1. Name of the CFA
2. How many CFA members do you have?
of the CFA members how many are F/M
3. Of the CFA members what proportion is actively involved in CFA and forest management activities?
4. In your own opinion, what age-group (Years) is mostly in CFA
5. When was the CFA registered?
6. Rationale for forming CFA
7. Which village has more members than the other? Any reasons for this?
 - a. What do you think are the main reasons for their participation in the PFM?
8. What are the level of the community participation in the CFAs activities?
 - a. What are the reasons for the above mentioned Low/ High participation?
9. Does KFS involve you in the decision-making processes?
10. Are all the CFA members involved in the decision-making processes?
11. Does the community participation in plantation and the indigenous forest differ/ same?
12. Who are the other stakeholders that you work closely with?
13. What are their role in forest management?
14. benefits derived by CFA members over NON-CFA MEMBERS
15. Are there CBO affiliated with CFA?

C. SAWMILLERS

1. Who are the other stakeholders that you work closely with in relation to the forest management?
2. Are you involved in any of the CFA activities in Kessup forest?
 - a. If YES, which ones?
 - b. If NO, why?
 - c. How often do you participate in these activities?
3. What are the main drivers for you getting involved in the Kessup forest management?
4. What is your opinion concerning the relationship among the other stakeholders that they work with?
5. What is your contribution to the Kessup Forest in enhancing the forest conservation and the management?
6. What is your role in regard to the management of Kessup forest?

D. KWS Official

1. What are your main drivers of affiliating with the KFS in the management of Kessup forest?
2. How often do you participate in the management issues regarding Kessup forest?

3. What is your main role in regard to Kessup forest?
4. Does KFS involve you in decision making processes? If **YES**, which ones?
5. What is your opinion on community participation in regard to PFM?
6. What benefits do you obtain the Kessup forest through your management?
7. Do you have equal attention in the two types (plantation/ indigenous) in regard to the management?
 - a. If YES, in what ways?
 - b. If NO, why?
8. Which other stakeholders do you work closely with?
9. What are their role in forest management?
10. Have you experience any challenges working with KFS as one of the stakeholders?

E. CHECKLIST FOR THE FOCUS GROUP DISCUSSION

1. Analysis of stakeholder, role, responsibility, strength etc. a swot analysis
2. What do you think are the main drivers of community participation in PFM?
3. Who are the main stakeholders involved in the management of the Kessup forest?
4. What are the main roles of these stakeholders in regard to forest management and in promoting the community participation in PFM?
5. What are the main benefits derived from the forest though the CFA membership?
6. What is your performance in participation compared to others?
7. How do you see potential forest before and after the introduction PFM?
8. Do you think all the members of the community Members derive the same benefits from the forest?