AN ASSESSMENT OF THE CHALLENGES AND OPPORTUNITIES OF RESTORING THE MAU NAROK FOREST AT MAU NAROK DIVISION NJORO DISTRICT, NAKURU COUNTY, KENYA.

BY

KAMAU PETER WAITHIRU

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DECLARATION

This research project is my original work and has never been presented for a degree in any other university or institution.

Kamau P. Waithiru _____ Date _____

N36/0750/2009

Approval

This research project has been submitted for examination with the approval of my university supervisor:

Dr Dekow S. Mohammed_____ Date_____

DEDICATION

This study is dedicated to my family, friends, the Senior Forester Mau Narok and my country Kenya as we look forward to a green nation.

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ABSTRACT

The Mau Forests Complex (MFC) is considered the most important of the five main watershed areas in Kenya because of its economic, social and environmental contribution to the country. The forest is under increasing threat from irregular and ill-planned settlements, encroachments and illegal forest resource exploitation.

In recent years, the Government of Kenya (GoK) has taken significant steps towards addressing the threat of rapid ecological degradation of its forest resources. A new forest policy and law were adopted in 2005. The forest law has placed significant emphasis on co-management of forest resources with local communities and the private sector and lays the foundation for the strict control of logging and human settlements. Another major step in addressing this issue was to commence restoration activities of the forests with focus set on Mau Forest. The Mau Narok forest is a part of the Mau Forest Complex where such restoration activities have taken place. The past restoration efforts at the Mau Narok Forest have not been successful evidenced by the massive dying of newly planted trees leading to duplication of reforestation efforts. There is no research study that documents the challenges and the opportunities of restoring the Mau Narok Forest. The purpose of the study was to investigate the challenges and opportunities of restoring the forest as the way to improve seedling survival rate.

This study was based in Mau Narok Division, and attempted to assess the factors that retard the restoration efforts and also came up with the opportunities that had not been seized. The study was able to unmask most of the challenges and opportunities. Among the challenges, included insufficient funds to undertake the restoration activities fully that specifically involve planting, tendering and protection exercises. In the opportunities, the local community has a great potential to participate fully in the conserving and restoring the Mau Narok Forest.

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ABBREVIATIONS

- CBO- Community Based Organization
- CFA- Community Forest Association
- FAO- Food and Agriculture Organization
- KFS- Kenya Forest Service
- NEMA- National Environment Management Authority
- NGO- Non Governmental Organization
- SoE- State of Environment

CHAPTER ONE

INTRODUCTION

1.1 Background to the Problem

The unique nature of forest ecosystems has long been acknowledged. Forest ecosystems play multiple roles at global as well as local levels: as providers of environmental services to nature in general- and humans in particular- and as sources of economically valued products. They provide ecosystem services such as river flow regulation, flood mitigation, water storage, water purification, recharge of groundwater, reduced soil erosion and siltation, protection of biodiversity, carbon sequestration, carbon reservoir and regulation of microclimate which provides favourable conditions for optimum crop production (GEO 3, 2002).

The 1972 Stockholm Conference recognized forests as the largest, most complex and self-perpetuating of all ecosystems, and emphasized the need for sound land and forest use policies, ongoing monitoring of the state of the world's forests and the introduction of forest management planning.

The historic loss of forests is closely related to demographic expansion and the conversion of forest land to other uses. Major direct causes of forest degradation brought on by humans include overharvesting of industrial wood, fuel wood and other forest products and overgrazing. Underlying causes include poverty, population growth, markets and trade in forest products and macroeconomic policies. Forests are also susceptible to natural factors such as insects, pests, diseases, fire and extreme climatic events (GEO 3, 2002).

FAO's *Global Forest Resources Assessment 2000* (FAO 2001b), using for the first time a common definition of forests as areas of at least 0.5 ha with tree crown cover of more than 10 per cent, concluded that the total area covered by forest is approximately 3866 million ha, almost one-third of the world's land area, of which 95 per cent is natural forest and 5 per cent is planted forest. At the global level, the net loss in forest area during the period 1990-2000 was an estimated 94 million ha (2.4 per cent of total forests). This was the combined effect of a deforestation rate of 14.6 million ha per year

and a rate of forest increase of 5.2 million ha per ha. According to FAO's *State of the World's Forest 2009*, the annual rate of change of forest area increased from -0.22 per cent in the period between 1990-2000 to -0.18 per cent in the period 2000-2005.

The forest situation in Africa presents enormous challenges, reflecting the larger constraints of low income, weak policies and inadequately developed institutions. The growing population and rising prices of food and energy will exacerbate the situation, especially as increased investments in infrastructure open up new areas. Progress in implementing sustainable forest management is expected to be slow, with forest loss likely to continue at current rates. Although Africa holds only 16 per cent of the global forest area, from 2000 to 2005 it lost about 4 million hectares of forests annually, close to one third of the area deforested globally (FAO 2009). Most forest loss is taking place in countries with relatively large forest area. To date, conversion to small-scale permanent agriculture has been the main contribution to forest loss, but investment in large-scale agriculture could become a major driver of deforestation in the future.

With an estimated 14.8 million hectares of planted forests (FAO, 2006b), Africa accounts for only about 5 per cent of the global total, of this 3 million hectares were planted for protection and the rest for production of wood and non-wood forest products. Average annual planting in Africa from 1990-2005 was estimated at about 70000 ha, less than 2 per cent of the global planting rate (FAO 2009).

Kenya is considered to be a low forest country with a forest cover of 1.7 per cent which is significantly lower than the internationally accepted threshold of 10 per cent. The decrease in forest cover is primarily due to encroachment, expansion of human settlements into previously forested areas, illegal logging, forest fires, agriculture and government excisions (NEMA 2009a). However, efforts to enhance the protection of forest biodiversity through the gazettement of an additional 19 000 ha of national forest and increased tree seed production are underway. Indeed, between 2005 and 2010, the Kenya Forestry Research Institute (KEFRI) increased tree seed production by 25 percent although owing to a range of intervening factors, the effect of seed production in increasing forest cover has not yet been established (MNDV 2010). The forest area of

Kenya was recorded to be 3,496,000 ha and 3,456,000 ha representing 5.9% of Kenya's total area.

The Mau Forest Complex comprises 22 separate blocks and is the largest of the country's five water towers with a total forest cover of 403 775 ha. It feeds a range of the country's major water arteries that extend as far as Lakes Turkana, Natron and Victoria and supports critical economic activities including hydropower generation, tourism and agriculture. In spite of its national importance, many portions of the Mau Forest Complex have been deforested or degraded. Much of this damage has taken place in the past few decades. Excision of forest reserves and continuous widespread encroachment have led to the destruction of over 100 000 ha of forest since 2000, representing roughly one-quarter of the Mau Complex area (UNEP 2009a).

In 2001, a 61 023 ha parcel of the Mau Forest Complex was excised. This included over half of the Eastern Mau Forest Reserve, one quarter of South West Mau Forest Reserve as well as the Molo Forest Reserve. The eastern slopes of the Maasai Mau are a crucial catchment for the Ewaso Ng'iro River while the western slopes help to recharge the Mara River. Forest loss in critical catchment areas of the Sondu, Mara, Molo, Naishi, Makalia, Nderit, and Njoro Rivers may result in ecological and hydrological changes which threaten the sustainable future of the downstream areas. In addition, people have encroached onto 43 700 ha of the Mau Forest Complex's remaining protected forests (Kenya SOE 2010).

The situation is not all gloomy as the Mau complex witnessed a number of positive developments between 2005 and 2007. First, only 63.06 ha of the entire Mau Complex were cleared. Second, 5 970 ha of the forest complex showed signs of regeneration. Third, a public-private sector partnership under the auspices of the 'Save the Mau Trust' has stepped up efforts to rehabilitate the degraded portions of the forest. The progress made in reclaiming the forest is captured in reports by an Inter-Ministerial Conservation Secretariat in the Prime Minister's office. Four phases of the rehabilitation programme have so far been completed and the initiative is currently in its fifth phase (KFWG personal communication).

1.2Statement of the Problem

The Mau Forests Complex (MFC) is considered the most important of the five main watershed areas in Kenya because of its economic, social and environmental contribution to the country. The importance of the Mau is related to the ecosystem services it provides, such as river flow regulation, flood mitigation, water storage, water purification, recharge of groundwater, reduced soil erosion and siltation, protection of biodiversity, carbon sequestration, carbon reservoir and regulation of microclimate which provides favorable conditions for optimum crop production. Nevertheless, these benefits have continued to fade away despite the Government of Kenya astounding efforts to restore and protect the country's most valuable asset. The past restoration efforts at the Mau Narok Forest have not been successful evidenced by the massive dying of newly planted trees leading to duplication of reforestation efforts. There is no research study that documents the challenges and the opportunities of restoring the Mau Narok Forest. The purpose of the study was to investigate the challenges and opportunities of restoring the forest as the way to improve seedling survival rate.

1.3 Research Questions

The study attempted to answer the following research questions:

a) What is the current status of the Mau Narok Forest?
b) What are the prior restoration efforts and to what extent has the adjacent communities been involved in the restoration activities?
c) What is the underlying factors hampering successful restoration?
d) What opportunities are there for successful restoration of the forest?

1.4 Research Objective

The study attempted to meet the following objectives:

a) To assess the current status of the Mau Narok Forest.
b) To assess the prior restoration efforts on the Mau Narok Forest.
c) To determine the challenges and opportunities in the restoration activities of the Mau Narok Forest.
d) To come up with ways to successfully restore the Mau Narok forest.

1.5 Research Premises

The study was guided by the following premises:

i. Mau Narok Forest Block is characterized with problems.
ii. Prior restoration efforts have not been successful.
iii. There is low level of community participation in the restoration activities.
iv. Successful restoration requires adequate planning and monitoring strategies.

1.6 Justification of Study

The Mau Narok Forest Block serves as the catchment area of the Njoro, Nderit, Makalia and Naishi Rivers that feed Lake Nakuru. The loss in the tree cover in the forest has transformed these rivers to being seasonal. The degradation of the forest has diminished other benefits of the ecosystem to the surrounding communities. The current status of the Mau Narok Forest Block depicts high rates of failure in the restoration activities evidenced by the death of most newly planted trees. There has been duplication of efforts by both the government and the NGOs in reforestation exercises in the area annually.

The critical roles the Mau Narok Forest block play are vital. One of the major objectives of the Vision 2030 with a forest focus is the conserving and rehabilitating the remaining natural forest and woodlands for environmental protection and biodiversity conservation. Consequently, an auspicious restoration is required and factors that have led to failure of past restoration efforts should be unearthed and addressed vehemently.

1.7 Significance of Study

The study involved the following stakeholders: local communities, the local authority, Kenya Forest Service, CBOs, CFAs, NGOs and the youth groups in the Mau Narok location. The study examined the underlying causes hindering the restoration efforts of the Mau Narok Forest Block and the role of active community participation in the whole process of revamping the forest. In addition, the study came up with measures to improve the existing conservation and rehabilitation strategies of the Mau Narok Forest Block. The study affirmed the need for more community and other local stakeholders' participation; to empower the communities and other groups through training and capacity building.

The findings of this study could be used not only in the Mau Narok Forest restoration but also in the rehabilitation of other dilapidated forest ecosystems nationally in order to actualize Vision 2030 and attain the world threshold of forest cover of 10%.

1.8 Scope of the Study

The study was based at Mau Narok division, Njoro district in Nakuru County. The study focused on the restoration of the Mau Narok Forest Block. The variables to be measured and determined were: The current status of the Mau Narok Forest Block; Prevailing rates of deforestation; Existing forest conservation measures; Number of trees planted in the prior restoration efforts; Extent of community participation and The climatic conditions and seasons.

1.9 Operational Terms

- Forest - Areas of at least 0.5 ha with tree crown cover of more than 10 per cent.
- Deforestation- The conversion of forest area to other uses that involves change and destruction of the forest ecosystem including cutting of trees and clearing of other forest cover.
- Restoration - The attempts to return a dilapidated forest to the original and ameliorated state.
- Reforestation- The planting of trees in areas where deforestation has occurred.
- Participation- The active involvement of a broad mass of people in the choice, execution and evaluation of programmes designed to bring about significant upward movement in their levels of living.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

FAO (2001) defines deforestation as the conversion of forests to another land use.

The term "degradation" means a loss of forest structure, productivity and native species diversity. A degraded site may still contain trees (that is, a degraded site is not necessarily deforested) but it will have lost its former ecological integrity. The Food and Agriculture Organization of the United Nations (FAO) has defined forest degradation as changes within a forest that affect the structure and function of the stand or site and thereby lower its capacity to supply products or services.

Widespread deforestation and declining condition of the world's forests has resulted in environmentally, economically and aesthetically impoverished landscapes. To some extent the effects of deforestation and loss in forest quality have been offset through natural regeneration of forest and the establishment of plantations. However, much of the regenerated forest consists of a few species designed to yield one or two products rather than seeking to produce a broader range of forest goods and services that will also contribute to the well-being of local communities.

Conventional approaches to plantation forestry are seldom capable of delivering the multiple values of forests and adequately addressing the needs of all interest groups (e.g. forest-dependent communities and downstream water users). Indeed, such schemes can result in a reduction in the range, quality and volume of forest goods and services, social and economic dislocations and an increased vulnerability to climate change and other natural perturbations. There is an urgent need to both improve the quality of forest restoration and rehabilitation at the site level and to find effective ways to undertake these activities in the context of broader environmental, social and economic needs and interests (Lamb and Gilmour 2003).

Large areas of the world's forests have been lost or degraded and landscapes everywhere are being simplified by current land-use practices (Dobson, Bradshaw and Baker 1997). In many tropical countries increasing areas of forest or woodland are cleared for

agricultural use. The same is true in some temperate countries although, for the most part, land-use patterns there have stabilized over the last century. In many temperate countries, however, agricultural practices are intensifying. Small family-owned farms are being replaced by larger industrial operations owned by corporations, and forest remnants and hedgerows are being removed to allow for larger-scale operations (FAO 2001).

This chapter will review causes and effects of forest loss and degradation, forest restoration measures, community participation in forestry activities and forest conservation and protection policy frameworks.

2.2 Forest Degradation and Deforestation

2.2.1 Causes of Deforestation

a) Persistently high demand for wood

High demand for wood is a prominent and persistent driver of deforestation. International demand is primarily generated by over-consuming industrialized countries, but domestic demand can also be high, especially in those countries where wood is the most easily accessed resource. Wood is typically used for house-building, furniture construction, fuel and paper. Yet there is scant evidence of national or international policies designed to address and lessen demand for timber as a means of reducing deforestation. (GFC 2010)

Increasing demand was specifically cited as an underlying cause of deforestation by the workshops in Bangladesh, Cameroon, Ecuador, Papua New Guinea, and the Philippines. El Salvador, for example pointed to the sale of timber to sawmills, and Nepal noted an increased number of furniture factories. Nepal and Kenya both listed the use of timber for house-building as a key issue. The need for timber for construction is one of the factors underlying deforestation in the Eastern Mau forest. The biggest logging companies in Kenya, Timsales and Comply, are based in the towns of Elburgon and Nakuru respectively, on the edges of the forest. Logging is the main economic activity in Elburgon and employs about 30,000 people. The big companies collect timber for export, while hundreds of small-scale loggers supply the local market in Nakuru, Molo, Elburgon and other neighboring towns (GFC 2010).

b) Spiraling demand for land for plantations and other forms of agriculture

Agriculture is estimated to be the proximate driver for around 80% of deforestation worldwide. Commercial agriculture is the most important driver of deforestation in Latin America (around 2/3 of total deforested area). In Africa and sub-tropical Asia it accounts for around

1/3 of deforestation and is of similar importance to subsistence agriculture (Gabrielle, Martin and Veronique 2012). Conversion of forest to agriculture, primarily to produce food for export to industrialized countries, also continues apace in many countries around the world, with devastating impacts. Crops traded in large volumes, such as soya (which is used in foods, as animal feed, and now to produce biodiesel to fuel vehicles) require more and more land for cultivation, leading to the destruction of large tracts of forest in places such as the Amazon. Less well known instances that were also reported include the ginger cash crop in the Chittagong Hill Tracts; and the production of coca (used in cosmetics and food as well as to produce cocaine) in Colombia (GFC 2010).

c) Industrialization, urbanization and infrastructure

Industrialization, urbanization and the spread of infrastructure have collectively been identified as principal drivers of deforestation by most forest conservation workshops. Whilst the development of impoverished economies is clearly critical, there seems to be very little evidence of any shift towards forest-friendly economic development, despite requests and demands from impacted communities, peoples and civil society organizations. The industrial sectors most clearly identified as a direct threat to forests were mining, oil and gas, especially in Bangladesh, Cameroon, Colombia, India, Papua New Guinea and the Philippines. Infrastructure, including the building of roads, housing, dams and other large-scale construction is another principal reason for forests being cleared. Urbanization which involves growth and expansion of urban centres, is a major cause of forest loss. Elburgon and Molo towns are exerting pressure on the East Mau and Molo forests. Towns are growing rapidly in part because of the rural-urban migration rate in Kenya, which is one of the highest in Africa. As soon as a person finishes secondary school, he or she moves to the urban centers because of the perception that it is only in urban centers that careers can be advanced. (GFC 2010)

d) Encroachment and illegal logging

On average, 5 000 ha of forest cover are lost every year in Kenya through illegal logging, encroachment, excision for settlement of people and cultivation. In 2001, the excision of 67 000 ha of forest was justified as needed to settle landless Kenyans and those internally displaced by political turmoil. This excision however resulted in a major disruption of the functions of Kenya's water towers. Illegal timber harvesting is also rampant since the logging ban is not adequately enforced, highlighting the need to raise the capacity of KFS to do so. (SoE 2010)

e) Vulnerability to climate change, pests and diseases and fires

Forests and woodlands are particularly vulnerable to climate change. This is because the impacts of climate change and variability lead to changes in land cover and land use, increase the incidence of pests, diseases and fire outbreaks and foment loss of livelihoods. Monoculture forest plantations are especially prone to pest attacks and an exotic pest known as blue gum chalcid is currently threatening eucalyptus trees in Kenya. First reported in western Kenya in

2002, it has now spread to most parts of the country. This pest is native to Australia and research to develop integrated management approaches (including biological measures) that can bring it under control is underway.

An estimated 3 000 ha of state forests are lost to fires annually in Kenya. These fires are either spread accidentally from neighbouring private farms or are started deliberately as an act of sabotage. It is therefore recommended that a participatory approach to formulating and implementing forest policies and projects is adopted in order to ensure local community support.

2.2.2 Effects of Forest Degradation and Deforestation

Agricultural expansion and intensification have decreased the overall area of forest and woodland, simplified the structure of the remaining forests and broken up forest areas into smaller and more isolated fragments. The consequences of these changes, seen both on-site and off-site, include the following:

- On-site reductions in landscape productivity because of increasing losses of nutrients and soil;

- Downstream impacts, such as reductions in water quality through increased sedimentation and changes in water yield; and
- Widespread reductions in biodiversity and the supply of various ecological goods and services.

Such changes and others likely to occur in the near future, are described by Vitousek et al. (1997) and Tilman et al. (2001). In some cases the effects of a loss of forest cover (e.g. erosion) are almost immediate. Other changes (e.g. salinization, biodiversity loss) take a long time to become evident. The cumulative effects of the release of carbon once sequestered in biomass and soil organic matter are likely to contribute to long-term changes in the global climate. These biophysical changes have both social and economic impacts, with the most immediate effects being felt by communities that depend on forests for part or their entire livelihood. Forest resources provide food, medicines and firewood, resources that now have to be obtained from more distant forests. And as forest areas are reduced pressure on the remaining forests increases even more.

2.3 Forest Rehabilitation and Restoration

The responses to deforestation and to the rapid increase in the area of degraded lands are usually inadequate. Reforestation has been carried out at a fraction of the deforestation rate and the new forests provide only some of the goods and services provided by the original forests. Most new forests, for example, are established simply to provide industrial timber; they benefit governments or large corporations rather than local communities. Many reforestation schemes do offer some functional benefits, such as watershed protection, but their simple composition and structure mean that they rarely contribute significantly to biodiversity conservation. Further, new forests are not always located in places with the largest areas of degraded land (Lamb and Gilmour 2003).

2.3.1 Reasons to undertake Restoration

There are several reasons to undertake forest landscape restoration. One is to provide the goods and help re-establish those ecological services or functions no longer being provided by the new forms of land-use. Industrial monoculture plantations produce wood but do not provide a variety of timbers or the forest products such as fruits, nuts or medicinal plants used by many rural communities. Plantations may be effective in

sequestering carbon or helping restore hydrological cycles to overcome salinity, but they are not always as effective in preventing erosion on the slopes of hills above agricultural areas, protecting riparian strips or restoring soil fertility. (Lamb and Gilmour 2003)

A second reason for undertaking forest landscape restoration is to restore some degree of biodiversity to degraded landscapes (Elliott et al. 2000). It is unlikely that any network of protected areas will be able to protect all existing biodiversity. Such reserves represent a small proportion of most landscapes and in many countries there is limited capacity to increase the number or size of them. Meanwhile the remaining undisturbed areas outside these reserves are being increasingly fragmented and homogenized as large-scale agriculture and industrial timber plantations spread across the landscape. Restoration offers a means of counteracting these trends towards landscape simplification. It can also ensure that species and ecosystems -across a large area-are more resilient and adaptable to change.

At a regional scale, forest landscape restoration is often likely to be needed to achieve more sustainable forms of land use. Many large areas of land became degraded because previous agricultural practices were unsustainable. Production was lost as fertility declined, salinity developed or weeds, diseases or pests became established. New agricultural systems are needed to replace these unproductive areas; more diverse landscapes are likely to be a necessary component of such systems (Hobbs and Morton 1999, Lefroy et al. 1999).

Forest landscape restoration incorporates both biophysical and socioeconomic values; that is, ecosystem restoration as well as the changes in human well-being associated with it. It is important to consider the social and economic impacts of forest restoration initiatives, particularly the effects on people living in or near the restored forest area.

A substantial amount of reforestation has taken place with the intent of overcoming deforestation or land degradation. Much of this effort involved fast-growing exotic tree species, planted, in many cases, after clearing shrub lands or secondary regrowth. These reforestation efforts may have brought some benefits but often the improvements in wellbeing have not been as great as expected. New plantations were often established solely for industrial timber users and provided few of the goods traditionally used by communities; where new plantations replaced regrowth or secondary forests a large

number of traditional resources disappeared. Forest landscape restoration differs in that it seeks to bring greater social and economic benefits to local communities.

2.3.2 Restoration Constraints

Restoration is a difficult undertaking, both in principle and in practice. There is some question as to whether it is even possible. The definition of restoration implies that the identity and population sizes of the plants and animals once present at a particular site are known. This is rarely the case. In many situations the best that can be done is to infer the nature of the original ecosystem from previous descriptions or remnants of communities. The definition also implies that these communities were static and would have remained unchanged over time. But this, too, is unlikely to be the case. Many communities undergo successional change, often over a period of time involving hundreds of years. Even mature ecosystems commonly exist in a state of dynamic equilibrium; changes occur in their composition, even in the absence of degradation. These difficulties mean that restoration can be both an uncertain goal and a shifting target.

Restoration can also be difficult for other reasons. Our knowledge of ecological processes is imperfect and our capacity to predict, let alone direct, ecological successions is limited. In many cases chance events such as weather or the timing of flowering or seeding have a major effect on the way successions develop. This means it might be difficult to achieve a particular outcome even if the target could be ascertained. Further, the large numbers of plant and animal species present in many communities mean that the ecology of species is poorly known. This makes it difficult to assist or encourage them to re-enter a degraded site.

The target might also become unattainable because some of the original species have become extinct. Exotic species may have become naturalized after a long period of human intervention.

Such is likely to be the case, for example, with the ecosystems of Europe and the Mediterranean basin or in China. In these cases simply fostering species-rich communities might be a more appropriate goal. In other situations the extent of topsoil loss, site exposure or salinity levels may be so great that restoration would be too expensive even if the technical means were available.

Social constraints may also apply. Traditional owners or users of degraded lands may be unwilling to agree to restoration because it is not a goal they share or because they believe that it will lessen their rights to future use. In such cases intervention from outside persons or organizations is unlikely to succeed. These problems mean that attempts to "ecologically restore" forests may at times be unrealistic. It may be more appropriate to aim at more modest goals, such as recreating a forest with large species diversity and a structure and function similar, but not necessarily identical, to that originally present.

2.4 Community participation in forestry activities

Community participation the active involvement of a broad mass of people in the choice, execution and evaluation of programmes designed to bring about significant upward movement in their levels of living. There are many ways for people to participate in decisions about the use of natural resources. There are extreme approaches, such as going to war, or to court and various passive and active approaches provided in specific decision-making. (Arstein 1969)

While focussing on the processes and practical aspects of promoting participatory natural resource management, Ingles *et al.* (1999), came up with four types of programmes concerned with natural resources management, based on the type of participatory approach predominantly used for making decisions about management interventions:

1. **Top-down intervention**: This intervention is based on informing and persuading. It is characterized by a composition of a small set of powerful stakeholders such as governments, international donor projects or private enterprise, which forms the main decision-making team. Decisions are made according to their own agendas, knowledge and value systems. There is little or no participation from other stakeholders hence planning is top-down.

2. **Modified top-down interventions**: The main mode of interaction is through consultation. This approach has characteristics of top-down intervention, except that there is an attempt to obtain information from other stakeholders about their

interests and knowledge before decisions are taken. There is some participation as a result of this information gathering, but planning is still top-down.

3. **Participatory intervention**: The main mode of interaction is that of sharing decision-making. A programme is designed and owned by a small set of powerful stakeholders, but is implemented by a small bottom-up planning. Stakeholder groups are engaged in assessments and joint decisions are taken about programme activities at specific locations. These activities are co-managed by the programme and beneficiaries and they are evaluated jointly.
4. **Catalytic agents**: Interaction is based on catalysis of group discussions. Here the programme is designed and owned by local stakeholders with help from outside facilitators. The interests and judgements of local stakeholders are given primacy in decision-making and management of activities shift rapidly to local institutions.

2.5 Forest conservation and protection policy framework in Kenya

Forest conservation activities in Kenya are guided by established local policies. In summary, these include:

1. **The Forest Act 2005**

For many years, forest legislation and practise in Kenya has been criticized for failing to protect the countrys indigenous forests or to ensure sustainable use of plantations and other areas of forest and woodland (World Bank 2007). Prior to the enactment of the 2005 Forests Act, most forest-adjacent communities were alienated by exclusion from forest management. The 2005 Forests Act was a timely piece of legislation that instituted the necessary legal mechanisms to comprehensively address the challenge of sustainable forest management. The law contains many innovative provisions to correct previous shortcomings and creates an enabling environment for developing the institutional capacity of the relevant agencies. It also promotes community participation in forest management and benefits sharing, nurtures transparency and accountability and encourages the formation of public-private partnerships. In addition, it takes cognizance of the role of farm forestry and dry land forests.

2. Vision 2030

In 2007, GoK launched its vision for national development over the next 30 years. The plan, 'Vision 2030', is implemented through five-year rolling plans starting in 2008. The current five-year plan sets out environmental objectives with a forest focus:

a) Increasing forest, tree cover and wood production especially at farm level;
b) Conserving and rehabilitating the remaining natural forest and woodlands for environmental protection and biodiversity conservation;
c) Enhancing participatory forest management; and,
d) Ensuring that the forestry sector makes a contribution to poverty reduction.

CHAPTER THREE

AREA OF STUDY

3.1 Introduction

Mau Narok Division is found in Njoro District, Nakuru County, on Eastern slopes of the Mau Forest Complex. It is a moderately rural area with small trade centres namely Mau Narok, Likia, Mathangauta, Mwisho Wa Lami and Tipis.

3.2 Physical set-up

3.2.1 Location and extent

Mau Narok Division is found at Latitude -0.6000°, Longitude. 36.0000°. It covers an area of 159.30 square km, with Mau Forest bordering it from all directions at the edges of the privately owned lands. This makes it easier for the local people to access the forest.

3.2.2 Topography and drainage

The drainage system in Mau Narok Division is composed mainly of two rivers namely Nderit and Makalia whose source is the Mau Narok Forest and they drain into Lake Nakuru. There are also a number of natural and artificial dams.

The major topographic feature is the Mau Escarpment with a relatively sloppy terrain covered by volcanic rocks, lacustrine and fluratile deposits. The area is between 1700m to 2400m above the sea level. The terrain favours forestry activities.

3.2.3 Geology and soils

Mau Narok area has both Latosolic soils and Planosolic soils. Latosolic soils are well drained red soils derived from volcanic and basement complex rocks. The fertility of these soils is moderately high supporting growth of crops including wheat, maize, pyrethrum, sunflower, finger millet, potatoes, vegetables, beans and peas. The Planosolic soils are poorly drained dark brown clays with highly developed textured top soil.

These soils make Mau Narok a high potential land in the district explain why there is forest encroachment so as to create more fertile land for agriculture.

3.2.4 Climate

The area receives an average rainfall of 1270mm annually with very little rainfall received in the months of December, January and February. The wet months are March, April and May when there are the long rains and when most crops are grown. The short rains occur from August, September and October.

The average temperature of Mau Narok is 20°C / 68°F with December to March being the hottest months and July being the coldest. The strength and direction is 4.6km/h east.

3.3 Ecological set-up

3.3.1 Agro-Ecological Zones

Mau Narok division is found within Zone II (Sub Humid) with a high potential for production. The main grasses are Pennisetum clandistenum (Kikuyu grass), Themeda triandra (Red oats), Andropogon Chrysostachyus, Andropogon pralonsia, Exotheca abysinica, Digiteria scalaram, Eragrostis lascantha, Seteria sphacelata, Pennisetum catabasis and Sporobolus filipes. The legumes include Trifolium johnstoni, Medicago sativa (Alfalfa or Lucerne), Sesbania sesban and Leuceana leucusephala.

This ecological zone favours both farm agriculture and forest growth.

3.3.2 Vegetation

The main vegetation cover is forest ecosystem though much of it was cleared for agricultural use. The ensuing grassland was predominantly kikuyu grass (*Pennisetum clandestinum*) and themeda grass (*Themeda triandra*) in natural association with legume clovers such as Kenya purple clover (*Trifolium burchellianum*), Kenya white clover (*T. semipilosum*) and Louisiana white clover (*T. repens*). Grassland research for high altitude areas focused on exotic species from temperate countries. While cocksfoot (*Dactylis glomerata*), rye grass (*Lolium perenne*), tall fescue (*Festuca arundinaceae*), and clovers have been shown to be promising, they are all short-lived and kikuyu grass usually supersedes them within two to three years after establishment. Other fodder crops used include oats (*Avena sativa*), kales (*Brassicas*), fodder beets and turnips.

3.4 Economic Set-up

3.4.1 Agriculture

Agricultural activities are mostly the source of income of the residents of Mau Narok Division. The main agricultural activities include farming of crops, horticulture, bee-keeping and rearing of livestock. The area is known to be a major producer of crops such as potatoes, cabbages, peas and cereals. The Mau Narok Forest modifies the micro-climate of the division providing a favorable climate to support most of these agricultural activities and also provides materials to build farm structures.

3.4.2 Forestry and Agroforestry

There various forest plantation in Mau Narok, some government-owned and others privately-owned. There are also tree nurseries established at some places by the community. The tree seedlings from theses nurseries are at times acquired for restoration activities of th Mau Narok Forest.

3.4.3 Fishing

Fishing is a minor activity in the division usually in small fish ponds. The fish ponds are mostly located on the banks of the Nderit and Makalia Rivers, which their source is the Mau Narok Forest.

3.4.5 Quarrying

There are various quarrying sites which are located in the Mau Narok Forest. The quarries produce building stones, murram and ballast. There is also mining of sand.

3.4.6 Commerce, Trade and Industry

Mau Narok division has trading centres located at Likia, Mathangauta, Mau Narok, Gatimu, Meta and Mwisho Wa Lami. The trading centres are dominated by retail and wholesale shops. These trading centres are involved in sale of forest products such as fuel wood, charcoal and poles.

3.4.7 Tourism

The rivers flowing from the Mau Complex are the lifeline for major tourism destination areas including: Maasai Mara National Reserve and Lake Nakuru National Park. The Rivers Nderit and Makalia all drain into Lake Nakuru and get their waters from the Mau Narok forest. However, recently the lake has been shrinking due to the reduced in flow of water from these rivers attributed to the reduce forest cover in the Mau Narok forest.

3.5 Demographic Set-up

The total population size of Mau Narok Division is 35,429 persons. The population is distributed unevenly with a large number of the population living in the urban centres and the slums. The area has a low population density of 222 persons per square kilometer. About 90% of the population live within 0-5 Km range to the forest and use the forest directly and indirectly.

CHAPTER FOUR

RESEARCH DESIGN AND METHODOLOGY

4.1 Introduction

According to Turato (2000) methodology is the systematic study of methods that are, can be, or have been applied within a discipline. Therefore it describes the methods and procedures likely to be used during a study, most significant in achieving the set research objectives and goals as per the requirement of the study.

The research design and methodology outlines the framework through which relevant data shall be collected and analyzed. Items of discussion include nature and sources of data, sampling methods, methods of data collection and methods of data analysis and presentation.

4.2 Nature and sources of data

The data collected is aimed at addressing the objectives of the study. The study used both qualitative and quantitative data. These in particular include assessing the various problems that characterize Mau Narok forest, assessing the nature and extent of community involvement in the restoration of the Mau Narok forest, examining past restoration activities and the extent of success. The data generated was used to develop a strategy for a successful Mau Narok forest restoration.

The study involved both primary and secondary sources of data.

4.2.1 Primary sources of data

Primary data includes first-hand information sourced from the opinions and views of the residents of the location and resource persons in the district. Sources were:

i. Interviews

Interview schedules, as well as oral interviews with the resource persons were undertaken with the resource persons including District Forest Officer, District environmental Officer, Mau Forest Officer-in-charge (Forester), District Development Officer and officials of relevant NGOs and local community groups.

ii. Surveys

Surveys were facilitated by use of household questionnaires to answer the research questions. This process generated a lot of data because of its efficiency.

iii. Observations

Observations were made on various activities in and adjacent to the forest including uses of the forest, conservation initiatives, socio-economic activities and community involvement such activities. These data was collected using photographs and sketches.

4.2.2 Secondary sources of data

Secondary sources of data were collected from published information. This included recorded and archived information mainly through the literature publishes, magazines, journals, state of the environment reports, Forest Act 2005, the New Constitution of Kenya and Njoro District Development Plan. These data resources were obtained from government offices, libraries, NGOs and online sources.

4.3 Population Description

The total population in the Mau Narok County Ward Assembly is 35, 429 spread across an area of 159.30 Sq Km according to the IEBC statistics. The study targeted the households adjacent to Mau Narok Forest, government agencies, NGOs, CFAs and CBOs.

The unit of analysis consists of households, groups of individuals, organizations with formal structures and environmental entities and attributes.

4.4 Sampling procedure

4.4.1 Simple random sampling

Mau Narok division has a low population density of 222 persons per square kilometer in the district. The population is also evenly distributed all over the division, practicing mainly small-scale subsistence farming and livestock rearing. Due to this settlement pattern, a simple random sampling technique was used in selecting households where data was collected.

Simple random sampling technique was used to sample a total of 30 households that represented the whole population.

4.4.2 Purposive sampling

The purposive sampling was used to sample the resource persons to collect data from. Knowledgeable people on the research topic were deliberately selected for purposes of research. This included government officials, groups' officials and elderly men and women.

4.5 Methods of data collection

Data was collected through the following methods:

a) Reviewing of the existing literature and other published materials such as reports and Njoro District development plan.
b) Survey and information collected in writing, taking photographs and drawing of sketches.
c) Discussion and interviews with heads of government institutions, NGOs, social and community leaders.
d) Questionnaire administered on a sample of 30 households and business men in the area of study.

4.6 Data analysis and presentation

Data was be analyzed and presented using bar charts, pie charts, tables and line graphs and any other method which will be found necessary. The unit of analysis was households.

4.7 Contraints to data collection

A number of challenges were experienced during data collection. These are:

a) Financial constraints- Inadequate funds hampered acquiring some data together with the high printing expenses.

b) Physical inaccessibility of some forest areas made it impossible to visit to those areas and collect vital data.

c) Lack of maps including the area of study and the forest maps.

d) Technological constraints. The personal computer that had the data crashed and lost all of the original data.

CHAPTER FIVE

DATA ANALYSIS AND DISCUSSION

5.1 Introduction

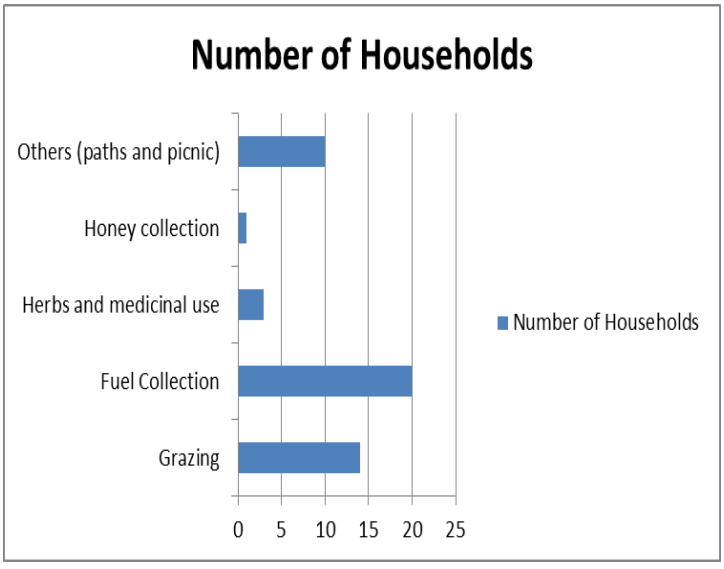
The overall goal of the study was find out the challenges and opportunities of restoring the Mau Narok forest and coming up with a way forward. The study was carried out at Mau Narok Division and also a visit to some institutions in the Njoro District. Data was collected and compiled through the procedures outlined in chapter three. This chapter analyses the data collected and the inferences made. Analysis and discussions are presented according to the objectives.

5.2 The Status of the Mau Narok Forest

The study found out that the acreage of the Mau Narok is approximately 13000Ha according to the interview held with the Senior Forester, under the Kenya Forest Service. According to the Kenya Forest Service the forest area under restoration is 1000Ha, degraded area is 3000Ha, and bamboo forest covers 2000Ha while the other 7000Ha is under natural regeneration.

Most of the household questionnaire respondents, 27 out of 30, live within 0-5 Km to the forest and have lived in the area for over 5 years with few above 20 years. The household survey also found out that 26 households used the forest either directly.

Figure 5.1 Community Use of the Forest



The figure 5.1 above shows the range of uses that the local community put the forest to. Most of the residents use the forest as the source of domestic fuel and sites to graze their livestock. However there a few residents whom use the forest as a source of honey and herbs for medicinal use and a few percentage use the spectacular forest vicinities as picnic sites. The Mau Narok forest is therefore a vital and integral resource for the residents of Mau Narok.

Plate 5.1 Grazing in Mau Narok forest

Plate 5.1 above shows grazing activities taking place in the Mau Narok Forest.

The household survey also suggested a number of changes observed in the Mau Narok Forest. According to the respondents, all of the 30 households observed a massive reduction of forest cover; 12 households had observed decreased number of wild animals such as the hyenas, gazelles and baboons. 3 respondents attributed the unprecedented rains and flooding to the deforestation of the Mau Narok forest.

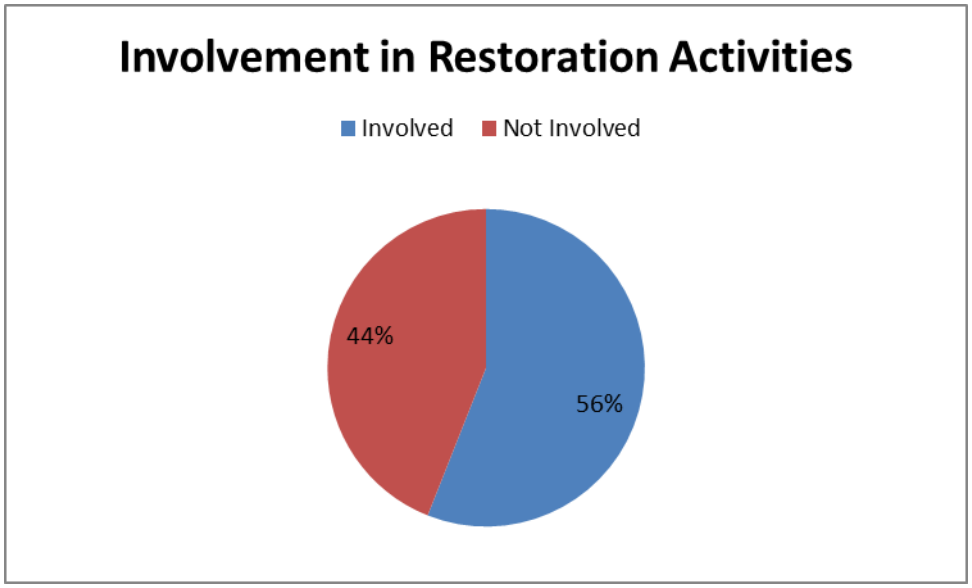
5.3 Assessment of The Prior Restoration Activities

The second objective of the study was to assess the previous and current restoration activities. The assessment was done by administering household questionnaires and interviews to the relevant authority.

Plate 5.2 Part of Mau Narok Forest Restored (Source: Field Data)

According to the household survey carried out, 25 households out of 30 households were aware of the on-going restoration efforts with 14 households only being actively involved in the restoration activities. The main activities they were involved in are planting and tendering of the new trees, recording a total of 14 households. There also 3 households whom were involved in protection of the newly planted trees also known as the “Scouts”.

Figure 5.2 Community Involvement in Restoration Activities (Source: Field data)



According to Figure 5.2 above, the percentage of active participation in restoration activities is 56% compared to 44% not being involved. This shows a large number of the households that were aware of the Mau Narok Forest restoration were involved in the reforestation activities. The senior forester denotes that those involved, are actively and fully involved in the restoration activities.

Plate 5.3 Community Participation in Restoration Activities (Source: Field Data)

The households' survey also notes that the participation is not enough, with all the 30 households agreeing to this fact. They also gave the following suggestions to increase and improve participation:

- Creation of public awareness about the restoration activities through public campaigns and public forums.
- Encourage formation of community groups and joining the Community Forest Association.
- Increase incentives such as labor wages so as to attract more people to the exercise.

The suggestions above mainly are based on the two approaches of community participation in the management of natural resources. These are participatory intervention and catalytic agents.

According to the Kenya Forest Service, so far one million trees have been planted with an estimated 65% survival rate. The duration of planting trees is usually determined by the funding agency and the wet seasons. They are therefore planted during April to May

during the long rains and November to December during the short rains. The main tree species planted are:

Figure 5.3 Main tree species planted in the Mau Narok Forest (Source: Field Data)

	Botanical Name/ English name	**Local Name**
1.	Dombeya goetzenail	Mukeu
2.	Cupressus lustinica/ Kenya Cedar	Muthithinda
3.	Prunus Africana/ Red Stink Wood	Muiri
4.	Olea Africana/ African Cold Owe	Mutamaiyu
5.	Juniperus Procera/ African Cedar	Mutarakwa
6.	Ekerbergia Capnesis	Mununga
7.	Hagaenia Abbysinica/ Rosewood	Mukorobothi
8.	Podocarpus Falcatus/ Pondo	Mubondo

Figure 5.3 above shows the mostly planted trees during the restoration exercises at the Mau Narok Forest. However, the species that thrive well with high survival rate include the Prunus Africana/ Red Stink Wood, Ekerbergia Capnesis, Cupressus lustinica/ Cedar and the Olea Africana/ African Cold Owe. For example, a great number of Ekerbergia Capnesis trees near Gatimu have grown to mature trees (See in Plates 5.4 and 5.5 below) . Others like the Juniperus Procera/ African Cedar take a long time to mature. According to the Kenya Forest Service, the Prunus Africana/ Red Stink Wood are one of the most endangered tree species and it should therefore be take care of.

Plate 5.4 Ekerbergia Capnesis(Mununga) trees (Source: Field Data)

Plate 5.5 Mature Ekerbergia Capnesis (Source: Field Data)

The funding agencies according to the KFS include:

a) KFS- Major source

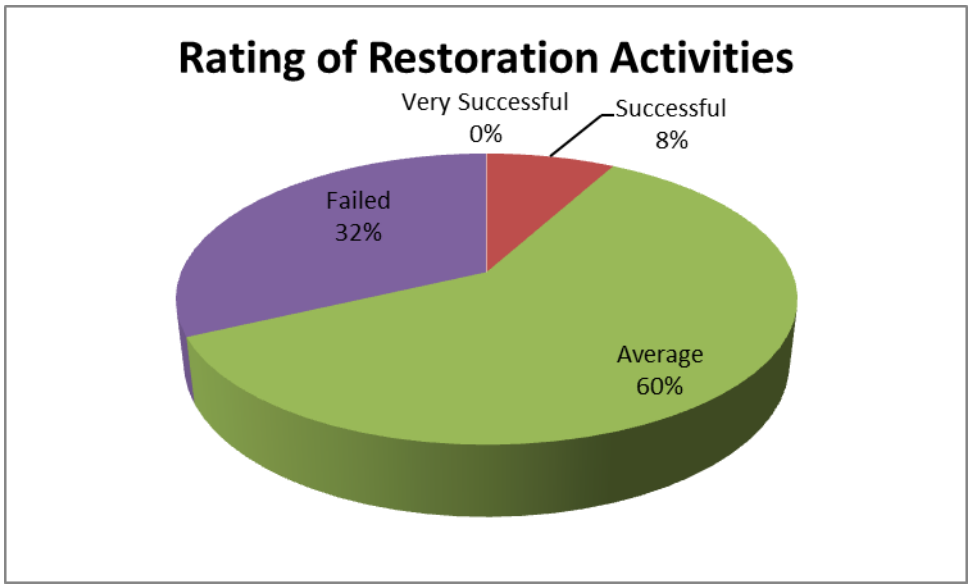
b) Universities- Including U.O.N, Yokahama city, Egerton University and the M.K.U

c) NGOs such as the AWF

However, the KFS notes that this funding is not enough to cater for all the activities of planting, tendering and protection of the new trees. The maintenance of the new planted trees is done for three years after which the trees are able to survive by themselves.

The restoration activities were rated as being average in success by the community. The results were as follows:

Figure 5.4 the Rating of Restoration Activities by the Community (Source: Field Data)

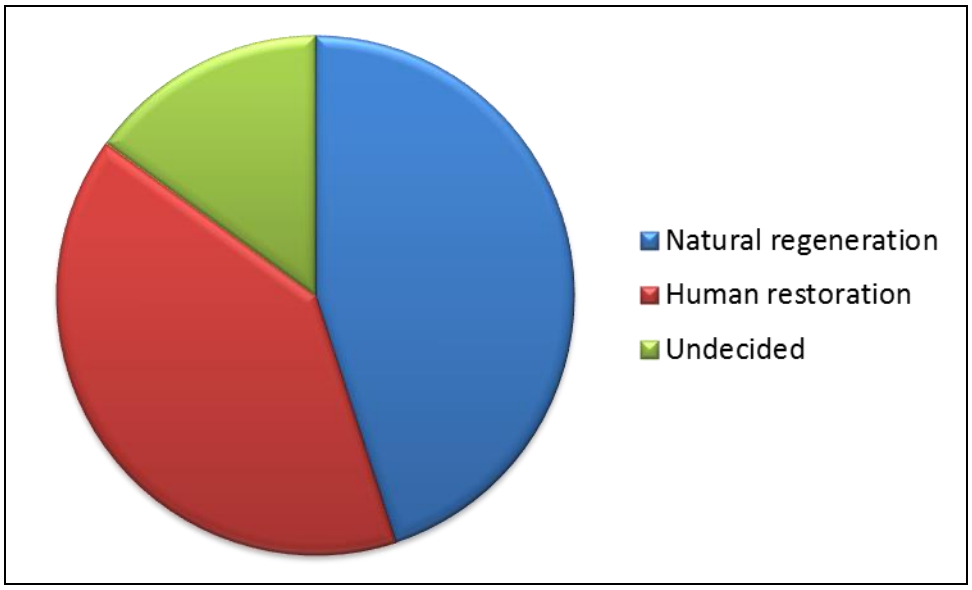


As shown above, 2 households rated the restoration activities as successful, 15 households average while 8 households failed. The percentage of failed though not large represents a substantial number of people who believe there is more work to be done for Mau Narok forest restoration to be successful.

5.4 Natural Regeneration vs. Human Restoration

In the focus group discussions, the topic of natural regeneration versus human intervention came up. A number of the local people felt that natural regeneration was far much better and more successful compared to human restoration efforts. A tally of 20 people was taken and the results were 9 persons were for natural regeneration, 8 persons supported human restoration while the other 3 persons were undecided as illustrated in figure 5.5 below.

Figure 5.5 Natural Regeneration vs. Human Restoration



The senior forester reckons that 7000Ha of the Mau Narok Forest is under natural regeneration and nods that it is far much successful compared to the human intervention.

Plate 5.6 Section of MauNarok forest under natural regeneration (Source: Field Data)

The Plate 5.6 above shows a section of the Mau Narok Forest that is undergoing natural regeneration. The forest has grown well and regenerated in promising manner.

5.5 Challenges and Opportunities of Restoration of the Mau Narok Forest

The household survey carried out in the Mau Narok Division had 30 respondents and came up with the following challenges facing the reforestation activities of the Mau Narok Forest:

1. Insufficient tree seedlings and planting materials with some planting holes left empty.
2. Some people planted the tree seedlings with paper bags making them unable to spread their roots properly.
3. Some of the tree seedlings are damaged during transportation.
4. Some malicious planters damage the tree seedlings deliberately.
5. The planting holes are at times not prepared making it difficult for the soft roots of the tree seedlings to adapt.
6. Rainfall varying at times may cause the trees to dry up.

7. Immature tree seedlings once transplanted are unable to cope.
8. Insufficient funds to support the activities.

The challenges above concurred with the ones discussed with the senior forester and some of the CFA members. They however added on the following challenges:

1. Retarding of the natural regeneration through uprooting of young trees by the local people for selling.
2. Grazing of the newly planted trees by the community.
3. Frost which mostly affect the broad-leaved trees.
4. Inadequate staff for technical, administration and enforcement functions.

The senior forester denotes that the staff at his disposal is inadequate. The composition includes 13 forest rangers and 10 community scouts to guard the 13000Ha forest. This signifies that one forest ranger is to guard 1000Ha of the forest which could be difficult to control forest poaching activities such as illegal felling of trees, charcoal burning and destruction of new planted trees.

Nevertheless, there are opportunities that can make the restoration more successful. The household survey and the institution interviews indicate the following opportunities:

- ✓ Conducive weather, recording an annual average of 1270mm rainfall. This can sustain the newly planted trees.
- ✓ Potential effective community participation in all stages of the restoration.
- ✓ Effective community policing.
- ✓ Availability of many tree nurseries in the local community.

The field survey results also suggested on a number of ways to seize the above opportunities. These include:

- Increase public awareness on the importance of restoring and conserving the Mau Narok Forest.
- Resource mobilization by the CFA and KFS.
- Involvement of local schools and institutions in the restoration activities.

From the above data, successful restoration of the Mau Narok forest is not only a possibility but also a reality that can be achieved through proper strategizing and control of the aforementioned challenges. Seizing the above opportunities will see the reforestation exercises move to a new level.

CHAPTER SIX

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter sums up the study and formulates recommendations as well as giving strategies on how to achieve the recommendations.

6.1 Summary of findings

The overall objective of this study was to assess the challenges and opportunities of restoring the Mau Narok Forest and giving a way forward toward a successful restoration. Individual objectives were: to assess the current status of the Mau Narok Forest; to assess the prior restoration efforts on the Mau Narok Forest; to determine the challenges and opportunities in the restoration activities of the Mau Narok Forest; and to come up with ways to successfully restore the Mau Narok forest.

Data was collected in 30 households in Mau Narok Division using random sampling and purposive sampling for the line institutions. The key findings were: the Mau Narok Forest was massively destructed and degraded; the prior restoration efforts have been moderately successful and there lie a number of challenges and opportunities in restoring the forest.

6.2 Conclusions

To sum up the Mau Narok forest is highly degraded and destroyed and requires both urgent and long term plans to restore Kenya's most vital water tower. The forest is highly valued by the local people whom have direct use and access to the forest and also important to Kenya as whole. The efforts to restore the forest are not enough and more is needed to attain the successful restoration of the Mau Narok Forest.

According to the study, the community is far much willing to join hands with the government and NGOs in a bid to see the regeneration of the Mau Narok forest. The community wants to be involved more in the restoration activities including planting, tendering and protection of the newly planted trees.

Though there a number of challenges, there exist also opportunities that have not been seized. Therefore, proper mechanisms should be put in place to curb the challenges while

optimizing on the opportunities in geared force to achieve optimum regeneration of the Mau Narok Forest.

6.3 Recommendations

The recommendations are based on the challenges as well as ways to optimize on the opportunities available. These are:

1. Increase public awareness through public forum and campaigns. The increased awareness will enlighten and broaden the knowledge of the community on the importance of conserving and protecting the Mau Narok Forest.
2. Encouragement of the local people to join the local CFA and other environmental groups. This will make it easy to pass information regarding the forest and also offer the public a platform to be involved in the management of the forest resource.
3. Involvement of local schools and institutions in the restoration activities. This will be rolled out in form of programmes designed to educate the relevant audience while occasionally organizing for practical involvement in the restoration activities.
4. Restriction should be put in place to prevent people from grazing their livestock in areas where restoration has taken place. This will also help curb human maliciousness. This can be achieved through increase of forest guards.
5. Solicit funds from local, national and international agencies. Locally, the businessmen in the area can be asked to be contributing towards forest restoration exercises. Nationally, the annual government budget allocation to KFS and environment docket should be increased to help in executing their mandates fully especially forest restoration efforts.
6. Forest rangers should be increased and deployed mostly to the areas which are endangered. Also, forest scouts should be formally be recognized as forest officials and increased in numbers to help them enforce forest laws.
7. Trees with high survival and flourishing rates should be planted. The choice of the tree seedlings should also consider those that mature fast. These tree species

include the Prunus Africana/ Red Stink Wood, Ekerbergia Capnesis, Cupressus lustinica/ Cedar and the Olea Africana/ African Cold Owe.

8. Proper management during planting and tendering stages of reforestation should be put in place to curb incidences of damage of tree seedlings and to ensure proper planting procedures are followed.
9. In areas where natural regeneration is taking place, proper protective measures should be put in place to safeguard the sprouting trees. These measures include deployment of forest rangers and scouts to bar the forest poachers from uprooting the small trees.

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APPENDICES

APPENDIX 1: HOUSEHOLD QUESTIONNAIRE

Household Questionnaire

I am Kenyatta University undergraduate student pursuing a Bachelor of Environmental Planning and Management. I am carrying out a research on the Challenges and Opportunities of Restoring the Mau Narok Forest in Mau Division, Njoro District Nakuru County. I am kindly requesting for some information from you. The information you will provide shall be used for academic purpose only.

Place of Residence_____

Date of interview_____

A. Background Information

1. For how long have you lived in Mau Narok Division?

   0-5 years ☐

   6-10 years ☐

   11- 20 years ☐

   Over 20 years ☐

2. How far is your home from the Mau Narok Forest?

   0-5Km ☐

   6- 10Km ☐

   Above 10Km ☐

B. Status of the Mau Narok Forest

1. a) Do you use the Mau Narok Forest?

   Yes ☐ No ☐

b) If the above answer is Yes, on want uses do you put the forest?

i) Grazing

ii) Fuel source

iii) Herbs and medicinal use

iv) Honey collection

v) Other (Specify)_____

_____

_____

2. What are the changes observed in the Mau Narok Forest?

_____

_____

_____

_____

_____

_____

C. Restoration Activities and Community Participation.

1) Are you aware of the restoration activities taking place in the Mau Narok Forest?

Yes ☐ No ☐

2) a.) Have you ever been involved in the restoration activities?

Yes ☐ No ☐

b.) In what activities have you been involved in?

_____

_____

_____

_____

_____

_____

c.) Do you think the participation is enough?

Yes ☐ No ☐

d.) If the answer to c) above is No, what do you think should be done to improve and increase participation?

_____

_____

_____

_____

_____

_____

_____

3) How can you rate the successfulness of the restoration activities of the forest?

Very Successful ☐

Successful ☐

Average ☐

Failed ☐

D. Challenges and Opportunities

1. What are the challenges faced during the planting of new trees?

_____

_____

_____

_____

_____

_____

_____

_____

2. What are the challenges faced during the tendering stage?

_____

_____

_____

_____

_____

_____

_____

_____

3. What are the opportunities of restoring the Mau Forest that have not been seized?

_____

_____

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_____

4. What do you think should be done to achieve successful restoration of the Mau Narok?

_____

_____

_____

_____

_____

_____

_____

APPENDIX 2: INTERVIEW SCHEDULE

Interview Schedule

I am Kenyatta University undergraduate student pursuing a Bachelor of Environmental Planning and Management. I am carrying out a research on the Challenges and Opportunities of Restoring the Mau Narok Forest in Mau Division, Njoro District Nakuru County. I am kindly requesting for some information from you. The information you will provide shall be used for academic purpose only.

Name: _____

Institution: _____

Position Held: _____

Date: _____

A. Status of the Mau Narok Forest

1. What is the acreage of the Mau Narok Forest?

   ---

2. What is the status of the forest?

B. Restoration Activities

1. How many trees have been planted?

   ---

2. Any data on the flourishing rate of the newly planted trees?

a) If **yes**, please specify?

   ---

b) If No, please range the flourishing rate:

- ☐ Very High
- ☐ High
- ☐ Average
- ☐ Low
- ☐ Very Low

3. i) Who has been funding the restoring and conservation efforts?

---

ii) Do you think the funding is enough (*tick appropriately)*?

Yes ☐ No ☐

4. How are the newly planted trees taken care of?

---

5. a.) Which are the main species of trees planted?

---

b.) Which of these species thrives well?

---

6. During what period are the trees often planted?

C. Community Participation

1. To what extent is the local community involved in the restoration activities?

- ☐ Not Involved
- ☐ Partially Involved
- ☐ Involved
- ☐ Fully Involved

2. In what ways are the local communities involved in the restoration efforts?

D. Challenges and Opportunities

1. What are the challenges faced during the planting period?

---

2. What are the challenges faced during tendering stage?

   ---

3. What are the opportunities of restoration that have not been seized?
