FACTORS INFLUENCING RESOURCE BASED CONFLICTS AMONG FOREST USERS: A CASE OF SURURU - EAST MAU FOREST, KENYA.

By

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DECLARATION

This research project is my original work and has not been presented for a degree or any other award in any other University or institution of higher learning to the best of my knowledge.

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L50/74965/2012

This Research Project has been submitted for examination with my approval as University supervisor:

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DEDICATION

I dedicate my research work to my son Ian Musumba and my daughter Ivy Musumba who always inspired me to work harder in difficult circumstances and to my friend Mr. Lazarus Kubasu a Social Consultant- World Bank, who always encouraged me and even supported me financially.

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ACRONYMS AND ABBREVIATIONS

CFAs Community Forest Associations

CBNRM Community Based Natural Resource Management

FAO Food and Agriculture Organization of the United Nations

FUGs Forest User Groups

GOK Government of Kenya

KFS Kenya Forest Service

KWS Kenya Wildlife Services

KEFRI Kenya Forest Research Institute

MENR Ministry of Environment and Natural Resources

NEMA Natural Environment and Management Agency.

NGOs Non-Governmental Organizations

NRM Natural Resource Management

PFM Participatory Forest Management

SPSS Statistical Package for Social Science

ABSTRACT

Mau forest is considered as one of Kenya's most dependent and rich Bio-diversity with an estimated annual economic value of US$ 1.3Billion (Africa Policy Report, 2010). But the encroachment on, and untenable exploitation of the Mau ecosystem by the adjacent communities, who encroach the forest for timber, firewood, water and land, resulted in widespread forest degradation with negative effects on the Kenyan economy and the livelihood of the population depended on Mau waters, leading to a series of forced evictions and unending conflicts between the government (forest regulators) and the forest adjacent communities; the worst being the recent 2009 evictions. The purpose of this study in this case sought to investigate the factors influencing Resource Conflict in East Mau forest. The specific objectives of the study was to study the relationship between community participation in forest management, access to forest resources by the forest adjacent communities, the level of environmental knowledge and resource benefit sharing to resource conflicts in Mau forest. In order to collect the required data the population of the study comprised an analysis of secondary data from Mau forest conservation, eviction reports as provided by the government and the use of a questionnaire that guided a structured interview for the forest users and regulators. The expected sample size was 90.The Questionnaire was piloted in a similar environment in Maasai Mau forest Narok County to improve on its validity. The collected data was coded and analyzed and presented using descriptive and inferential statistics namely: frequency tables. All analysis was done using SPSS. The findings for this research found among other factors community participation had a lot of influence on forest resource conflict management. Participation brings on board all other factors of access to resources, correct environmental knowledge and resource benefit sharing contributing to forest conflicts. This research concludes that for sustainable forest resource use and management in Mau Forest to be achieved, a more collaborative and participatory dialogue approach has to be embraced.

CHAPTER ONE

Introduction

1.1 Background of the study

Natural Resource Management conflicts both locally and internationally vary a lot in terms of intensity and cause factors. At the local level for example, conflicts may occur as a result of a certain user group feeling excluded from participating in Natural Resource Management (Matose, 1997; Castro and Nielson, 2001). Natural Resource Management conflicts may also arise when access to certain forest products and benefit sharing are not very clearly defined (Engel and Korf, 2005).

In Kenya Natural Resource Conflicts have always been between the Natural Resource regulators (government) and the resource dependent communities. Communities adjacent to forest resources have been accused of encroaching the forest for timber, clearing the forest for human settlement and agriculture hence degrading the forest resource. Undefined institutional arrangements also have the effect of further causing conflicts between managers and forest dependent communities due to different objectives and management strategies (Ongugo and Obonyo, 2008). This has led to several forced forest evictions displacing many families and disrupting their lifestyles. Between 2004 and 2006, massive evictions have been done in Mau Forest, Mt.Kenya, Mt.Elgon, Cherangany, Marmanet, Embobut and Aberdares, displacing more than a hundred thousand persons (Africa Policy Report, 2010).

The Government of Kenya seemingly is not relenting on evictions in forest areas as the only way to save her existing rich bio-diversity and just recently in 2009, the government carried out very debilitating evictions in East Mau forest and parts of Maasai-Mau forest.

This research while acknowledging these other causes of conflicts, however, focusses on some of the critical underlying cause factors of Natural Resource based conflicts in East Mau forest, which have not been addressed adequately. Such factors include: community participation in forest management; access to forest resources and benefits sharing by the forest adjacent communities; further the level of environmental knowledge of the community adjacent to Mau forest.

Research carried out by the IFRI programme in 14 forests in Kenya, indicate the wave of conflicts have led to increased incidences of forest destruction and loss of Bio-diversity, often through illegal activities by forest adjacent communities. The study concluded that there was need to involve members of communities in the management of forests for sustainable development. The study further recommends the adoption of participatory principles in managing NRM conflicts to enhance co-management, co-ownership and conservation of the resources (Ongugo and Obonyo, 2008). This study in a bid at replication specifically focuses on East Mau forest and compares some of these findings.

1.2 Statement of the problem

The focus of this study was on cause factors for forest resource conflicts in Sururu-East Mau Forest in Kenya. Over the years Mau forest has continued to be depleted by irregular and unplanned human settlements, illegal logging, farming, charcoal burning and a host of other human activities. These combined activities have consequently led to Mau forest complex losing an estimated 107,000 hacters (25%) of forest cover (Africa Policy Report, 2010). The government of Kenya has forcefully evicted communities in Mau forest to address this situation. The worst evictions took place recently in 2009 following a cabinet endorsement of recommendations of the Mau forest task force that were adopted by the Kenyan parliament to evict communities occupying Mau forest. The evictions have led to displacement of many families and disrupting their livelihood.

The local community has always been excluded from participating in the forest resource conservation and management, yet their long-term relationship with the forest makes them better placed to be effective stewards. The study proposes a participatory forest management that engages local institutions, mobilizes local capacity through use of local approaches such as customary laws, local leadership and negotiation skills. These will enhance responsible and legal utilization of the resources.

1.3 Purpose of the study

The purpose of the study was to establish the factors influencing Resource Based Conflicts among forest users in Sururu-East Mau forest in Kenya.

1.4 Research Objectives

The study was guided by the following objectives:

1. To determine the extent to which community participation in forest management influence resource based conflicts among forest users in East Mau forest.
2. To examine how access to forest resources by the forest adjacent communities influence resource based conflicts among forest users in East Mau forest.
3. To establish how resource benefit sharing influence resource based conflicts among forest users in East Mau forest.
4. To assess how the level of environmental knowledge influence resource based conflicts among forest users in East Mau forest.

1.5 Research questions

The study was based on the following research questions:

1. To what extent does community participation in forest management influence resource based conflicts among forest users in East Mau forest?
2. How does access to forest resources by the adjacent community influence resource based conflict among forest users in East Mau forest?
3. To what extent does resource benefit sharing influence resource based conflicts among forest users in East Mau forest?
4. To what extent does the level of environmental knowledge influence resource based conflicts among forest users in East Mau forest?

1.6. Significance of the study

It is hoped that the results of the study added to improving forest resource conflict management in Mau Forest and other forests in Kenya. The study was expected to be significant by adding to existing body of knowledge in the area of forest resource conflict management to researchers, both state and non-state actors and the local community forest users, to understand the significant role played by a participatory forestry management strategy in mitigating forest resource conflicts, by devolving forest resource management rights to the local community and other stakeholders; enhancing cooperation which contributes to poverty reduction, employment creation and improvement of livelihoods through sustainable forest resource use and management. It is hoped that it will go a long way to inform policy formulation on managing Natural Resource Management conflicts. Future research should explore a similar strategy for other natural resources in the country not necessarily forests which the study did not undertake.

1.7. Limitations and delimitations of the study

1.7.1 Limitations of the study

The research instrument used was expected to generate varying data depending on the truthfulness of the respondents under study. This was mitigated by design of a reliable and valid research instrument. Another expected limitation of the study was access to confidential information held by government offices particularly on evictions which could be very necessary for the study and suspicion by the authorities on the researcher as one investigating on the authorities who might deter openness and may even respond negatively or incorrectly. This is all due to the way these authorities have carried out evictions in the past. The members of the

communities may not also be free and willing to volunteer some of the information for fear of being victimized by the authorities. To overcome this, the research relied on the principle of confidentiality and assured respondents of confidentiality and that the research findings were for academic purpose only.

1.7.2. Delimitations of the study

Cognizant to the various limitations of this study, the research only investigated the research problem delimited to the accessible areas around Sururu-East Mau forest only and accessible respondents done through random sampling.

1.8. Definition of significant terms in the study

Community forestry Involvement of the local community adjacent to forests in the management of the natural resource.

Participatory forest management Forest management that allows every stakeholder to contribute to the decisions made. It does not exclude the parties or forest users.

Natural Resource Management Conflicts These are Conflicts arising out of use and management of natural resources.

Accessibility of forest resources A situation where forest users can get opportunity to freely reach and use forest resources.

Bio-diversity Natural resource area with diverse natural resources.

Benefit sharing economically viable opportunities accruing from forest resource use and management

Community leadership Persons in the community who are relied upon to give direction and decision on critical matters that affect the community.

Environmental Knowledge- Expertise and or capacity to manage forest resources

Government policy Government direction and or position on how best things should be done.

Conflict Management All processes and efforts aimed at mitigating conflicts sustainably.

1.9 Organization of the study

This study is organized in the following manner: Chapter One deals with the preliminaries from Dedication,acknowledgements,Abstract, Background of the study, Statement of the study, Purpose of the study, Research Objectives, Research questions, Significance of the study, Limitations of the study, Delimitations of the study, Definition of significant terms. Chapter Two deals with Literature Review, Theoretical frame work, Conceptual frame work, Gaps in literature reviewed and the Operational definition of Variables. Chapter Three deals with the Research Methodology, Research Design, Target population, Sample size and sampling procedures, Data collection instruments, Validity of the instrument, Reliability of the instrument, Data collection procedures, Data analysis techniques, Ethical consideration for the research. Chapter Four and Chapter Five details the summary research findings from the analyzed data collected and recommendations, a contribution of this research to the body of knowledge. The appendix has the structured interview schedule and Research authorization details.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter examined the existing information of the research to understand the literature in the field (Boote and Beile, 2005). There was analysis of different literature on the dynamics of forest resource conflicts i.e. the nature, causes, contexts and the role of community forestry in addressing these conflicts. The Chapter also examined the factors influencing Resource Based Conflicts among forest users in East Mau Forest namely community participation in forest management; access to forest resources by the forest adjacent communities; resource benefit sharing around Mau forest and how the level of environmental knowledge of the adjacent community influence forest resource conflict among forest users in East Mau forest. The chapter also looked at the theory of conflict and communication in relation to natural resource conflicts in East Mau forest. The views of scholars cited in this review are compared in Chapter Five with the findings from this research to see whether the findings agree with the views cited in the literature review.

2.2 Background information

The Management of Natural Resource conflicts has remained a global challenge over the decades. As the world over the years has undergone rapid socio-political and economic change in globalization and decentralization, this change has continuously brought about serious Natural Resource Management conflict challenges (Schafer, 2001; Lane, 2003, Brosius, 2005).

Around the world Natural Resource Conflicts have been occasioned by degradation or decline in forest resources and ensuing competition over the reduced amounts of forest products; from perceived scarcity through competitive use and a failure to negotiate rules and regulations for resource sharing which are acceptable to all stakeholders(Castro and Nielsen,2004).

Natural Resource Management conflicts both locally and internationally vary a lot in terms of intensity and cause factors. At the local level for example, conflicts may occur as a result of a certain user group feeling excluded from participating in Natural Resource Management (Matose, 1997; Castro and Nielson, 2001). Natural Resource Management conflicts may also arise when access to certain forest products and benefit sharing are not very clearly defined (Engel and Korf, 2005).

According to FAO (2000a), conflicts occur when there are contradictions between local and introduced management systems, misunderstanding and lack of information about policy and programme objectives, lack of clarity in laws and policies, inequity in resource distribution or poor policy and programs implementation. At the international level Natural Resource Management Conflicts would involve two or more nations conflicting over a shared river or the management of transboundary resources (Sneddon and Fox, 2006).

According to Castro and Nielsen, 2001; Natural Resource conflicts can sometimes turn violent leading to resource degradation, undermining livelihoods and displacing communities, severe effects which may take a long time to come to terms with.

Natural Resource Management conflicts can have very devastating effects on the socio-political and economic infrastructure of a people (Martinez-Alier, 2001; Wenban –Smith, 2001). In general, destructive conflict is characterized by a tendency to expand and escalate (Deutsch, 1973). Expansion occurs along the various dimensions of conflict: the size and number of immediate issues: the number of motives and participants implicated on each side of the issue, the size and number of the principles and precedents that are perceived to be at stake, the costs that the participants are willing to bear in relation to the conflict and the intensity of negative attitudes toward the other side.

Therefore more diplomatic and participatory approaches are required to balance these extremes. Community forestry provides such a platform which can address natural resource conflicts. The recognition of the role of conflict resolution has partly come as a result of decentralization and participatory approaches in Natural Resource Management (Castro and Nielsen, 2004).These approaches imply a wider stakeholder involvement, each with own priorities in respect to what products and services a forest should produce.

Several studies around the world indicate a significant improvement and success in Natural Resource Management for particularly countries that have incorporated participatory principles in their forestry strategy. The opposite is the case for countries that have held onto state control and micro-managing forest resources.

Nepal

In the late 1970s, Nepal for example found her afforestation programmes coming to a crisis with the World Bank predicting a total extinction of the forests by the year 2000.Policy makers realized that the objective of arresting the rapid degradation was unachievable without active and substantial involvement of other Forest User Groups (FUGs) hence subsequently enacted The Forest Act, 1993, which gives detailed provisions for community forests to be managed by user groups. Forest User Groups are an automous and corporate body, with legal and statutory status and have perpetual succession rights to develop, conserve, use and manage the forests and sell and distribute the forest products independently by fixing their prices according to a work plan (Hobley and Campbell, 1996).

The FUGs are entitled to 100% of the revenue. FUGs have set rules and penalties for illegal grazing and felling of trees. The Forest Department role is to provide technical support but has also powers to cancel registration of non-compliant FUGs. According to a study by Nepal Australia Community Research Management Project, in 1988-99, Forest User Groups (FUGs) earned $54,445 and generated employment worth $61,571.Kakitor Village of Lalitpur, Nepal has already spent $2044 for irrigation purposes and getting potable water .Out of a total forest cover of 5.83Million Hectares, about 900,000 Hectares of forests (21%) has been handed over as community Forestry to about 11,400 user groups of about 1.3Million House Holds. Further, it has been found that vegetative cover has significantly improved in the Community Forests even on degraded forestland (Department of Forests, 2000).

India

Studies in India indicate a decline in forest land under the Joint Forest Management to an estimated 10.25Million Hectares or 16% of the total forest area in India (FSI, 1999).This has been attributed to the slow implementation of the Joint Forest Management Policy by the government, a policy which motivates the local community to identify themselves with the development and protection of forests from which they derive benefits. India has carried on the British colonialist approaches of consolidating state control on public forests and to putting forestry operations on a scientific footing. The British in 1865 passed the Indian Forest Act which obliterated the old customary use of forest resources by rural communities and instead established exclusive state control over forest resources. This inevitably led to total alienation of the local communities from forest management and generated a strong feeling of resentment against the forest department. This approach undermines people who are an integral part of the forests and without involving those in the management, wildlife or bio-diversity cannot be protected (FSI, 1999).

Latin America

The experience in Latin America of forest management decentralization indicate that highly centralized forestry administrations have achieved limited results in effectively regulating forest resources in almost all countries in the region as compared to the few that have decentralized forestry management. This is mainly due to a lack of funding, scant physical presence in the field, limited access to informal information flows and poorly motivated field personnel (Pacheco et.al.1998).

A study by the Centre for International Forestry Research (CIFOR) and the International Development Research Centre(IDRC) on Municipal Participation in forest management in Latin America in Bolivia,Guatemala,Brazil and Costa Rica, Honduras and Nicaragua show a diverse reality where each municipal government make important decisions regarding management and access of forest resources(Lyes Ferrouchi,2003).In Bolivia and Guatemala for example the study indicates the new forestry laws permit local governments to supervise up to 20% of the national forests within their jurisdiction. This mechanism permits formalization of user rights to local forest exploitation for small scale-loggers and other traditional forest users. The law also establishes the fact that indigenous groups are the owners of the forest resources. This has improved agroforestry and reforestation projects; forest fire and pest control campaigns;manging forest funds; controlling illegal logging, better land use plans and overally increased local participation and inter-governmental coordination on environmental issues(Larson,A,2002).

2.3. Africa

In Zimbabwe, the CAMPFIRE (The Communal Areas Management Programme for Indigenous Resources) Programme shows a successful major project to recognize the importance of providing both benefits and a meaningful role to the people who lived with wildlife and its habitat. The programme decentralizes political and administrative powers to people at grassroots level, distributes millions of dollars to the barefoot masses in communal areas and has resulted in the adoption of eco-friendly views on wildlife and other natural resources by the people of Zimbabwe. It has also been of significance in reviving the cultural well-being of the people in

Zimbabwe. The programme has been widely accepted by people because it doesn't contradict the traditional wisdom about the environment (Kasere and Stephen, 1998).

CAMPFIRE (The Communal Areas Management Programme for Indigenous Resources) involves rural communities in conservation and development by returning to them the stewardship of their Natural Resources, thus harmonizing the needs of rural people with those of the ecosystem. It emerged with the recognition that as long as wildlife remained the property of the state, no one would invest in it as a resource.

Since its inception in 1989, CAMPFIRE has engaged more than a quarter million people in the practice of managing wildlife and reaping the benefits of using wildlands.Since 1975 Zimbabwe has allowed private property holders to claim ownership of wildlife on their land and to benefit from its use. Under CAMPFIRE, people living on Zimbabwe's impoverished communal lands which represent 42% of the country, claim the same right of proprietorship.

Many of the communal lands have unreliable rainfall for agriculture but provide excellent wildlife habitat. Conceptually, CAMPFIRE includes all natural resources, but its focus has been wildlife management in communal areas adjacent to Natural parks, where people compete for scarce resources. Most communities sell photographs or hunting concessions to tour operators, under rules and hunting quotas established in consultation with the wildlife department.

Others choose to hunt or crop animal populations themselves and many are looking at other resources, such as forest products. The revenues from these efforts go directly to House Holds, used for communal efforts like grinding mills or development projects (Kasere and Stephen, 1998).

Gambia

In Gambia, West Africa, a study conducted by a section for Forest Management and Nature Conservation, German Agency for Technical Cooperation (GTZ) in November, 1998, presents a clear retrospective view of impacts of forest management by communities. (Friederike Von Stieglitz, 2000).Gambia lies in the ecological buffer zone on the edge of the Sahel desert. Her remaining dry forest resources are threatened with massive degradation; hence policy makers adopted the concept of community-based management of forest resources as a national policy (Gambian Forest Management Concept).With this forest policy and legal framework the Gambia has developed a participatory –oriented forest management framework.

Through management agreements with the communities called Community Forest Management Agreements, an estimated 16,000 Hectares of additional forest area has been placed under conservation. Here the most important management instrument is fire prevention; the principle initial incentive for the communities is to regain and secure long-term control over the forest resources around them, is-à-vis the state and external users.

Fire prevention also forms both a protection and rehabilitation instrument through establishing of the value of the regeneration potential of the dry forest. A decline of losses caused by fire makes enhanced economic exploitation of the forest resources particularly through the use of fuel-wood and forest pasturage.

Transferal of management responsibilities to local communities has placed value on existing local potential for control and management of resource use(traditional custodianship over land).Two community forest associations which play an integral role in monitoring, conflict management and advisory services. A new definition of forest parks: from the forest park as a state forest preserve to the forest park as a center for application-oriented forestry research and training (e.g. for community forest organizations in villages).

Community forests have stimulated development of new income sources in related areas e.g. the establishment of private nurseries. Community forests have also stimulated the development of new marketing structures and income sources through new interest groups (for women especially).Forestry as a variety of land use is for the first time offering the rural population a monetary returns and can thus compete with other forms of land use. Locally and through indirect conservation impacts also regionally, the community forests contribute to stabilizing the resource basis for various livelihood activities; year round forest pasturage; use of brush wood as fuel for house hold needs and an increasingly as a new income source for women.

Further, improved dialogue and cooperation between resource users and government services have developed and the forestry authority is increasingly taking on advisory and service tasks for the population.

2.4. Kenya

Research carried out by the IFRI programme in 14 forests in Kenya, indicate the wave of conflicts have led to increased incidences of forest destruction and loss of Bio-diversity, often through illegal activities by forest adjacent communities. The study concluded that there was need to involve members of communities in the management of forests for sustainable development. The study further recommends the adoption of participatory principles in managing NRM conflicts to enhance co-management, co-ownership and conservation of the resources (Ongugo and Obonyo, 2008).

Kenya now has new forest Policy enacted in 2005 which will involve forest dependent communities in the management of forests to help reduce the incessant forest resource conflicts. The New Forest Act 2005; outlines explicitly a concise framework for community and private sector participation in forest management. In the Act Kenya Forest Service (KFS) as an administrative department which replaced the Forest Department has the mandate and autonomy in managing forest issues.

It has a board consisting of Permanent secretaries from the Ministries of Environment and Natural Resources,Water,Finance,Local Authorities, Directors of KEFRI,Kenya Wildlife Services(KWS),NEMA and Kenya Forest Services(KFS) and other eight persons who are not public servants appointed by the Ministry of Enviroment,two who are from the local community (MENR,2007).

The Act also allows the board to establish Forest conservation committees in conservancies, devolve powers to private sector and Community Forest Associations which link and inform the community and the board on forest issues. The new law gives incentives to the private sector, farmers and communities to practice commercial tree planting and ensures market prices for the forest produce with an aim of ensuring wood and other timber products are provided. The new law however, has serious penalties for illegal logging, charcoal burning, cultivating forest land and setting fires (MENR,2007).

The objectives of the 2005 new Forestry Policy include:

1) Contribution to poverty reduction, employment creation and improvement of livelihoods through sustainable use, conservation and management of forests.
2) To contribute to sustainable land use through soil, water and bio-diversity conservation and tree planting through sustainable management of forests.

3) To promote the participation of the private sector, communities and other stakeholders in forest management to conserve water catchment areas, create employment, reduce poverty and ensure sustainability of forest resources. All these will be done through empowering local communities to manage forests through Community Forest Associations, providing necessary incentives for them to ensure sustainable use and management of forest resources (Ongugo.et.al. 2008).

The appropriate implementation of this act will see a decline in resource based conflicts in Kenya.

2.5. Role of Community Participation in forest Management on resource conflicts.

Community forestry (participatory forest management) is defined by the Food and Agricultural Organization (FAO) of the United Nations (UN) as "any situation that intimately involves local people in forestry activity" (FAO Forestry Paper, 1978). Community forestry exists when the local community in an area plays a significant role in land use decision-making and when the community is satisfied with its involvement and benefits from the management of the surrounding forest and its resources (Robert and Gautam, 1985).

Pretty and Guijit(1992) define community forestry as "a process by which local groups or communities organize themselves with varying degrees of outside support so as to apply their skills and knowledge to the care of natural resources while satisfying livelihood needs."

Community Based Natural Resource Management (CBNRM.Net) (2011), defines community forestry as "the management of natural resources under a detailed plan developed and agreed to

by all concerned stakeholders. The approach is community based in that the communities managing the resources have the legal rights, the local institutions and the economic incentives to take the responsibility for sustained use of these resources. Under the Natural Resource Management plan, communities become the primary implementers, assisted and monitored by technical services".

From these definitions community forestry indeed lays a lot of emphasis on local community inclusion in forestry management. It involves the participation and collaboration of various stakeholders including community, government and non-government organizations (NGO's). The level of involvement of each of these groups is dependent on the specific community forest project and area and also the management system in use.

Community forestry gained prominence in the mid-1970s and has continued to expand in many countries all over the world. Successful examples of community forestry can now be seen in many countries including Nepal, Indonesia, Korea, Brazil, India, and North America. It has been considered one of the most promising options of combining forest conservation with rural development and poverty reduction objectives (Pandit, 2010). More recently, community forestry has been implemented in developed countries and it has been successful in its aims of sustainable forest management and securing socio-economic benefits for local communities (Roberts, and Gautam, 1985).

The approach is a move away from the traditional command and control top-down management commonly used by state organs in managing natural resources to community participation(shackleton,2002).State run top-down conservation strategy does not reflect the local realities of the targeted communities(Brown,2002).The key objective of Community based Natural Resource Management approach is to devolve decision making power to the grassroots communities over the use and management of their own natural resources(Nhantumbo,2003).The concept of devolution has its background in the "Ecologists report of 1972;and became popular by Schumacher's(1973) famous "small is beautiful". The Brundtland report (1987) and the Rio Earth Summit (1992) have also advocated for decentralization of resource management to the local communities but under government supervision.

Community forestry is first implemented through the establishment of a legal and institutional framework including the revision of legal norms and regulations for forest management, the development of National Forest Plans and the strengthening of decentralization processes to sub-national levels of government. The second principal line of action is the implementation of pilot projects to demonstrate the feasibility of the community forestry framework. However, a study by the Overseas Development Institute shows that the technical, managerial and financial requirements stipulated by the framework are often incompatible with local realities and interests. A successful legal and institutional framework will incorporate the strengthening of existing institutions and enable the dissemination of locally appropriate practices as well as the local capacity for regulation and control (Overseas Development Institute, February 2008).

Community forestry management involves a multi-stakeholder framework which brings together the local community, public and private sectors in the sustainable management of forest resources (Ngece, 2007).The inclusion of communities in forest resource management in essence enables the actors to attain forest sustainability and bio-diversity conservation with socio-economic objectives. These socio-economic objectives include equity, conflict resolution, poverty reduction and forest production (Ongugo, 2008).

Different researchers examining natural resource conflicts agree that community participation in forestry management plays an integral role in sustainable and widely accepted forest management and use. The local communities enjoy being part of the process and hence are encouraged to protect and conserve the forest resource minimizing the conflicts. The conservation benefits of forest management require adequate social arrangements, which community-based forestry provide. This kind of approach, nearly always in common property forests and often including timber harvest, is increasingly common (Poffenberger and McGean, 1996; Messerschmidt, 1993; Utting, 1994).

Currently, many researchers increasingly argue that common property can also be a viable resource management system. They note that groups of people are demonstrably capable of crafting rules and following harvesting patterns that encourage sustainability in forest use under a range of conditions, especially when user groups and forest territories are stable and clearly defined.

While social and economic change can destabilize these resource-management systems, a supportive policy environment, new technologies, better information, and increasing scarcity can also create invigorating new possibilities for collective action leading to viable common property management. Furthermore, many groups with long histories of forest use and forest culture have a wealth of cultural institutions upon which to draw in adapting to change (Ostrom, 1999; McKean, 1995; Ostrom et al., 1999; Berkes et al., 1998).

Community participation in forest management provides a setting that potentially overcomes many of the social obstacles facing conventional concession forest management. In a common property situation, forest management for timber production provides the means and incentives for communities to develop and strengthen local enforcement capabilities (Klooster 2000a, and Losos, 1998). It provides security of operation and operational control, so that forests are not converted to other uses following logging, and so that low-impact logging techniques are correctly applied.

With the active participation of resident communities, forest management becomes a strategy that provides both mechanisms and incentives for communities to conserve forests, while meeting local development needs. Therefore, community forest management represents a useful tool for arresting processes of forest degradation and deforestation in developing countries.

The recognition of the critical part conflict and conflict resolution plays has partly been occasioned by devolution of forest management rights and local community participatory frameworks in natural resource management(Castro and Nielsen,2004).These in essence therefore means that stakeholders are widely involved in the prudent forest resource use and subsequent management.

2.6 Access to forest resources by communities adjacent to forests as a source of conflict.

Highly influential research by Paul Collier and Anke Hoeffler at the World Bank (2000) suggests that countries whose wealth is largely dependent on the exportation of primary commodities, both agricultural produce and natural resources are highly prone to civil violence. In explaining the correlation between primary commodities and conflict, Collier and Hoeffler argue that conflict may be explained either by greed or by grievances, such as feelings of ethnic or political marginalization. They conclude, in large part based on the correlation between access to primary commodities and conflict, that to understand the causes of contemporary civil wars, we should forget about political and cultural arguments and focus instead on the greed of rebels and especially on their trade in natural resources. Homer-Dixon (1994) distinguishes between three kinds of environmental scarcity that can increase the risk of violent conflict.

They are Environmental change, which refers to a decline in the quantity or quality of a renewable resource that occurs faster than it is renewed by natural processes; Population growth, which reduces a resource's per-capita availability by dividing it among more and more people; and Unequal resource distributions, which concentrates resource in the hands of a few people and subjects the rest to greater scarcity, and which often results when property rights that govern resource distribution ,change as a result of large-scale development projects or new technologies that alter the relative values of resources.

Homer-Dixon also highlights two distinct kinds of interaction between these dimensions of environmental scarcity, which he terms “resource capture” and “ecological marginalization”. In the former, decreased quality and/or quantity of renewable resources combine with population growth to create unequal resource access, which then leads to increased environmental scarcity (and risk of conflict). In the latter, by contrast, unequal resource access is a cause rather than an effect; combined with population growth, it leads to decreased quality and/or quantity of renewable resources, and hence once again to increased environmental scarcity and risk of violent conflict.

Castro and Nielsen (2004) observe that conflicts can arise from incompatible individual or group values, needs, interests especially when they have to be met from a commonly shared resource. They argue that forest management conflicts particularly are often triggered by degradation or decline in forest resources which generates unhealthy competition for the dwindling resource.

The conflict is worsened by the failure of the stakeholders (actors) to agree on a framework to equitably share the resource. Conflicting parties often end up contradicting, compromising or even defeating each other's interest as they pursue their own interests (Ochieng-Odhiambo, 2000).

2.7 Resource Benefit sharing as a source of conflict

Forest resource benefit sharing has increasingly triggered conflicts between the forest regulators (mainly government) and the forest adjacent communities and other forest user groups (FAO, 1993). The community plays an integral role in the protection and rehabilitation of forest resources which grows the economic valuation of the forest products over time. Community forestry agreements stimulate the development of new income sources in related areas (e.g. the establishment of private nurseries) and market for forest products e.g. timber, fuel wood etc.However,these benefits do not benefit the community, instead those who benefit are the national and international organizations through revenue and tourism. Local communities could benefit from such revenue collected from the sale of forest products and entry fee paid at the parks (Ongugo, 2004).

This however, has been hampered by lack of policy and legislative instruments. This lack of direct benefit to local communities has to some extent alienated the local communities from the forest resource and subsequently led to encroachment of forestlands for the forest products, human settlement and carrying out agricultural activities leading to forest resource conflicts between the community and the forest regulators(government) (Ongugo, 2004).

2.8 Level of environmental knowledge influence on forest management conflicts

Indigenous peoples with a historical continuity of resource-use practices often possess a broad knowledge base of the behavior of complex ecological systems in their own localities. This knowledge has accumulated through a long series of observations transmitted from generation to generation. Such "diachronic" observations can be of great value and complement the "synchronic' 'observations on which western science is based. Where indigenous peoples have depended, for long periods of time, on local environments for the provision of a variety of resources, they have developed a stake in conserving, and in some cases, enhancing the biodiversity. They are aware that biological diversity is a crucial factor in generating the ecological services and natural resources on which they depend (Nora, 1999).

Some indigenous groups manipulate the local landscape to augment its heterogeneity, and some have been found to be motivated to restore biodiversity in degraded landscapes. Their practices for the conservation of biodiversity were grounded in a series of rules of thumb which are apparently arrived at through a trial and error process over a long historical time period. This implies that their knowledge base is indefinite and their implementation involves an intimate relationship with the belief system. Such knowledge is difficult for western science to understand. It is vital, however, that the value of the knowledge-practice-belief complex of indigenous peoples relating to conservation of biodiversity is fully recognized if ecosystems and biodiversity are to be managed sustainably. Conserving this knowledge would be most appropriately accomplished through promoting the community-based resource-management systems of indigenous peoples (Alfonse and kreg,1996).

Communities' local and territorial knowledge is an important resource for site-specific information needed for adaptive management. This includes inventories, long-term studies on local forest dynamics based on sample plots, regeneration surveys, and the monitoring of critical conditions for pollinators and seed dispersers (Palmer and Synnott, 1992; Blockhus, 1992).

Johnson and Cabarle (1993) observed that the participation of the people who inhabit forest regions helps generate effective enforcement structures and facilitates the evolution of adaptive management. Forest dwelling communities often have strong ties to the forest and highly value its future productivity. In the language of economics, they have a low discount rate. Lack of these characteristics undermines current concession forestry methods (Harder and Rice, 1999; Frumho and Losos, 1998).

2.9. Theoretical frame work

Conflict Theory to Model Complex Societal Interactions- Bartos and Wehr

Conflict theory can be used to explain the interactions between societies during times of turmoil and change (i.e. revolutions, strikes or everyday debates). Conflict theory is a collection of multiple theories from different fields including sociology, psychology, and economics that attempts to understand how humans begin, maintain, and end conflicts.

Bartos and Wehr contend that conflict occurs when actors use conflict behavior against each other to attain incompatible goals and/or to express their hostility. How and why conflicts occur can be explained by defining conflict behavior, incompatible goals between societies, and what it means to express hostilities. Bartos and Wehr describe a generalized picture of conflict theory by reviewing over a hundred different sources related to how conflict function. They present the following terms in their definition of conflict:

Actor means one or more individuals that have their own goals and are participants in a conflict. The different stakeholders and forest users in Mau forest are all actors involved in the forest conflict.

Conflict behavior (conflict styles) is any behavior that helps actors achieve their goals or desirers against, or express hostility towards, another actor. Frequent differences between the community adjacent to East Mau forest and the forest regulators which have resulted in evictions have come to form a conflict behavior in Mau forest.

Incompatible goals between actors occur when an actor tries to achieve goals that compete against another actor's goals. The forest regulators and the forest adjacent communities' pursuits have put them at loggerheads. Each group pursues goals in their best interest which are in conflict (incompatible) with the other.

Hostility is irrational behavior, meaning actors do not asses all conflict behavior possibilities properly due to heightened emotional state, anger, revenge, etc.

In summary, actors are groups of individuals that conflict when they have incompatible goals with other actors. During a conflict, actors use conflict behavior against one another to achieve their goals which may cause hostilities between the actors to grow. Conflicts do not necessarily

have to be negative or violent however, using violence is a form of conflict behavior (Aureli and Waal, 2000).

Incompatible Goals

There are three types of actor goals which may be incompatible. These include: resources, roles and values. Resource incompatibilities occur when actors compete for: wealth, power, and prestige. Wealth is anything tangible that holds value to actors. Power is the ability of actor A to force actor B to perform, even to a minimal degree, in a way deemed by actor A. For example, a boss has the power to force their employees to work on projects which the boss deems necessary Prestige is the "ability to live up to a group's ideals (Wilmat and Hocker, 2001).

These resources can cause conflicts through their deprivation (an actor is left without a resource), illegitimate power (an actor takes power illegally) or through belligerent action (an actor acts aggressive to steal resource). The conflicts around Mau forest are all resource based. The adjacent communities to the forest are fighting for access to the forest resources, inclusion in the management of the forest resources and share in the forest benefits. Role incompatibilities occur between actors in a vertical or horizontal hierarchy. Incompatibilities between hierarchies are conflicts in which one actor maintains power over another actor (vertical) or both actors have equal levels of power (horizontal).

Historically, Karl Marx theorized vertical hierarchical differences between capital holders and the working class cause conflicts which can be characterized as a "Whole vs. Part" conflict. Horizontal conflicts cause task conflicts, for example a conflict that occurs between a programmer and a designer on how a feature should be implemented in a game(Marx and Engels,2002).

Value incompatibilities occur when actors are separated from one another or differences in their size and technology exist. National borders are physical examples of separation between two actors and cause different societies to form with their own set of values. For instance, some separated societies may hold different values when it comes to handling conflicts, defined as the belligerence of the society (belligerence may cause resource conflicts between societies but belligerence itself is a personal or cultural value). Other separation differences in size and technology can also affect a society's values; the contrast between values in industrial and nonindustrial countries is an example of incompatibilities between size and technology.

Homan's theory of free communication

For actors to engage in conflict, it is generally required that they have free communication and conflict solidarity. Homans's theory of free communication states that when two or more individuals begin to communicate with one another both begin to homogenize their interests and form groups (or actors). Other theories also mark communication as a key element in any conflict (Homans,1968).

Having free communication, meaning communication is not obstructed between individuals, leads to conflict solidarity which is a set of similar hostilities or incompatible goals that a group of individuals share. For instance, conflict solidarity is needed for a workers union to strike. Strikers have a common grievance against their employer and thus form an actor that has solidarity.

Solidarity will break down if other factors force an actor's individuals to change their goals that go against the actor's goals, financial strain on the strikers for example. However, once an actor obtains solidarity, it may begin to organize, mobilize and perform conflict actions against another actor in an attempt to achieve their common goals.

A conflict organization is created by actors in order to handle conflict. An army is a conflict organization that has been created to handle a country's foreign conflicts. Mobilizing an organization, like an army, requires the actor to possess enough conflict resources (food, money, equipment) and have the ability to use them. Groups do not need conflict organization to mobilize, however actors are able to enter into conflict action once mobilization becomes possible.

A conflict action has the same definition as conflict behavior, as stated above; however conflict action expresses only rational actions as opposed to both rational and irrational actions (caused by hostilities).

In this paper we will refer to conflict behaviors and actions interchangeably because we separate hostility from behaviors when we describe our conflict framework. Conflict actions include non-coercive actions (compromising, cooperation) and coercive actions (attacking, being assertive. Conflict actions can also occur on varying "level of analysis" including individual, nation state, and inter-nation state levels.

Escalation, De-escalation, and Moderation

A period of escalation and de-escalation occurs once actors have entered into conflict. Escalation is an increase in the intensity of the conflict while de-escalation is a decrease in intensity. This period of escalation and de-escalation can occur over a varying amount of time. Conflicts can be escalated as long as actors have the ability to sustain their solidarity and resources. As time passes, changing conditions, such as the loss of resources or loss of conflict solidarity within an actor, can deescalate a conflict(Aureli and Waal,2000).

Finally, moderation is used to effectively mediate conflict and prevent serious unnecessary conflicts. Peace talks between countries and the signing of treaties are examples of moderation. Having effective communication, peaceful negotiation, and promoting trust are methods of preventing conflict or creating a resolution which ultimately deescalates a conflict.

The Hegelian Dialectic Theory moving our World to a One World Order.

Georg Wilhelm Friedrich Hegel (1770-1831)

Kant and Hegel in their social theory add that every individual, group, organization or other unit in society represent a force whose action stimulates many counterforces. When force meets counterforce, either cooperation or conflict can result, depending on many factors. In either case, a new product or relationship (or synthesis as Hegel refers to it) emerges from the interaction. When the synthesis comes from conflict, the interaction is likely to be more costly and destructive than when arises from cooperation. But even then, conflict can be pursued and managed in less costly ways(Meddler and Fitzgeral,2000).

The nature of Mau forest conflicts has been characterized by non-relentness of both the forest adjacent communities and the forest regulators (government).The community members have encroached on forest land for forest products, land for cultivation sometimes even when they have been warned by the authority not to do so. This consequently has led to the authority to counter this action with force; evicting the encroachers forcefully and with debilitating consequences in the long-run. When such a conflict is allowed to persist the consequences are dire. The only way out is to have an agreeable common ground for the conflict actors that allows dialogue and ultimate cooperation.

The ultimate goal of this study in looking at Natural resource management conflicts is to identify some of the more economical ways of dealing with conflict, and this is provided for by community forestry framework which is participatory, allows cooperation and dialogue and interaction and is less adversarial. The many people i.e. individuals,groups,organizations and societies there are involved in Natural resource management conflicts and are engaged constructively, the greater the development of better use and management of these resources.

The theory too argues that not all conflicts are destructive in nature and that it has to be avoided at all times. Some conflicts are beneficial to individuals and society. Some conflicts bring about new revelations into problems that those who believe in status quo may not have realized. In some cases, conflicts well managed produce the much needed change and reform institutions. The political conflicts in Kenya in 2007/2008 for example after the disputed presidential elections; heralded a lot of reforms in many sectors and a new constitution. The waves of forest conflicts around Mau forest over the years have been as a result of incompatible goals between the local community and the forest regulators.

The community's interest for forest products e.g. Timber, charcoal, grazing, and land for cultivation was not fully addressed. The authorities in a bid to push their interest through resorted to forced evictions leading to more conflicts. Communication for an amicable solution and enhance cooperation seemed lacking. Community forest associations introduce a participatory platform that allows for consultation and dialogue easing the conflict

2.8 Conceptual frame work: Figure 2.1.Conceptual framework

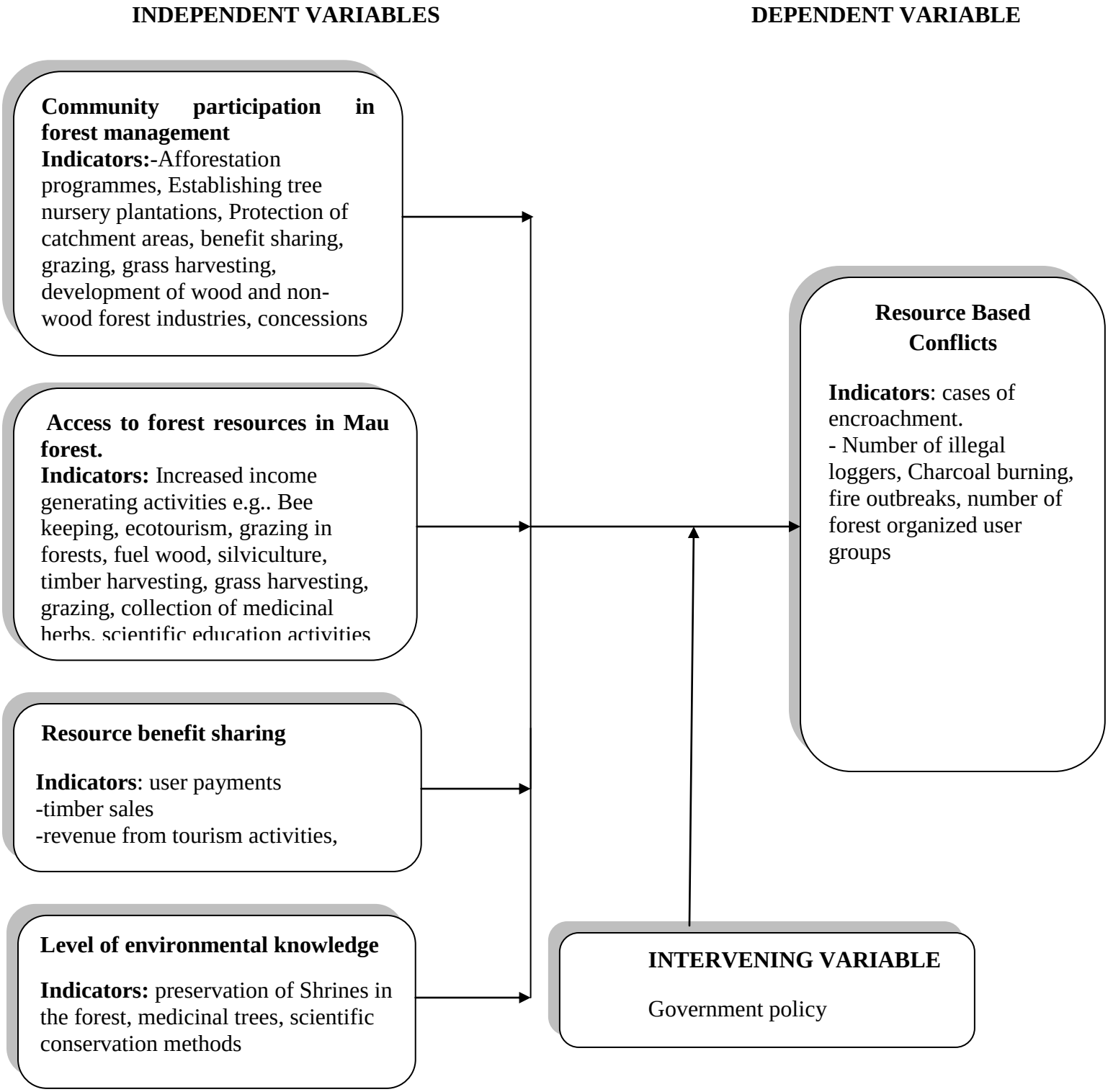

Figure 2.1. Above Conceptual framework illustrates the different functional areas that may influence forest conflicts in East Mau forest. Community participation in the management of forest, access to the forest resources, resource benefit sharing and the level of environmental knowledge and or understanding of environment management are thought to have some influence on the natural resource conflicts. The intervening variables include the government policies that come into play and may influence conflict management.

2.9 Summary of literature reviewed.

This review looked at the connection between conflict management and the participation of the community in forest management, accessibility of these resources, resource benefit sharing and level of environmental knowledge, from the global perspective- Asia, Latin America and Africa and locally in Kenya. The literature under review has emphasized on a participatory approach where forest management rights are devolved to the local communities adjacent to the forests a framework for sustainable resource management. The chapter also looked at the conflict theory relevant to the topic under study and provided literature on the various factors influencing resource conflicts management as provided in the study objectives. The literature also provided some best practices around the world on community forestry and also as espoused in the new The New Forest Act 2005; which outlines explicitly a concise framework for community and private sector participation in forest management through creation of Community Forest Associations (CFAs) a framework for participatory-partnership.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presented the research methodology that was used in data collection and analysis for the research study to its logical conclusion. The instrument has been discussed in terms of its validity and reliability. This chapter also contained the research design, the target population of the study, methods of collecting data from respondents and data analysis methodology.

3.2 Research Design

Since this study sought to obtain descriptive and self -reported information from members of communities around Sururu-East Mau forest, non-governmental organizations, and government officials, the researcher used a survey design which was most appropriate (Best and Khan, 1986). The survey allowed the researcher to expose the respondents to a set of structured questions to allow comparison since it was assumed that all respondents had information or experience on Mau Forest conflicts required for the problem being investigated: Factors Influencing Resource Based Conflicts among forest users in East Mau Forest, Kenya; as users and also victims of the conflict**.** The researcher administered questionnaires to selected respondents and short focused interviews to gather information on variables of interest and the findings later would be generalized to the population that the sample is intended to represent (Borg and Gall, 1996).

3.3 Target population

The study targeted a population of 300 people in living or working around Mau forest **(**Ministry of Lands Report, 2006).

3.4 Sample size and sampling procedures

From the population of 300 people, a sample size of 30% from the total population was taken totaling to 90 people who were expected to be interviewed. According to Mugenda and Mugenda (2003), a representative sample should be 10%-30% of the total population. The sample size taken was expected to be manageable considering the time, finance and manpower constraints coupled with the terrain and the heavy rains during the research period in the area.

The research also employed a multi stage cluster sampling technique to sample the groups to be surveyed since the area is relatively large. The entire target area is divided into systematic sub-areas called primary units, secondary units and tertiary units which must be representative enough (Kothari, 1985).The groups selected in this study were drawn from forest user and management group in Mau Forest. These included: community members, key community leaders, government officials (ministries of local government, provincial administration, Kenya Forest Services, Water, Kenya Wildlife services), private licensed loggers and NGOs. With the use of stratified random sampling the required sample was obtained from the three selected groups. The respondent audit indicated that all the 90 respondents were interviewed during the study.

3.5 Data collection instruments

The research instruments were majorly questionnaires that guided a structured interview where the interviewer administered the questionnaire to the respondents. Illiterate respondents were explained the questions by a local translator sourced from the area. The questionnaire had both open and closed ended questions. Section A, questions 1-6, examined the Demographic details of the respondents (gender, age, marital status, occupation, education level and period respondent has worked or lived around Mau forest). Section B Questions 1-6 examined causes and actors involved in the Mau forest resource conflicts, questions 3-6 specifically evaluated community participation in the forest management and the influence this has on the resource conflicts in Mau forest. Section C Questions 1-8 evaluated accessibility of forest resources to the community and other forest users and resource benefits with question 3 focusing on the influence these had on resource conflicts in East Mau forest. Section D questions 1-5 dealt with the level of environmental knowledge that the community had and how this influenced resource conflicts among forest users in East Mau forest.

3.6 Validity of the Research instrument

Mugenda and Mugenda (2003) refer to validity as the quality that a procedure or instrument or a tool used in research is accurate, correct, true and meaningful. This research intended to use Content validity as a measure of the degree to which data collected using the Questionnaire represents the correct indicators espoused in the four research questions. The instrument contained all possible items that were used in measuring factors influencing resource conflict

management among forest users in East Mau Forest, Kenya. Prior to collection of data; pilot testing of the questionnaire was done to test the accuracy of language and meanings and to further test whether the pilot respondents comprehend. The test was undertaken in a similar forest area, Maasai Mau forest in the neighboring Narok County. The researcher randomly sampled a group of 15 respondents who were subjected to the questionnaire that was to be used in the actual study and it was possible to accept the research instrument validity from the content of the respondents. The researcher also took time to go through the instruments and comparing them with the set objectives to ensure that they contain all the information that answers the set questions and objectives.

3.7. Reliability of Instruments

Mugenda and Mugenda (2003) say that reliability of a research instrument is concerned its level of internal consistency over time. A reliable instrument therefore is one that constantly produces the expected results when used more than once to collect data from two samples drawn from similar population. Test-Retest-a method of estimating test reliability in which a test developer or researcher gives the same test to a similar group of research participants on two different occasions.

For the purpose of this research, reliability was determined from a test-retest administered to a similar population that has similar characteristics to the target population in Maasai Mau forest in Narok County The objective of piloting was to eliminate any ambiguous items and to establish if there were any challenges in administering the instruments.

3.8 Data collection procedures

Confidentiality was maintained in each case by assigning each subject a random number. The respondents were clustered into three major categories namely Community members, Government officials and Non-governmental and Private organizations. The questionnaire was designed based on the study objectives and was administered using drop and pick later methods in a period of two weeks. A research permit was sought from the National Council for Science and Technology on approval and clearance from the University.

3.8.1 Data analysis techniques

The Qualitative Data collected particularly from open ended questions was coded to enable for quantitative analysis. The coding specifically targeted the knowledge on the existence of conflicts in Mau forest, the causes in Questions 1 and 2 in Section B, Participation of community in the management and conservation of East Mau forest as a source of conflicts in question 5; Section C-community access to forest resources and resource benefit sharing activities, Section D Level of environmental knowledge issues in Question 1-4. The coded data and the Quantitative Data were analyzed using descriptive statistics techniques which included: frequencies, percentages and mean computations presented in tables to summarize. All analysis was done using the Statistical Package for Social Scientists (SPSS).

Data was scrutinized in relation to the objective of the survey, otherwise with a potential abundance of data; vast numbers of irrelevant summaries would be produced. Analysis was descriptive in nature. In the data presented in this report, results for each item are based upon the number of cases which had valid data for that item.

Descriptive statistics was aimed at identifying the pattern of the data and consistency of the responses in each of the identified factors influencing resource Conflicts among forest users in East Mau Forest, Kenya.

3.8.2. Ethical considerations

The researcher was aware of, and respected the confidentiality of information from the respondents especially considering the sensitivity of the Mau Conflict issue. The researcher was open and briefed the respondents on the objectives and significance of the study and assured them of confidentiality. The researcher also sought prior consent of respondents before commencing the interviews. Those who were unwilling were replaced accordingly with their immediate neighbors.

3.9 Operational definition of variables

The very essence of operationalizing the variable was to enable the researcher to measure the phenomena understudy. **Table 3.1** below describes how various characteristics in the study were measured.

Table 3.1: Table showing operationalized variables.

Variable	Type of variable	Indicators	Measure(scale)	Data collection method	Tools of Analysis
Community participation in forest management	Independent	- Conservation efforts e.g.- Afforestation programmes, Establishing tree nursery plantations. -Protection of catchment areas. -benefit sharing,grazing,grass harvesting, development of wood and non-wood forest industries, concessions and licence granting	Ordinal	Questionnaires, oral interviews, report reviews.	Quantitative, Frequency and Percentage
Accessibility to forest resources in Mau forest.	Independent	Increased income generating activities e.g.-.bee keeping -ecotourism. -grazing in forests and fuel wood,silviculture, timber harvesting, grass harvesting, grazing, collection of medicinal herbs, scientific education activities,	Ordinal	Questionnaires, oral interviews, report reviews.	Quantitative, Frequency and Percentage
Resource benefit sharing	Independent	-user payments -timber sales -revenue from tourism activities,	Ordinal	Questionnaires, oral interviews	Quantitative, Frequency and Percentage
Level of environmental knowledge.	Independent	-preservation of Shrines in the forest, medicinal trees, scientific conservation methods	Ordinal	Questionnaires, oral interviews	Quantitative, Frequency and Percentage

Forest conflict management	Dependent	-cases of encroachment. - number of illegal loggers, Charcoal burning, fire outbreaks, -number of forest organized user groups	Nominal/Ordinal	Questionnaires, oral interviews.	Quantitative, Frequency and Percentage

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION OF FINDINGS

4.1. Introduction

This Chapter presents the study findings. Data was scrutinized in relation to the objective of the survey, otherwise with a potential abundance of data; vast numbers of irrelevant summaries would be produced. Analysis was descriptive in nature. In the data presented in this report, results for each item are based upon the number of cases which had valid data for that item .Descriptive statistics was aimed at identifying the pattern of the data and consistency of the responses in each of the identified factors influencing the Resource Based Conflicts in East Mau forest. Results were then presented in tables.

4.2. Response Return Rate

In this study, the respondents were drawn from members of the community sampled randomly from the households around Sururu-East Mau Forest, government and local government officials, licensed loggers and non-governmental organizations around Mau forest areas under study. The study had all the respondents 90(100%) interviewed using the interview schedule and analyzed. The following characteristics were considered: Gender, Age, Education level, Occupation and experience with Mau forest conflict issues.

4.3 Socio-Demographic Details

Socio-Demographic characteristics of the respondents considered such distribution as gender, age, occupation, level of education and period worked or stayed around Mau forest.

4.3.1. Distribution by Gender

Table 4.1. Table showing frequencies for Gender only (N=90).

Gender	Frequency	Percent
Male	52	58
Female	38	42
Total	**90**	**100**

As indicated in **Table 4.1.**above, the study population was almost evenly distributed with 52(58%) of the respondents representing males while 38(42%) were female respondents.

4.3.2 Distribution by Marital status

Table 4.2.showing the frequencies for marital status distribution in the study population

Marital status	Frequency	Percent
Married	59	66
Single	21	23
Widowed	10	11
Total	**90**	**100**

From the findings presented in **Table 4.2** above, an examination of the respondents marital status revealed that 59(66%) were married, 21 (23%) were single, while 10(11%) were widowed.

4.3.3. Distribution by Age

Table 4.3: Table showing the frequency for Age Distribution

Age	Frequency	Percent
15-20	7	8
21-25	10	11
26-30	23	26
31-35	35	39
36-40	11	12
Over 40	4	4
Total	**90**	**100**

A closer examination of the respondents by age distribution as indicated in **Table 4.3** above reveal that the respondents age ranged between 18-40years with most of the respondents belonging to the 31-35 years range(39%) followed by the 26-30 years range(26%);those in the 21-25 years range were 11% and those between 15-20 years were 7(8%),those between 36-40 years were 11(12%) ,while those over 40 years of age were the lowest 4(4%)

4.3.4. Occupation

Table 4.4.Frequency Table showing Occupation

Occupation	Frequency	Percent
Formal employment	32	36
Business	12	13
Self- employment	38	42
Student	7	8
None	1	1
Other	0	0
Total	**90**	**100**

Most of the respondents(42%) as indicated in **Table 4.4** above reported that they are self-employed particularly doing farming compared to those who are in formal employment (36%) majority of whom reported to be working in government departments. A few respondents were reported to be undertaking some business (13%) involved in commercial logging, owning timber yards or running small shops. Finally, (8%) were reported being students in tertiary colleges and (1%) reported themselves as doing nothing.

4.3.5 Distribution by Education Level

Table 4.5. Table showing frequencies for Education Levels.

Education Level	Frequency	Percent
Primary Certificate	34	38
Secondary Certificate	41	46
Diploma	10	11
Graduate	5	6
Other	0	0
Total	**90**	**100**

Regarding education level 34(38%) had attained primary school certificate level of education while 41(46%) had secondary school level of education, while 10(11%) had Diploma and 5(6%) Graduate level of education presumably those from government departments and some of the NGOs as indicated in **Table 4.5** above.

4.3.6 Distribution of the period one has lived or worked around Mau forest complex

Table 4.6.Table showing Frequency for statistics for the period one has lived or worked around Mau Forest.

Years worked or lived in Mau	Frequency	Percentage
Less than 1 year	2	2
1-5 years	8	9
6-10 years	30	33
11-15 years	35	40
15-20 years	13	14
Over 20 years	2	2
Total	**90**	**100**

The statistics in **Table 4.6** indicate that all the respondents have either lived or had a working experience within the Mau forest region. A majority are said to have been in Mau forest for over 10 years and these are expected to be community members who do farming at 6-10 years (33%), 11-15 years (40%) and 15-20 years (14%).

4.7 To determine the extent to which community participation in forest management influence resource based conflicts in East Mau forest.

The first question aimed at establishing the relationship between community participation in forest management and the emergent forest resource conflicts in East Mau forest. Various conflict components such as the causes of conflicts, types, the parties involved and the .management and conservation activities undertaken by the community were evaluated. **Table 4.7** shows the evaluation on the opinion as to whether conflicts existed around Mau forest.

Table 4.7.Shows opinion on existence of conflicts around Mau Forest

Is there any resource conflict in Mau	Frequency	Percent
Yes	87	97
No	2	2
Don't know	1	1
Total	**90**	**100**

The results as shown in **Table 4.7** above indicate a majority of the respondents interviewed (97%) strongly agreed that indeed conflicts exist around Mau forest only (2%) disagreed and 1% did not know.

4.7.2 Distribution by group/organizations (parties) involved in Resource Based Conflicts around Mau forest

Respondents were also asked to name the groups/organizations (parties) involved in the resource conflicts in Mau.

Table 4.8.Table showing Frequency for statistics for the groups (actors) involved in the conflict around Mau Forest.

Groups(actors) in the conflict	Frequency	Percent
Community	27	30
Loggers-timber companies	20	22
NGOs, CSOs	10	11
Government officials	33	37
Others.	0	0
Total	**90**	**100**

(Community-farmers, teachers, members of the churches, community leaders, political, **Government officials-** Kenya forest services (KFS), KWS, Provincial Administration (DC, DO, and Chiefs), Local government-Councilors, mayor etc.)

From the findings in **Table 4.8**.the community 27(30%) and government 33(37%) were found to be the leading and key parties in the Mau forest Conflict, followed by Loggers 20(22%) and NGOs-10(11%) respectively.

4.7.3 Distribution of causes of resource conflicts around Mau forest

Table 4.9.Table showing Frequency for statistics for the causes of conflict around Mau Forest.

Causes of conflict	Frequency	Percent
Forest Resources	36	40
Politics (local and national).	15	17
Forest benefits-Payment for Environmental use (PES).	10	11
Policy issues.	8	9
Participation in forest management.	20	22
Others (poverty, unemployment, attitude etc.).	1	1
Total	**90**	**100**

(Forest resources (Land, timber, firewood, charcoal, water, boundary issues)

Table 4.9 above indicates that Conflicts caused as a result of forest resources namely Timber, firewood, water, land and boundary (cut-line) issues were reported to be the leading and prime causes of conflicts around Mau forest 36(40%); this was followed by Participation in forest management by community20 (22%0, while Politics (local and national) 15(17%), Forest benefits10 (11%) and policy issues8 (9%) were reported to contribute less to the Mau resource conflicts.

4.7.4 Distribution of group/organization involvement in the management and conservation of mau forest

To evaluate community involvement in the management and conservation activities was evaluated using five statements for the groups/organization expected to participate in the conservation and management of Mau forest resources which included: community, loggers, NGOs/CSOs/WRUAs and Government..

Table 4.10.Table showing Frequency for statistics for group/organization involvement in the management and conservation of mau forest

Level of extent	Community	Government	Loggers	NGOs
	N (%)	N (%)	N (%)	N (%)
Not at all	(0)0	(0)0	(0)0	(0)0
Very low extent	(38)42	(9)2	(36)40	(16)18
Some extent	(36)40	(20)22	(29)32	(32)35
A great extent	(0)0	(45)50	(14)15	(37)41
A very great extent	**(0)0**	**(45)50**	**0**	**(29)32**

The findings in **Table 4.10** recorded high levels of agreement for groups and organizations involvement in forest management. Government had a high agreement leading in conservation and management activities(50%), followed by NGOs(40%) and high levels of disagreement for the participation of community(45%), Loggers(40%).

4.7.5. Distribution of influence of community participation in the management and conservation of East Mau forest and resource conflict challenges.

Table 4.11.Table showing extent to which community participation influence resource conflicts in East Mau forest.

Level of agreement	Frequency	Percent
Strongly agree	30	33
Agree	42	47
Strongly disagree	7	8
Disagree	11	12
Don't know	0	0
Total	**90**	**100**

As indicated in **Table 4.11** a majority of the respondents 72(80%) agreed that community participation indeed influence conflict in Mau forest. Only 18(20%) disagreed.

4.8. To examine how access to forest resources by the forest adjacent communities influence forest resource conflict in East Mau forest.

The second research question aimed at establishing the relationship between community access to forest resources and the emerging conflict challenges in East Mau forest. An evaluation was done on respondent's access to the forest and forest resources.

4.8.1. Distribution by access to forest

Table 4.12.Table showing access to forest

Do you access the forest	Frequency	Percent
No	49	54
Yes	41	46
Total	**90**	**100**

From **Table 4.12** above the response as to whether the respondents access the forest or not was almost unevenly distributed but with many respondents(54%) reporting that they do not access the forest, while 46% agree that they actually access the forest although restrictively.

4.8.2. Distribution by access to forest resources

Table 4.13.Table showing extent to which forest resources are accessible to community.

Level of agreement	Frequency	Percent
Easily accessible	4	4
Accessible	26	29
Not Easily accessible	34	38
Inaccessible	25	28
Don't know	1	1
Total	**90**	**100**

When asked how accessible the forest resources were to the people, findings in **Table 4.11** above indicated that the forest resources were inaccessible particularly the economically viable resources.67% of the respondents reported that indeed the forest resources are not accessible while 33% reported that the resources are accessible but on restricted terms.

Respondents were presented with a list of forest resource exploitation related activities and were asked to rate how the community accesses the resources and participates in those activities at the time of the study. Each question in this section was to be answered on a 5-point scale. All of the statements used a scale that ranged across 5-very high, 4-high, 3-medium, 2-low, and 0-1-very low.

Table 4.14 showing distribution of economic activities/benefits accessed by forest users

Activity	Frequency	Percent
1) Collection of medicinal herbs	53	60
2) Harvesting of honey	73	80
3) Harvesting of timber	31	34
4) Grass harvesting and grazing	29	32
5) Collection of forest produce for community based industries	15	17
6) Ecotourism and recreational activities	8	9
7) Scientific and educational activities	14	16
8) Plantation establishment through non-resident cultivation	30	33
9) Contracts to assist in carrying out specified silvicultural activities	15	17
10) Development of community wood and non-wood forest based Industries	4	4
11) Other benefits often agreed upon between CFA and KFS	20	22

The findings in **Table 4.14** show that the activities and or resources accessed by the forest users particularly the community were mostly those that have minimal economic benefit. For example a majority of the respondents acknowledged Collection of medicinal herbs (60%) and harvesting honey (80%) as the activities mostly accessed by the community but had very little

economic value and had little or no direct negative impact to the forest to warrant any conflicts. These were followed by grass harvesting and grazing (32%). Harvesting of timber and or fuel wood, collection of forest produce which fetch a lot of revenue when sold out to commercial loggers, were low (17%) indicating low accessibility as the activities are perceived to destroy the forest by the regulators hence causing serious conflict challenges. Ecotourism and recreational activities(9%),scientific and education activities(16%),plantation establishment through non-resident cultivation(33%),contracts to assist in carrying out specified silvicultural(17%),development of community wood and non-wood forest based industries(4%),other benefits as agreed by CFA and KFS from time to time(22%).

4.8.3. Extent to which access to forest resources influence resource conflicts in East Mau forest.

Table 4.15.Showing frequency distribution of extent to which forest resources influence conflicts.

Level of agreement	Frequency	Percent
Agree	74	82
Disagree	16	18
Don't know	0	0
Total	**90**	**100**

The findings in **Table 4.15** above a majority of the respondents (82%) agreed that accessibility of forest resources contributes to resource conflict in East Mau Forest while 18% disagrees.

4.9. To establish how forest resource benefit sharing influence forest resource conflict in East Mau forest.

Four survey items were used to evaluate the relationship between resource benefit sharing and resource conflict challenges in East Mau forest.

Table 4.16.Distribution showing frequency for statistics of the existence of viable resources to benefit community

Level of agreement	Frequency	Percent
Yes	80	89
No	8	9
Don't know	9	2
Total	**90**	**100**

Table 4.16 above indicate that the findings revealed 89% of the respondents admitting that there exists benefits accruing from the forest resource which include revenue from timber sales, payment for resource use, fuel wood, wages for forest work etc. which should benefit the community; 9% disagreed that there are any resource benefits, while 2% did not know whether these benefits existed in East Mau forest.

4.9.1. Distribution of the extent to which the community benefits from the resources.

Table 4.17.Extent to which community benefits from the resources.

Level of benefit	Frequency	Percent
A very great extent	2	2
A great extent	4	4
Some extent	10	11
Low extent	18	20
Not at all	56	62
Don't know	0	0
Total	**90**	**100**

As regards the extent to which the community benefits from the forest resources through a sharing arrangement with forest managers, findings from **Table 4.17**. Indicate that only 17% of the respondents agree that the community benefits from the resources accruing from the forest, while 82% say that the community doesn't benefit from the resources.

4.9.2. Distribution by type of resource benefits available in East Mau forest.

Table 4.18 Types of Resource Benefit available in East Mau forest.

Resource	Frequency	Percent
Timber sales	90	100
Concessions/Leases/Licenses/Grants	58	64
Payments for environmental use	45	50
Tourism Levies	12	13
Compensations	10	11
Wages for forestry work	63	70
Community development	12	13
Others	5	6

Respondents were asked to list any available forest resource benefits (user rights) and expected to be shared between the community and forest managers. The list was ranked on a scale of a 5-point likert scale. All of the statements used a scale that ranged across 5-very high, 4-high, 3-medium, 2-low, and 0-1-very low. From the findings in **Table 4.18**.above Timber sales was reported as the most available resource benefit at 100%; benefits expected from Concessions/Leases/Licenses/Grants-64% followed by Wages for forestry work at 70% and Payments for environmental use at 50%.The least available resource benefits as reported by respondents were Tourism Levies(fees from parks)and Community project development(schools,roads,health facilities etc.) at 13% ;while compensations(wildlife attacks, loss of property due to predation by wild animals)11%.

4.9.3 Statistics on the influence of Resource Benefit sharing influence on conflicts in East Mau forest.

Figure 4.19. Showing influence of resource benefit sharing on conflicts in East Mau forest

Level of agreement	Frequency	Percent
Agree	77	86
Disagree	13	14
Don't know	0	0
Total	**90**	**100**

86% of the respondents agree that indeed Resource Benefit sharing influence forest resource user conflict in East Mau forest. **Table 4.19** above shows 86% of the respondents agreed that benefit sharing influences conflict, 14% disagreed.

4.9.1 To assess how the level of environmental knowledge of the community adjacent to Mau forest influence forest resource conflict in East Mau forest.

The research question was aimed at establishing the relationship between forest resource conflicts in East Mau forest and the level of knowledge or skills the community has in as far as the environment or natural resource management and conservation is concerned. The research determined the level of environmental knowledge of the community using five questions. The aim was to measure the knowledge/understanding of the community of standardized and scientific practices used by forest regulators in managing and conserving forest resources in the forest and how the indigenous knowledge conflicts with the the regulations.

Table 4.20.Table showing the level of environmental knowledge by the community

Level of knowledge	Frequency	Percent
Very poor	14	16
Poor	25	28
Fair	45	50
Good	5	6
Very Good	0	0
Excellent	0	0
Total	**90**	**100**

Over 90% of the respondents were in agreement that environmental knowledge as is expected by the forest regulators was low. **Table 4.20** shows the frequency distribution of the level of knowledge rated poorly at 94% below par.Perhaps the Community instead relied more on the use of traditional/indigenous knowledge and methods to conserve the forest. Among the frequently used methods was the conservation of medicinal trees, herbal vegetation, sacred trees, shrines, trees that acted as beehives.

4.9.3 Extent to which the level of environmental knowledge influence resource based conflicts in East Mau forest

The extent to which environmental knowledge is embraced by the community, the use of traditional knowledge in conservation and how this conflict with the standard scientific methods and the extent to which the level of environmental knowledge by the community influence resource conflict in East Mau forest was evaluated.

Table 4.21. Table showing the level of environmental knowledge and its influence on conflict management in Mau forest.

Theme	Level of extent	N (%)
1.To what extent does the level of knowledge influence resource conflicts in Mau forest	A great Extent	**(63)70**
	Some extent	**(16)18**
	Not at all	**(9)2**
	Don't know	**0**
2.To what Extent does indigenous knowledge conflict with standard scientific knowledge	A great extent	**(56)62**
	Some extent	**(23)26**
	Not at all	**(4)4**
	Don't know	**(9)2**
3.To what extent does the community use indigenous knowledge to conserve the forest resource	A great extent	**(42)47**
	Some extent	**(37)41**
	Not at all	**(9)2**
	Don't know	**0**

Table 4.20 findings indicate that whereas the use of traditional methods was placed at 47%, at least 58% of the respondents did agree that indigenous methods of conservation conflict with the scientific methods .Overally, a total of 70% of the respondents agreed that that environmental knowledge did influence conflict management in Mau forest.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter discusses the findings, conclusion and recommendation based on each of the objectives of the study. It also gives the contributions of the study to the general body of knowledge specifically with reference to forest resource conflict management.

5.2. Summary findings

The main focus of this study was to analyze the factors influencing Resource Based Conflicts among different forest users in Sururu-East Mau Forest, Kenya; such factors as community participation in forest management, accessibility to forest resources, forest resource benefit sharing, and the level of environmental knowledge influence forest resource conflicts in Mau forest. The research used a structured interview and an accompanying questionnaire to gather data as explained in chapter three. The data analysis was done using SPSS and findings presented in Chapter Four. Chapter two explored views of other authors on this topic of forest resource conflict management and it is against this views that the researcher will discuss the findings in this chapter.

5.3 Objectives and findings

Objectives

1. To determine the extent to which community participation in forest management influence resource conflicts in East Mau forest.

Majority of the respondents agreed that there exist resource conflicts in East Mau forest.97% identified the community and government (forest regulators as the key actors in this conflict, further exacerbated by Loggers and NGOs ((32%).Forest resources i.e. Timber, fuel wood and other forest products are the cause of conflict. Community participation was rated very low at 40%.Well over 80% respondents agree that the low level of community participation in the management and conservation of the forest resource influence resource conflicts in East Mau.

2. To examine how accessibility to forest resources by the forest adjacent communities influence resource conflicts in East Mau forest.

Regarding access to forest resources, the findings show that 82% of the respondents agree that access to forest resources influences forest resource conflicts in East Mau forest. A closer look at the resources accessed by the forest users particularly the community were mostly those that have minimal economic benefit. For example a majority of the respondents acknowledged Collection of medicinal herbs (60%) and harvesting honey (80%) as the activities mostly accessed by the community but had very little economic value and had little or no direct negative impact to the forest to warrant any conflicts. These were followed by grass harvesting and grazing (32%).

Harvesting of timber and or fuel wood, collection of forest produce which fetch a lot of revenue when sold out to commercial loggers, were low (17%) indicating low accessibility as the activities are perceived to destroy the forest by the regulators hence causing serious conflict challenges. Ecotourism and recreational activities(9%),scientific and education activities(16%),plantation establishment through non-resident cultivation(33%),contracts to assist in carrying out specified silvicultural(17%),development of community wood and non-wood forest based industries(4%),other benefits as agreed by CFA and KFS from time to time(22%).

3. To establish how resource benefit sharing from Mau forest influence resource conflict in East Mau forest. Whereas most respondents acknowledge that there exist a lot of benefits that the locals would benefit from, 82% reported that they do not benefit directly or indirectly from these resources. The most available benefits coming from Timber sales (100%) and forestry wages (70%) and concessions (50%); while very little was reported as benefiting any community development (13%). 86% of the respondents agree that resource benefit sharing which does not benefit the community is a cause of resource conflicts in East mau forest.

4. To assess how the level of environmental knowledge of the community adjacent to Mau forest influence conflict management in East Mau forest.

Over 90% agree that the level of standardized scientific environmental knowledge is very low among the members of the community. Traditional methods are instead commonly used and 58% of the respondents reported conflicts of the use of indigenous conservation methods and the scientific required methods by the forest regulators. Environmental knowledge influence resource conflicts in Mau forest

5.4. Discussion of findings

This section will discuss the research findings and compare with the findings of other authors in the literature review to see whether the findings concur or not. The researcher will look at the findings according to the objectives.

The first objective of this study was to determine the extent to which community participation in forest management influence forest resource conflicts in Mau forest. A majority of the respondents (over 80%) were found to agree that conflicts around East Mau forest are as a result of non-participation of the community in forest management. These findings agrees with most studies on Natural Resource Management Conflicts.Natural Resource Management conflicts both locally and internationally vary a lot in terms of intensity and cause factors. At the local level for example, conflicts may occur as a result of a certain user group feeling excluded from participating in Natural Resource Management (Matose, 1997; Castro and Nielson, 2001). Natural Resource Management conflicts may also arise when access to certain forest products and benefit sharing are not very clearly defined (Engel and Korf, 2005).

Over 80% of those interviewed during this research while acknowledging that the Mau forest conflict is real, they also agree that Mau forest conflict is as a result of the local community being excluded from participating in the forest resource conservation and management, yet their long-term relationship with the forest makes them better placed to be effective stewards. The community has been perceived by the forest regulators (government) as mere encroachers whose interest is to exploit forest products i.e. timber, fuel wood, charcoal etc. reported to cause 40% of the conflicts in the study and which destroys the rich Bio-diversity, hence forest regulators has

harassed and forcefully evicted them. However, the irony has always been that while the community is kept away from the forest resource, the same government has allowed big commercial and private loggers and NGOs to exploit the same resources as reported as key conflict actors at 33%.The community doesn't seem to benefit a lot.

Community forestry exists when the local community in an area plays a significant role in land use decision-making and when the community is satisfied with its involvement and benefits from the management of the surrounding forest and its resources (Robert and Gautam, 1985).

Pretty and Guijit(1992) define community forestry as "a process by which local groups or communities organize themselves with varying degrees of outside support so as to apply their skills and knowledge to the care of natural resources while satisfying livelihood needs."
Community forestry management involves a multi-stakeholder framework which brings together the local community, public and private sectors in the sustainable management of forest resources (Ngece, 2007).The inclusion of communities in forest resource management in essence enables the actors to attain forest sustainability and bio-diversity conservation with socio-economic objectives. These socio-economic objectives include equity, conflict resolution, poverty reduction and forest production (Ongugo, 2008).

The second objective was to examine how access to forest resources by the forest adjacent communities influence forest resource conflicts in Mau forest. The study found that the struggle to access particularly economically viable resources by the community contributes to conflict challenges in Mau forest.82% of the respondents affirmed that access to forest resources by the community influence conflict management in Mau forest. A closer look at the main user

rights(activities) and or resources that the community and forest regulators are supposed to mutually agree on the use in the spirit of community forestry as espoused in the new Kenya Forest Act,2005;revealed that the community has limited access to the most viable forest resource products. Resources accessed by the forest users particularly the community were mostly those that have minimal economic benefit. For example a majority of the respondents acknowledged Collection of medicinal herbs (60%) and harvesting honey (80%) as the activities mostly accessed by the community but had very little economic value and had little or no direct negative impact to the forest to warrant any conflicts. These were followed by grass harvesting and grazing (32%). Harvesting of timber and or fuel wood, collection of forest produce which fetch a lot of revenue when sold out to commercial loggers, were low (17%) indicating low accessibility as the activities are perceived to destroy the forest by the regulators hence causing serious conflict challenges. Ecotourism and recreational activities(9%),scientific and education activities(16%),plantation establishment through non-resident cultivation(33%),contracts to assist in carrying out specified silvicultural(17%),development of community wood and non-wood forest based industries(4%),other benefits as agreed by CFA and KFS from time to time(22%).

This situation agrees with the views of different researchers examining natural resource conflicts who agree that local communities if allowed to enjoy being part of the forest management process and benefits are encouraged to protect and conserve the forest resource minimizing the conflicts. The conservation benefits of forest management require adequate social arrangements. This kind of approach, nearly always in common property forests and often including timber harvest, is increasingly common (Poffenberger and McGean, 1996; Messerschmidt, 1993; Utting, 1994).

Currently, many researchers increasingly argue that common property can also be a viable resource management system. They note that groups of people are demonstrably capable of crafting rules and following harvesting patterns that encourage sustainability in forest use under a range of conditions, especially when user groups and forest territories are stable and clearly defined. While social and economic change can destabilize these resource-management systems, a supportive policy environment, new technologies, better information, and increasing scarcity can also create invigorating new possibilities for collective action leading to viable common property management. Furthermore, many groups with long histories of forest use and forest culture have a wealth of cultural institutions upon which to draw in adapting to change (Ostrom, 1999; McKean, 1995; Ostrom et al., 1999; Berkes et al., 1998).

In a common property situation, forest management for timber production provides the means and incentives for communities to develop and strengthen local enforcement capabilities (Klooster 2000a, and Losos, 1998). It provides security of operation and operational control, so that forests are not converted to other uses following logging, and so that low-impact logging techniques are correctly applied.

The third objective was to establish how forest resource benefits influence forest resource conflicts in East Mau forest. Different scholars argue that Forest resource benefit sharing causes resource conflicts especially between the forest regulators (mainly government) and the forest adjacent communities and other forest user groups. (FAO, 1993). While the community being the custodian of the forest resources is supposed to benefit from the growing economic valuation of the forest products however, these benefits do not benefit the community; instead those who

benefit are the national and international organizations through revenue and tourism. Local communities could benefit from such revenue collected from the sale of forest products and entry fee paid at the parks (Ongugo, 2004).

This however, has been hampered by lack of policy and legislative instruments. This lack of direct benefit to local communities has to some extent alienated the local communities from the forest resource and subsequently led to encroachment of forestlands for the forest products, human settlement and carrying out agricultural activities leading to forest resource conflicts between the community and the forest regulators(government) (Ongugo, 2004).

This school of thought agrees with the East Mau forest conflict dynamics. While 100% of the respondents acknowledge the fact that there exist several beneficiary resources in East Mau Forest, 82% report that they hardly benefit the community. On the other hand 86% of the respondents agreed that resource benefit sharing is a serious cause of resource conflicts around East Mau forest.

The fourth objective was to assess how the level of environmental knowledge of the community adjacent to Mau forest influence forest resource conflicts in Mau forest. On average, very low levels of scientific environmental management knowledge ratings were evident in the study, recording a mean score of 20%.Respondents reported (75%) that the community uses traditional methods to conserve trees-for medicine, cultural practice-but not allowed to access certain parts of the forest or access timber,fuel-wood,scientific education activities.54% of the respondents agree that the non-scientific environmental knowledge at times conflicts with the expectation of

the forest regulators for example when certain sacred or medicinal trees are felled down upon recommendation by the regulators or are sold to the commercial loggers. This always puts the community in conflict with the regulators. Honey harvesting using fire at times is prohibited by the regulators since the fire could be dangerous to the entire forest. Further, the forest regulators always look at the indigenous methods used by the community as inferior.

However, 46% agree that indigenous environmental methodologies are good for conservation. This agrees with scholars Indigenous peoples with a historical continuity of resource-use practices often possess a broad knowledge base of the behavior of complex ecological systems in their own localities. This knowledge has accumulated through a long series of observations transmitted from generation to generation. Such "diachronic" observations can be of great value and complement the "synchronic' 'observations on which western science is based. Where indigenous peoples have depended, for long periods of time, on local environments for the provision of a variety of resources, they have developed a stake in conserving, and in some cases, enhancing the biodiversity. They are aware that biological diversity is a crucial factor in generating the ecological services and natural resources on which they depend(Nora,1999).

Some indigenous groups manipulate the local landscape to augment its heterogeneity, and some have been found to be motivated to restore biodiversity in degraded landscapes. Their practices for the conservation of biodiversity were grounded in a series of rules of thumb which are apparently arrived at through a trial and error process over a long historical time period. This implies that their knowledge base is indefinite and their implementation involves an intimate

relationship with the belief system. Such knowledge is difficult for western science to understand.

It is vital, however, that the value of the knowledge-practice-belief complex of indigenous peoples relating to conservation of biodiversity is fully recognized if ecosystems and biodiversity are to be managed sustainably. Conserving this knowledge would be most appropriately accomplished through promoting the community-based resource-management systems of indigenous peoples(Alfonse and Kreg,2000).

5.5 Conclusions

Results from the study indicate that community participation, access to forest resources, forest resource benefit sharing and the level of environmental knowledge factors influence resource conflict management among different forest users in East Mau forest. Community participation and access to forest resources results show are very significant contribution to resource conflict challenges in East Mau forest. It is an indication that the more the community is alienated or denied access to forest products they protect and within their vicinity, the more they will encroach on the resources.

Whereas stringent controls of disallowing adjacent communities to access or harvest forest products as conservation mechanism may serve, but they are not durable solutions. Infact such measures are known to attract illegal timber harvesting hence destroying the forest. Devolving decision making in forest resource management in Mau forest will enhance community participation hence reducing forest conflicts and ensure sustainable management of the forest resource.

Participatory forest management principles need to be mainstreamed in the forest conflict management. This will ensure that communities can co-own and co-manage forest resources adjacent to them and share the benefits accruing from the resources. This will reduce the un-ending forest resource conflicts.

Due to moderately significant statistical relationship between environmental knowledge and forest Resource conflict management, the discussion is not conclusive. Indigenous people are known to have a historical continuity of resource-use practices and often have a broad knowledge base of the behavior of complex ecological systems in their own localities. This knowledge has accumulated through a long series of observations transmitted from generation to generation. Such "diachronic" observations can be of great value and complement the "synchronic' 'observations on which western science is based. Where indigenous peoples have depended, for long periods of time, on local environments for the provision of a variety of resources, they have developed a stake in conserving, and in some cases, enhancing the biodiversity.

They are aware that biological diversity is a crucial factor in generating the ecological services and natural resources on which they depend. It is statistically significant to carry out more research in this area.

5.6. Recommendations

This research points to a multiplicity of factors and actors involved in the forest resource conflict management, in view of this therefore there is need to build more collaboration between this actors to build synergy in preventing and sustainably manage the Mau forest resource.

In relation to environmental knowledge, there is need for further studies to establish the link between environmental knowledge and conflict management.

There is need for further research into other factors (variables) such as the unclear tenure - regarding ownership of natural resources. Community members seem to believe that forest land is theirs and not for the government.

There is need to replicate this kind of research with other natural resources that are non-forest related.

5.6. Contribution to the body of knowledge

The findings of this research did not end the conversation on the cause factors of forest conflict challenges but only added other insights and dimensions for further research and theorizing. It is hoped that the results of the study added to improving forest resource conflict management in Mau Forest and other forests in Kenya.

The study was expected to be significant by adding to existing body of knowledge in the area of forest resource conflict management to researchers, both state and non-state actors and the local community forest users, to understand the significant role played by a participatory forestry management strategy in mitigating forest resource conflicts, by devolving forest resource management rights to the local community and other stakeholders; enhancing cooperation which contributes to poverty reduction, employment creation and improvement of livelihoods through sustainable forest resource use and management.

It is hoped that it will go a long way to inform policy formulation on managing Natural Resource Management conflicts. Future research should explore a similar strategy for other natural resources in the country not necessarily forests which the study did not undertake.

The study also introduced a new dimension of environmental knowledge and resource benefit sharing as causes of conflict that need to be further explored.

These findings also contribute to the field of Project Planning and Management in that it is now prudent for programme developers and managers to design need based programmes that have the principles of collaboration and community participation.

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APPENDIX 1: RESEARCH QUESTIONNAIRE

TITLE: FACTORS INFLUENCING RESOURCE BASED CONFLICTS AMONG FOREST USERS: A CASE OF SURURU-EAST MAU FOREST, KENYA.

Instructions

Please answer the questions to the best of your knowledge, honestly and exhaustively. All the information given will be confidential and will be used for academic purpose only.

(Please tick in the box your choice of answer and fill the blank spaces provided appropriately).

A. Bio-data (for ALL respondents).

1. Please indicate your gender

   a) Male ☐ b) Female ☐

2. What is your marital status?

   a) Married ☐ b) Single ☐ c) Widowed ☐

3. Indicate your age

   a) 15-20 years ☐ c) 26-30 years ☐ e) 36-40 years ☐

   b) 21-25 years ☐ d) 31-35 years ☐ f) over 40 years ☐

4. Indicate what you do for a daily living (work)

   ……..

5. What is your highest level of education attained?

   a) Primary school certificate ☐ Secondary school certificate ☐

   c) Diploma ☐ d) Graduate ☐

   e) Any other (please specify)……..

6. For how many years have you lived or worked around Mau Forest?

   a) Less than 1 year ☐ b) 1-5 years ☐ c) 6-10 years ☐

   d) 11-15 years ☐ e) 15-20 years ☐

SECTION B: **Forest Resource Conflicts and Community Participation in the Management of Mau Forest (**for **ALL** respondents**).**

1. In your own opinion do you think there are any resource conflicts existing in MauForest?

   a) Yes ☐ b) No ☐

   If **yes** name some of the groups or organizations involved in these conflicts.

   ……

   ……

   ……

   ……..

2. What do you think could be the causes of these conflicts in Mau forest?

   ……

   ……

   ……

   ……

3. How would you rate the extent to which the following groups/organizations participate in the management and conservation of Mau forest resources?

Groups	**a very great extent**	**a great extent**	**some extent**	**very low extent**	**not at all**
Community					
Loggers					
NGOs, CSOs					
WRUAs					
Government officials/departments					
Others					

4. In your own opinion how much would agree that community participation in the management of Mau forest influences conflict in Mau Forest?

Strongly agree	**Agree**	**Strongly disagree**	**Disagree**	**I don't know**

Section C: Accessibility to forest resources and Resource Benefit sharing

1. Does the adjacent community access the forest?

a) Yes ☐ b) No ☐

2. How accessible are the forest resources to the community adjacent to East Mau forest?

a) easily accessible b) accessible c) not easily accessible d) inaccessible

e) I don't know ☐

3.Rating with the **lowest score of 0** and the **highest score of 5**, how would you rate local community access and involvement in the following activities in Mau Forest?

Activity(user rights)	**Rating-0-5 (0-Lowest; 5-Highest)**
(a) collection of medicinal herbs (b) harvesting of honey (c) harvesting of timber or fuel wood (d) grass harvesting and grazing (e) collection of forest produce for community based industries (f) ecotourism and recreational activities (g) scientific and education activities (h) Plantation establishment through non-resident cultivation (i) contracts to assist in carrying out specified silvicultural operations (j) development of community wood and non-wood forest based industries (k) other benefits which my from time to time be agreed upon between community forest association and the Kenya Forest service	

4,To what extent do access or involvement in these activities in 3 above contribute to conflicts in East Mau forest?

a) a very great extent ☐ b) a great extent ☐ c) some extent ☐
d) a low extent ☐ e) I don't know ☐

II. Influence of forest resource benefit sharing

.1. In your own opinion are there any resource benefits available in East Mau forest that the community adjacent to the forest can benefit from?

a) Yes ☐ b) No ☐

2. If Yes in question 1 above, name some of the available resource benefits in East Mau forest……

……

…….

3. How would you rate the extent to which the community benefits from these resources benefit opportunities in East Mau forest?

a) a very great extent ☐ b) a great extent ☐ c) some extent ☐

d) a low extent ☐ e) I don't know ☐

4. Does sharing of resource benefits influence resource conflicts in East Mau forest?

a) Yes ☐ b) No ☐

Section D: **Level of environmental knowledge of the community (for government officials, NGOs, CSOs, other registered orgs)**

1. How would you rate the level of community environmental knowledge in as far as Mau forest conservation and management is concerned?

   a) very poor ☐ b) poor ☐ c) fair ☐ d) good ☐

   e) very good ☐ f)excellent ☐

2. To what extend does the community use indigenous environmental knowledge to conserve the forest.

   a) a very great extent ☐ b) a great extent ☐ c) some extent ☐

   d) a low extent ☐ e) not at all ☐ f) I don't know ☐

3. To what extent do you think indigenous environmental knowledge by the community conflict with the conservation methods of the forest regulators?

   a) a very great extent ☐ b) a great extent ☐ c) not at all ☐

   d) some extent ☐ e) a low extent ☐ f) I don't know ☐

4.. To what extent do you think the level of environmental knowledge by the community has influenced conflict management in Mau forest?

a) a very great extent ☐ b) a great extent ☐ c)some extent ☐

d) a low extent ☐ e) not at all ☐ f) I don't know ☐

End

Thank you much.

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