

RURAL LIVELIHOOD AND FOREST MANAGEMENT IN MOUNT ELGON, KENYA

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**Rural Livelihood and Forest Management
by Mount Elgon, Kenya**

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DECLARATION

I, Siri Mette Myhren hereby declare that this thesis is my original work for a Msc. degree in Development Studies at the Norwegian University of Life Science. This thesis has not been submitted to any other institution than the Norwegian University of Life Science. I hereby declare that all work except that of my own has been acknowledged.

Siri Mette Myhren

Ås

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Abstract

This survey aimed at identifying key economic activities of rural livelihoods adjacent to Trans Nzoia Forest Reserve, Trans Nzoia National Park and Mount Elgon Forest Reserve, all of the Mount Elgon ecosystem, Western Kenya. The fact that the reserves and park all have different management regimes, makes it even more interesting to identify, to what extent, the forest management has a positive or negative impact.

Data was obtained through household surveys and key informant interviews. These were guided by open-ended questions so that triangulation was possible when additional information was required. Several questions focused on income. This topic often creates some resistance to answer with accuracy. All surveys and interviews were carried out personally, so that additional learning through observations was possible. A total of 134 households were surveyed, 3 group meetings and several formal and informal discussions were carried out with forest officials and village elders.

Main economic activities that are carried out by households in all areas, is were agricultural related; cultivation (cash crops and subsistence production) and livestock keeping. Estimated costs and income show that households in this area depend strongly on services and goods offered by the forest. 15 % of annual income is spent on collection or purchase. The right to access and withdrawal resources becomes a time consuming process and day to day constraint.

Local people have little to say in the legal and political dimension of forests, though changes are expected in near future. A participatory approach is under planning by the FD, though local people are not sure if this will be successful. Many promising words have been said, lack of communication and little experience on participatory management does not increase the hopes for a collaborative future between the users and the protectors.

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1. Introduction

1.1 Background

“Kenyans—like all people on Earth—depend on nature to sustain their lives and livelihoods. Not only does it provide the basic goods needed for survival such as water, food, and fiber, people also rely on nature to purify air and water; produce healthy soils; cycle nutrients; and regulate climate. Collectively, these benefits derived from nature’s systems are known as ecosystem services. They fuel the Kenyan economy and, if wisely used and invested, build the nation’s wealth” (World Resources Institute, 2007: 3).

As the World Resources Institute stresses the degree of dependence on natural resources, the World Watch Institute (2007) emphasises a rapid loss of forest covered areas around the world and the related threats to biodiversity. Biodiversity plays a significant role concerning the sustainable relation between the human being and nature, and the global focus on these issues is growing. Biodiversity is of significant importance for the whole environment: people, wildlife and for the ecosystem. Changes and loss in biodiversity affect the diversity at local as well as global level. The dependence is often diversified in relation to the situation of the resource users. This can vary from small scale farmers, who need resources such as fodder and firewood for the day to day survival, to companies who collect large quantities and are often supported by governments as they contribute to the national economy.

The focus on environmental issues has global trends, often initiated by the western world. Up to the mid 1980’s, the management of natural resources had a “Fortress Conservation Approach” (Vedeld, 2002). This approach had a strict “fence and fine” policy. Meaning that decisions were made top-down according to preservation and conservation of the nature and there was a minimum consideration of the impact on forest dwellers. Experience from these strict exclusion and preservationist policies enlightened the need of a change regarding management of natural resources (Scott, 1994). The conservation and control approach created challenges to a sustainable livelihood of people living in rural areas while at the same time being able to conserve the natural resources. This form of management was not as sufficient as expected. A new discussion was brought up in the 1980 World Conservation

Strategy (IUCN, 1980 in Scott 1994). The debate was whether the management of natural resources could sustain and benefit the environment as well as present and future generations. Such debates led to “the Participatory Approach”, which would allow access to the natural resources, and take into account important values in decisions-making processes to better meet the needs of humans and the environment. The idea of local participation was, and still is, to strengthen the capabilities and achievements of micro (household), meso (institutional) and macro (governmental) level. Empowerment at the local level combined with governmental decision-makers can help improve traditional and new techniques of management through enhanced motivation and knowledge.

Especially in developing countries, natural resource management is determined at the national level and are strongly influenced by the macroeconomic strategies to follow development plans for the country as a whole (Mogaka et.al, 2001). In Kenya, almost 3 million people live adjacent to forests and the majority of these depend on agriculture or agricultural-related activities as a livelihood (KIPPRA, 2002). As agriculture and forest resources have a strong contribution to the natural resource based economic production and consumption activities; it is estimated respectively 1% contributes to the monetary (cash) economy and 13% to non-monetary. The local forest value can be difficult to identify in quantitative terms as it is also a source of non-monetary activities (subsistence use). Cultural and traditional values and knowledge exchange through history, experimentation and innovation and local forest management by the communities themselves. This also makes it difficult to incorporate well-defined policies into the national development (Mogaka et al, 2001).

Since colonial times in the early 20th century the governments had a major control of forest land and resources. The management of this land, gazetted as governmental forest, reflects a conservation and control approach. Mount Elgon is one of many areas in Kenya which is managed by the government. The Mount Elgon ecosystem has an important diversity of biodiversity and is also one of the five major water sources in Kenya. What makes the ecosystem so interesting is not only its environmental importance, but also how the area is physical divided and managed within different tenure systems. The forest mountain area is divided into four different units: two forest reserves which are split by the national park, and a national reserve. People live adjacent to the forest reserves and the national park, but nobody live permanently in or around the national reserve.

As agriculture and agricultural activities are major economic activities of people living adjacent to Mount Elgon, this is a strong factor that influence their livelihood adaptations, but this is not the only one. To be able to understand livelihood adaptations, both external and internal factors need to be understood. The sustainable livelihood approach shows the complexity and interaction of factors that is needed to understand how and why decisions are made. Amongst these is the level on dependence on forest resources, as they can provide firewood, construction materials, foods, medicine and cultural values.

1.2 Problem statement

In 1999, the population census of Kenya found that approximately 800 000 people lived in the surrounding districts of Mount Elgon. The majority lives in rural areas and has subsistence agriculture as their main economy and livelihood (Vedeld et al, 2005). It is not only agricultural activities and the influence of natural resources that contribute to the choice of livelihood. Mount Elgon, Kenya is managed under three different management regimes at four different units. The Forest Department controls the forest reserves; the Kenyan Wildlife Service controls the national park while the Mount Elgon County Council is the main policy – maker of the national reserve. These external actors manage their respective areas differently and contribute to differentiation of the people such as farm activities and off- farm activities and non-farm activities.

The Forest Department and the Kenyan Wildlife Service have manifested in their strategic plan to create and implement policies which will include the natural resources and help the people to be able to reach more successful outcomes. This research will investigate to what extent people depend on different patterns of income diversification (farm, off farm-, and non-farm) and how this is conditioned by different political, economic and socio- cultural factors. By understanding the role of actors and income activities, it can help create improved strategies, from poverty reduction strategies to sustainable management of the natural resources.

1.3 Justification of the study

This study aims at gaining a greater understanding of the connection between livelihood strategies chosen or forced upon and forest dependency. As history and research shows, there are strong connections. People depend on water and energy sources, construction materials, food, medicine plants, and land for cultivation and social and cultural activities. In addition, the forest offers environmental security and stability. At the same time as the forest act contribution positively to people, the forest can be a fundament for struggle. As resources become negligible, the desperation of access can lead to disputes, towards the administrative, the neighbouring people and the nature.

But how strongly do the policies and regulations in management influence the livelihoods of the people living around Mount Elgon National Park and Forest Reserves? There are different opportunities and challenges related to the respective management regimes of where the people are living. These differences can derive from farm activities and off- and non-farm activities. The level of diversification might also influence the level of dependency to forest related resources. Increased knowledge towards the local and administrative perspectives concerning challenges and opportunities can be important in further discussions concerning decisions affecting the livelihood of the people, as well as the level of the people's empowerment and involvement in the decision making.

1.4 Objectives and research questions

The main objective of the study is to determine to what extent people at different locations are affected by the various management regimes of Mount Elgon, Kenya.

The main objective is further divided into sub- objectives with its following research questions:

- 1) To determine the general livelihood situation and to what extent do they depend on forest related resources?**
 - a) What is the general access to endowments?
 - b) How are endowments transformed to incomes?

- c) How is the distribution of income between different locations?
 - d) To what degree is the level of dependence on environmental incomes?
 - e) What impact do the various resources have?
 - f) Does location affect collection?
- 2) **To identify key constraints for improved livelihoods.**
- a) What are is seen as major internal constraints by the household?
 - b) What major challenges arises from the Mount Elgon Ecosystem?
- 3) **Management regimes and their impact on rural livelihood.**
- a) How do the different institutions manage their respective areas (Forest Reserves, National Park and National Reserve); physical structures, administrative structure, rights and duties, decision arenas, management cultures?
 - b) Which role does the local community play in decision-making?
 - c) What are local people's perceptions of rights and duties?
 - d) How does the forest management affect rural livelihood?
 - e) Is the management sustainable for the biodiversity as well as for the people living by the forest?

1.5 Thesis structure

The thesis is sectioned into 5 chapters. Chapter 1 gives an introduction. Chapter 2 presents the different management regimes present in Mount Elgon, Kenya and a theoretical perspective. This is to identify social and economic factors that can and will influence the choice of livelihood strategies of the people living adjacent to Mount Elgon National Park and Forest Reserve. Chapter 3 describes the study area and the methods used in this research. Following there will be a presentation of the methodology used. In chapter 4 the results and findings are discussed in relation to the objectives presented in the introduction. Chapter 5 will provide conclusions and future recommendations.

2. Literature review and theoretical frameworks

This chapter provides a brief background history of Mount Elgon, Kenya, the three different management regimes and the theoretical frameworks that are used in this research.

2.1. Forest management in Kenya

In pre-colonial times, forest areas were managed through local and traditional institutions that was learned and developed through generations of experience. Formalisation of forest ownership and management in Kenya was set during the early 19th century, during colonial time. By gazettement the forest land, government became the owner and the aim of the colonial government was to protect the natural resources from the people through strict conservation, also recognized as a command and control approach. By displacing and reducing people's access to rich biological ecosystems, it would benefit all. The fortress conservation approach, where people and land are physically separated, was widely used in development countries up to the mid 1980's (Vedeld, 2002), and still is. By doing so, it has been assured that important ecosystems need to be protected from people living in or adjacent to such areas because their dependence on the commodities and services are too strong for sustainable management. Experiences from several countries show that such an approach with a low degree of access to resources, excludes local people. Low levels of participation and cooperation from the regulations made and can lead to conflicts between stakeholders. The exclusion of local communities leads to loss of important knowledge of forest management because local control, rights and access have been strongly negatively affected. The combination of the government's lack of personnel and financial resources in combination with the ignorance of existing local knowledge has made the situation of sustainable management difficult (Ongugo and Njuguna, 2004).

Years of experience with the fortress conservation approach, has lead to a shift towards participatory approaches. It has been recognised that social factors, such as control, rights, duties, and access strongly influence management and use and thus the state of environment. As governments often have ignored the interest of forest dwellers, a sustainable management of ecosystems has not been successful. The result has been degradation and depletion of forest

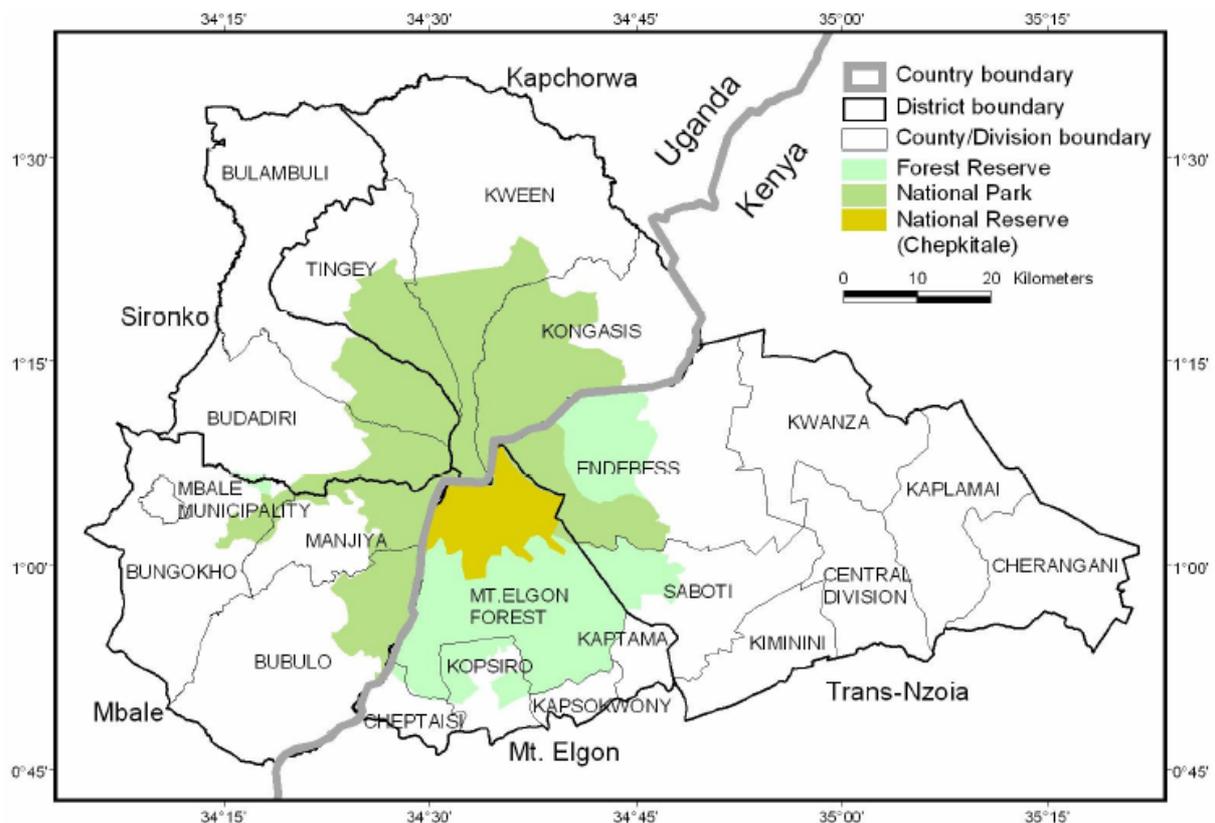
resources. By including local interests, people feel a stronger belonging and a greater conscience for preserving nature. The importance of participation has started to be recognised by the Kenyan government and it is expected that the a Forest Act will lead to a greater involvement in all sectors. Local organisations have been developed and private stakeholders are invited to contribute monetarily. Stakeholders might suggest new strategies, but the state will still be the main decision-maker (Interview with MECC, 06.12.2006).

The level of degradation and depletion of forest resources in Mount Elgon has been difficult to determine in quantitative manners, due to poor report systems by the Forest Department and the Kenyan Wildlife Services. A review made by the Mount Elgon Integrated Conservation and Development Project, MEICDP, (Nield et al, 1999) for the managements of Mount Elgon concludes that the destruction and losses are significant, due to excisions, encroachment and poaching by individuals and companies, such as Pan Paper Mills and RaiPly.

2.1.1 History of the management of Mount Elgon

The Mount Elgon forest was gazetted in 1932 (Ongugo et al, 2001). The forest is not only special for its biodiversity and environmental importance, but also for its location and the division that followed the independence of Kenya in 1963. The border between Kenya and Uganda divides the mountain area and implies that the forest reserve is handled under different management strategies. In Kenya, the gazetted forest was split again after the independence. Parts of the forest reserve were converted into a national park in 1968 and in 1978 the highlands were converted to a national reserve. Today, the main gazetted area is still, on the Kenyan side, forest reserves, one unit in Mount Elgon district and one in Trans Nzoia (see Figure 1). These are divided by the Mount Elgon National Park, also within the Trans Nzoia district. Chepkitale National Reserve lies in the highlands (figure 1). The many regimes and location within two provinces makes the influence of the respective management regimes on the forest resources quite complex. Prior to the gazettelement the local people saw the forest as their land. After the formalisation, the land became governmentally owned and managed by the Forest Department, the Kenya Wildlife Service and the Mount Elgon County Council. Besides the governmental institutions, there are also two non-governmental

organisations that operates here; the World Conservation Union - IUCN and SCC-Vi (Ongugo et al, 2001)



Figur 1: The protected areas of Mount Elgon (Uganda and Kenya)

Source: Eija Soini (2006): Past and present land tenure and incentives for land management in the five districts surrounding Mount Elgon (Kapchorwa, Sironko and Mbale in Uganda, and Trans-Nzoia and Mt. Elgon in Kenya), p. 2.

2.1.2 Forest Department

The Forest Department (FD) under the Ministry of Environment and Natural Resources manages the forest reserves, with five forest stations in Trans Nzoia and three in Mount Elgon division. The department is responsible for management of forest plantations, law enforcement and sanctions, fire protection and controlling regulation of extraction through permits and licensing (Ongugo et al, 2001). The regulation includes which resources are allowed to extract, the amount, the time period as well as the equipment or method to be used by companies and by individuals. The rights and duties vary for the different parties. Regulations aimed at individuals are to ensure that collection is at a small scale, non-destructive and mainly for subsistent use. Some collection and grazing of animals are allowed with special requirements, but no harvesting, hunting, logging or charcoal burning is permitted. Companies are allowed to harvest fresh resources at larger quantities; in return they

are expected to contribute to improve local conditions, such as roads and other infrastructure. A weakness in the control of collection activities is that records are not made and there is little or no information on what the income from fees are used for (Soini, 2006).

While promoting a strict conservation approach, forest development has been promoted. Forest resources are crucial for rural livelihoods as well as for industrial income as a contributor to the national economic growth. Such industry is estimated to generate \$40 million annually and employs 80 000 people (Nield et al, 1999). The timber and paper demand is continuously growing due to a high population growth. Major companies working in the Mount Elgon area is Pan Paper Mill and RaiPly and these have special agreements in relation to their activities.

The Forest Department follows the guidelines of the National Forest Policy and the Forest Act 2005, chapter 385. There have been no opportunities for local regulations and participation. In their guidelines, they are expecting changes in the revised Forest Act of 2007, and a participatory management is planned to be incorporated (Soini, 2006). Community based organizations are being developed and training of forest officers on the new strategy has started within newly established Community Forest Association (CFA). The motto for the new approach is “government owns the forest but community together with the government manages it” (Soini, 2006: 21). The aim of establishing a participatory management is to better identify the needs and interest of local people in connection with assessing the state of the forest. The acknowledgement of the needs and interest can be crucial in order to create a stable and healthy relationship between the dwellers and the state institution.

2.1.2.1 Licensing

There are two types of licenses to extract resources from the forest reserves, one for industrial purposes and one for collecting firewood at subsistent level. All collection is prepaid. The individual who collects for subsistent manners, apply for the permit and pay a monthly fee. The person is expected to follow the regulations concerning location and collection methods. Small-scale millers or bigger companies that collect for commercial matters, also pays up front. Trees to be collected are regulated by hammered marks at the plantations and to an

agreed volume. In addition to paying the license fee, the bigger companies are expected to support community needs, such as maintenance of roads, schools and health centers.

A plantation system called the Non-Residential Cultivation (NRC) system led by the Forest Department was for a longer period used to maintain and recover the depletion of forest that had happened as well as meet the needs of the forest dwellers. The Forest Department allocated plots within and outside the boundaries to the communities adjacent. Community leaders distributed the plots to the local people. Community members were allowed to grow food crops on the given plots. After harvesting the plot, care-takers were given seedlings for replanting on the same area when the seedlings were matured, or a maximum time period of three years. This project can be seen as a win-win system for the people and institution. People were given more access to fertile land and thereby increased their food production, while the FD got assistance in nurturing and planting. But for the forest resources it had a different effect. Data shows that there has been an increase in cultivated areas (D. Too, 1999 in Nield et al, 1999). The NRC system require a continuous monitoring by the FD, to ensure local people fertile land and to follow the cultivation and plantation cycle to make sure that a maintenance of the forest is successful. Despite increased plantation areas and revenue, legal and illegal harvesting has led to a decrease in total volume, both in indigenous forests and for planted trees. Poor management means lack of knowledge on the trees lifecycle and non-accurate control of extraction. Access to the forest leads to easier access to harvest indigenous tree species. Today, this system is terminated due to the increase of encroachment and poor control.

2.1.3 Kenyan Wildlife Service

Mount Elgon National Park is managed by the Kenyan Wildlife Service (KWS). The KWS was created in 1990 and controls all the national parks in the country through the Wildlife Act of 1975, chapter 376 (Nield et al, 1999). Their approach of conservation follows the traditional “stick and fence” policy. Neither individuals nor companies are allowed to utilize resources from the park. The park boundaries are clearly defined by an electric fence and are heavily guarded to protect the people from natural dangers as well as keeping the people out of the park (IFRI Kenya, 2007) .

Records were started to control the cash flow as episodes where large parts of the income of park vanished occurred frequently. The park is mainly non-accessible, but by paying an

entrance fee for non-consumptive activities (recreation and education), one is allowed to stay within the borders for a specified time period. The KWS has developed a Wildlife Development Fund where part of the revenues are used on activities to benefit the local communities. These are activities such as health service, education facilities, infrastructure, livestock and enterprise developments. The intention with this revenue sharing is to improve the relationship between the KWS and the local people so that the regulations are followed to a greater extent (Mogaka et al, 2001).

The relationship between the governmental institutions and the communities vary widely from individuals and communities. The FD and the KWS have signed a Memorandum of Understanding (MoU) which is meant to increase collaboration and improve management for both parties, as well as the local communities. This has been a top-down decision and surveys have shown that a minimum of the employees are aware of the guidelines of the MoU. A general understanding of the relationship between the institutions and the communities is that the FD has more interaction with local people as people have access to forest resources in the reserve, but no access in the park. On the other hand, the KWS are expected to have more influence on the local people as they have a more visible sharing of revenues through school building, health facilities and maintenance of roads. The KWS control and sanction system also raises the respect from local people. In general, the local people are not satisfied with these institutions. As there is little or no participation, people feel excluded and that their rights are taken away (Nield et al, 1999).

Research on management of the forest resources in Mount Elgon confirms that there are several shortages. Amongst others, the IUCN has been asked to assist in the Mount Elgon Integrated Conservation and Development Project (MEICDP). This is a cooperation between the FD and the KWS to promote and “strengthen the institutional capacities and capabilities of local management institutions for sustainable management of the Mt Elgon ecosystem” (Nield et al, 1999: 1). This research includes conservation of biodiversity as well as incorporating the livelihoods of adjacent communities. A review the IUCN conducted in 1999 showed several weaknesses. The report system and book-keeping of extracted forest resources by neither the FD, nor the KWS is adequate. Both small-scale and large-scale extractions are meant to report all their activities and collection in the given area, so that the FD can keep track of consumption level and following revenues. Researchers explain this shortage by several factors. Poor infrastructure, as roads and communication facilities, in and around the

forest reserve is one factor. This makes it difficult for the forest guards to control the movements and keep in contact with all actors. There are no local or national forest management plan for improving infrastructure in the area and the agreement between companies and the FD are not maintained. The poor road quality also has a negative affect on the environment, as exhaustion leads to impaired water and soil quality. Another strong factor is the lack of monetary resources, resources that are needed for employment, training, planning, mapping and materials.

2.1.4 Local authorities

Chepkitale National Reserve is situated in the higher region of the Mount Elgon ecosystem and was gazetted in 2000 (Soini, 2006). This area is stated as Trust Land, meaning that land is held in trust by local authorities on behalf of the local community (Wily and Mbaya, 2001 and www.ciel.org). In this case, the Mount Elgon County Council is responsible for the management and follows the guidelines of the Trust Land Act. The boundary of the national reserve does not physically border the inhabited areas in Trans Nzoia or Mount Elgon district, and permanent settlement is not allowed within this area. Furthermore the management approach is not as complicated or strict as the park or forest reserve. Collection of resources to carry out of the reserve and grazing is not regulated. It is permitted to use the area for cultural and traditional events and for recreation (Matiru, 1999 and Soini, 2006)

2.1.5 Community based organisations

Local communities surrounding Mount Elgon have a role as an informal management institution. They are hardly included in the governmental institutions action plans, but have a traditional value of forest management. These people have indigenou knowledge of the forest, they are aware of, and respect the different practices of forest users. They have also seen and experienced the negative shifts on the forest. Lack of institutional involvement and the deterioration of forest are of great concern, which makes them highly motivated to be included in a sustainable forest management.

As participatory conservation approach has no tradition in Kenya, it faces several challenges of implementation, and training is needed for all parties. Due to the revised Forest Act

2007 Some community based organisations (CBOs) are developing. This will be further described in paragraph 2.2.3 (Structure – process model). How the implementation process will be carried out will be of great importance. Some of the CBOs are trained in activities such as agroforestry, energy saving stoves, zero-grazing and soil and water improvement.

2.1.6 Threats to the Mount Elgon ecosystem

There are many threats, direct or indirect, to the Mount Elgon ecosystem. Threats can arise through extraction (legally or illegal); poor demarcation and mapping; and high population growth rate, all which have led to movements displacing the correct boundaries. This is particularly evident in Mount Elgon district. Lack of manpower and patrolling simplifies these actions. The boundaries have also been moved by management in the past. As the information flow is often insufficient in rural areas due to illiteracy, poor infrastructure and non-transparent decision-making, it is not always clear to the local people where the demarcation actually is.

Some of the major illegal activities in the area are poaching and encroachment beyond the agreements. Poaching is estimated to be one of the most serious threats to biodiversity and to a sustainable development. According to the Wildlife Act, all hunting on wildlife is banned in Kenya (MECC, 06.12.2006). But for security reasons, people feel forced to continue. There is lack of money to buy meat, larger mammals often damage crops, injure or kill people at confrontation and disseminate pests and ticks. An electric fence is built around the park area and there are guards, both in the reserve and the park, to protect people living adjacent to the forest. Security has been improved, but is not all successful. Incidents still occur and the FD and the KWS have poor documentation of the level of threat the wildlife creates. There is also encroachment beyond regulations on forest products and the most common are of firewood, poles and timber. Excision of forest products can weaken the species. When harvesting legally, regulations describe age, size and location of the product. In plantations, thinning activities are carried out to improve the product to be harvested. The illegal excision often happens on the immature trees and hinders a successful reproduction.

Other illegal activities are bee keeping and charcoal burning. In some areas, bee keeping is encouraged on own property (Nield et al, 1999) but not within the forest. Bee keeping inside

the boundaries leads to more frequent visits in the park or reserve area and makes it easier to combine this activity with poaching. Smoke is used when harvesting honey from the bee cubes to keep the bees away and this method has led to many forest fires. Forest fire is also one of the major reasons of charcoal banning, besides the encroachment of trees.

Local farmers depend on the forest areas for grazing. Land scarcity is common in the area around Mount Elgon. Maize stems are often used for fodder, but since their crops are at times small and unpredictable, this does not meet the farmer's needs. Few farmers have enough land to use for grazing. Unclear boundaries, pressure for a sustainable livelihood and corrupted forest officials make it easier for local people to access the forest with their livestock.

Most of the illegal activities are carried out within the forest reserve. The park area has an electric fence to demarcate the boundaries and the KWS have more resources for controlling and patrolling. Park guards are armed and more visible and hence gain more respect. Other elements, such as roads, vehicles, and equipment also have a strong influence. National and international NGO's and governmental institutions have started to realize the extent of destruction these threats have created. In the revised acts, proposals and initiatives are included in national and local papers, as an incentive to slow down depletion and degradation of forest resources and more room to rebuild reconstruction of the ecosystem.

A participatory conservation approach has been initiated by the IUCN and adapted on the Ugandan side of Mount Elgon. Communities are not homogeneous, but one can recognize several traditional values of forest resources and predicts challenges. By sharing experiences, management regimes can learn important lessons by looking into the experiences done elsewhere. Management of protected areas has continuously been under revision as an attempt to develop a suitable framework to forge partnership between governmental institutions, such as the Forest Department and the Ugandan Wildlife Authority (UWA). Their approach today allows local communities to harvest resources by regulation within the boundaries and participate in management and decision-making to some extent. The framework also states that 20% of the park revenues will be shared with the communities. There is not a total ban on hunting on the Ugandan side; if the local people or their production is threatened by wildlife, they are allowed to defend themselves against this, without being punished by the UWA (Gachanja, 2003). This management style as been established through communication and identification of the needs and interest of the local communities. Their experience of allowing

participation in management has given positive outcomes such as; cost reduction on management activities and employees, a more positive attitude and respect towards governmental institutions and improved outcomes on conserving biodiversity.

2.2 Theoretical approaches

Developing a sustainable livelihood has led to shifts in local, national and global ways of thinking of development strategies since the late 20th century: to take care of the environment and to try to fight poverty by sustaining and improving rural livelihoods. Ian Scoones (1998) developed an approach to better understand the complexity of rural livelihood and the outcomes from the strategies chosen, at the individual level to national levels. Frank Ellis has further elaborated on his theory (Ellis, 2000).

To better understand the relationship between natural resources and stakeholders at operation level; Elinor Ostrom's eight design principles for long enduring common pool resources (CPR) institutions can be used as a guide to analyse and predict the outcome of the management, either it is strictly by governmental institutions or including community participation (Ostrom, 1990).

At last, the theoretical tools of this research will include a structure- process model to identify and analyse the relationship between the different actors of Mount Elgon, Kenya, and the process towards change.

2.2.1 Environmental income, household diversification and local heterogeneity

Environmental income is a fundamental source of income to households in rural areas and the term has a wide range of definitions through previous studies, based on the variety of environmental goods and services (WRI, 2007). In this paper, environmental income will have its main base on the goods that the Mount Elgon ecosystem provides, through the forest products; timber and Non-Timber Forest Products (NTFP's). The environmental services the ecosystem offers, such as climatic conditions and rainfall, are equally important as the environmental goods. Rural households depend on predictable climatic conditions for agricultural produce. Since agricultural related activities are the main source of income for the

rural livelihoods surrounding Mount Elgon, they will be examined as an individual section; the physical capital and agricultural features.

Forest products contribute to the economic income for many households in rural areas (Vedeld et.al 2004) and forms part of household's (Barrett et.al 2001). The diversification of household economy involves a broad spectre of activities and few families collect all income from one source. Main reasons for diversifying income can be seen as either push or pull factors (Barrett et.al 2001). The push factor works as an insurance of costs and risks. As Vedeld et.al (2004) explains; "lack of savings and other assets to draw on during periods of food or income shortfall makes forest fulfil an important insurance" (p. 14). The pull factor works as an integration strategy of the different activities, the ability to recognize how different activities can complement each other. The resources can be a crucial support in addition to subsistent farming activities, such as firewood, construction materiel, medicinal plants as well as insurance (Barrett et.al 2001). Diversification reflects on assets and ability to optimise utilisation of activities and of predicting opportunities and challenges.

Many rural households that depend on forest resources diversify their activities because they feel they have no other or better option. Assets, activities and income level that is available for people's survival generates high labour inputs, low skills and low returns. The households diversification strategies will be determined by their goals towards food security, long-term income stability and resource constraints (Ellis, 2000), including household size and demography. To acknowledge the importance of the forest related activities, it is useful for policymakers to design and implement sustainable strategies for poverty reduction as well as utilisation.

The choice of livelihood strategies reflects that the rural communities are heterogeneous. The environment can sometimes be homogeneous, but activities and assets within the household such as the division of roles, education levels, size, age and gender, relations to the social institutions, experience, land endowment makes the individual households within the community different: households have different income generating activities (Barrett et.al 2001). When household's and communities have different adaptations, it also makes the management of the natural resources more complex, for both conservation purposes and for the sustainable livelihood.

The roles within the social institution also affect the strategy of household's and their activities. The members can join informal groups, knowledge based and material based, that support each other. This will affect the social capital and their choices. Such relations can be complex and are defined by history, ethnicity, hierarchy and interaction with other communities (Ellis, 2000). Income generating activities, social institutions, heterogeneity as well as the state affects the dependence towards the forest resources leading to unequal distribution of benefits in the household, between households in the community and between communities.

As mentioned, few households generate all income from one source. The most common economic activities for rural livelihoods are; livestock-raising, growing a diversity of crops, collecting forest products for subsistence needs and sales, being involved in a variety of reciprocal transactions with fellow community members, having a family member in off-farm employment who remit money back to the households and having another member involved in small-scale industry (Campbell and Luckert 2002: 7).

Income diversification is seen to be a major contribution to the ability of the household to cope with shocks and stress. When connecting income diversification to rural livelihood strategies, off- farm and non- farm activities become key words. Off- farm and non-farm activities describe the various ways of making a living in addition to self- sufficient, subsistent farming. Off-farm activities are activities that are carried out away from ones own land and are often farm related. The non- farm has no relation to husbandry.

The diversification includes off-farm and non-farm activities. Most households surrounding Mount Elgon depend on farming as their main economic activity, but the farming itself is seldom enough to cover all basic needs for the whole family. The most common on- farm activities in this area are livestock-raising, growing crops (cash crops and subsistent), off-farm employment and small-scale entrepreneurship. For the household to manage throughout the year, they need to diversify. Off-farm work that requires special skills tend to be less available, as the majority in the area are small-scale farmers and the large-farm farmers have access to technologies that make the labour more efficient. Non-farm employment, which is related to higher income, is also of scarce access as the education level in the area remains quite low and requires high investments.

In developing countries, such as Kenya, the off-farm work might not generate monetary income, but as return of favours. Rural households adjacent to Mount Elgon often experience low or no waged income and find ways to meet their needs by exchange of labour, materials or foods. The input and output relation of exchange can be negative as this labour requires no special skills. Barrett et al (2000) have identified 4 different livelihood strategies in agrarian societies. The first two include the work activities; “full-time farmer” strategy (all work on own farm) and “farm and farm worker” (self farming and off-farm work). The other two comprehend the income relation of activities and skills: “farm and skilled non-farm” (work on farm and non-farm related activities that require specific skills and thereby higher income) and the last is the “mixed” strategy (combines all three strategies mentioned, on and off-farm, skilled and non-skilled).

2.2.1.1 Shifts in labour and land productivity

It is difficult to analyse shifts and trends between the different provinces of Kenya as social and climate conditions vary greatly within the provinces. In addition there are no regional specific agricultural policies. Nyoro and Jayne (undated) reported following findings in agricultural productivity in the Rift Valley and Western Province in the last 25 years with an emphasis on land and labour productivity.

The Rift Valley region experienced an increase of labour and land productivity in the period from 1970 and up to the 1990's. This is expected to be a result of adaptation of high yielding maize and the use of fertilizer. From the 1990's and onwards there were market inflations that squeezed the production level from increased fertilizer prices and declining market prices on maize and wheat (the major cash crops in this region), and due to liberalization of the market.

Land and labour productivity in the Western Province had the same experience as the Rift Valley. Major struggles in the Western Province during the last 25 years were the recovery after the drought of 1980's. After the challenge of drought recovery the region experience a slight increase of labour productivity as the population had a rapid growth. The region could not manage to improve the land productivity coherent to the population. The Western Province experienced the same challenges of market fluctuations and towards the late 1990's both labour and land productivity had declined. This was supplemented by poor industrial

management of cash crops. These trends have led to a stable decline of welfare of the population surrounding Mount Elgon, both for those situated in the Trans Nzoia district and Mount Elgon district. Another effect is wage opportunities which have become a constant struggle.

Opportunities to expand the farmers agricultural technology is a challenge due to high costs and taxation, low awareness and poor linkage between research and extension. Important areas of technology is fertilizer, pesticides, seed and labour wages; information, quality and control (Nyoro and Jayne, undated). Other factors that contribute to challenging daily activities for small-scale farmers are market systems, orientations and policies, entrepreneur training and infrastructure such as roads and communication.

2.2.1.2 Shifts in crops and markets trends

The Kenyan government has realized the importance of targeting the population groups directly, not only the areas as homogeneous areas, when implementing policies to reduce poverty and contribute to entrepreneurship and small-scale subsistent population. In Kenya, most poor people are found in rural areas where they depend on agricultural-related activities. Research shows that a focus on poverty reduction within agricultural activities has multiple positive effects. Not only does it improve food security, which is seen to be one of the main factors of achieving poverty reduction, but it has a trickle- up affect on the urban and national level towards foreign exchange. By achieving food security at the regional and national level, the off-farm employment sector will be improved and act as a trigger for national economic growth. Off-farm employment is crucial for stabilizing and improving the household incomes and thereby contributes to equity in the society. Prioritising policies for income distribution can greatly improve the rural households.

In the early days of independence the Government of Kenya had a strong focus on agricultural policies for achieving economic growth. Maize was expected to be the staple food, meaning that food security would be reached and the rapid growth of maize production would also contribute to foreign exchange. The economic growth reached its top during the 1980's. The strong governmental interventions were not sustainable. The high costs and low level of independence of people and industry led to liberation of the market. Price regulations and

privatisation grew on the new arena. Decline in productivity was one challenging outcome and squeezed the demand and supply relation.

The market is an important factor for economic growth, individually and nationally. Market contributes to cash flow and competition for individuals and industry. Liberation of agriculture and the market that set foot in Kenya during the 1980's is usually a positive factor for growth as it leads to competition, efficiency and empowerment of the individual. But the functioning of the free market demands good governmental policy making for institutional, legal and regulatory frameworks for an enabling market. According to Reynolds (1988); "the necessary conditions for the free market include equilibrium between buyers and sellers, free entry and exits of firms, homogeneous products, and a perfect flow of information" (in Kimenyi, 2002 p.12). These factors have been a continuous struggle for success in all regions in Kenya. The complex strategy for success inquires implementation of the right size at the right time at the right place, by the right people and in the interest of the people. The Kenyan government has made an effort of decentralization to adjust to the regional conditions. This has been done rather unsuccessfully due to poor planning, poor communication with the local people, bad budgeting, and poor distribution and implementation.

The second most important income diversification activity, next to agriculture, is forest related activities. This is for both subsistence and commercial production. The forest related activities derive from non-forest timber products (NFTPs) such as timber and environmental services. The NTFP offers a wide span of products, from fruit and herbs for subsistent use, to medicinal plants for commercial matters (Angelsen and Wunder, 2003). In the past, the forests have offered wild meat as well, but this is today banned in Kenya. Timber can contribute as poles and posts to build houses and fences on own land as well as contribute to industrial timber for RaiPly.

Agroforestry is another rapid growing activity in Mount Elgon district and Trans Nzoia district. Many local and international NGO's are emphasising the importance of agroforestry and offers training and seedlings to groups in the local communities.

2.2.2 Dependency on environmental income/ forest products

Dependency on environmental income and forest products vary between households and communities. The major factors that influences the dependency level are five capitals; physical, human, social, financial and natural (Scoones 1998), including inter-household variations and demographic composition, climatic seasonality and location (e.g. Campbell and Luckert, 2002, Angelsen and Wunder, 2003). The average household surrounding Mount Elgon can be categorised according to CIFOR's "coping strategy" category (Angelsen and Wunder, 2003). Households are mainly subsistence-oriented in this group and the collection is based on own consumption or sale. The resource products used by this group have a low value on the market as they require a minimum of skills or capital to gather. The main use is for consumption, and is influenced by market prices, successful harvests and seasonality.

2.2.3 Roles of forest product in rural livelihood strategies

Forest products are seldom the main cash earning for poor households, but are often used as a backup when difficulties and emergencies occur. Cavendish (2003, in Vedeld et al 2004) distinguishes the role of forest resources between three different functions: safety nets, support of current consumption, and as a pathway out of poverty. These three functions are covered by different resources, but can also overlap.

A common view is that poor households have a stronger dependency on forest products, due to lack of alternatives. The alternatives are restricted to the household's level of investment, labour intensives and easy access. Forest resources produced at a small-scale require low levels of capital investment and skills, in contrary to large- scale where the higher incomes are expected to be. At larger quantities equipment and knowledge is needed to create a high income production.

1) Safety net function

Safety net is an insurance function and is an additional income source in periods of predictable and unpredictable shortfalls of other livelihood sources (Vedeld et al, 2004: xiv). Forest products for safety nets are seldom stable and collection of products differs from season and situation.

2) Support of current consumption

The support of current consumption is a gap-filling activity and can be periodical or unpredicted. As this is a gap-filling factor, it does not contribute to reduce poverty, but rather to stabilise the situation. Forest products seldom provide staple food to secure nutrition needs throughout the year. Instead non-timber forest products substitute shortfalls of subsistent production or contribute in non-harvest periods, as a coping strategy (e.g. Angelsen and Wunder, 2003, Vedeld et al, 2004).

The seasonality of NTFP's, support seasonal buffers and storages, such as between staple harvest and employment flexibility. Fruits can be gathered to supplement staple food or stored. Unpredictable occurrences can be diseases, political and tribal conflicts or environmental shocks. In such situations the forest resources can be collected to generate quick cash.

3) A pathway out of poverty

Factors such as diversification of forest strategies, specialised forest strategies and payment for environmental services can contribute to find a pathway out of poverty or reduce the level of poverty (Vedeld et al, 2004).

The poverty situation of rural livelihoods can be divided into two groups: chronic poverty and transitory poverty. Chronic poverty can be defined as a long- enduring, permanent poverty,

even passed on through generations. Transitory poverty is situational and acts more as a stage (Barrett and McPeak, 2004). The poverty line might differ in countries and regions and are often set by the state. The median time in poverty in rural Kenya is set to a lifetime or more and creates challenges for the household and the state to develop strategies to avoid a poverty trap and develop a pathway out of poverty.

When studying the situation of rural livelihoods it is important to make a distinction between structural poverty from stochastic poverty. Structurally poor are rural people who have restrictions to asset endowments, which is crucial for meeting diversification strategies to decrease poverty. The stochastically poor are households who find themselves under the set poverty line while having access to assets that per definition would carry them above the line. These again help to define poverty traps and ways out of poverty.

2.2.4 Sustainable livelihood

The term sustainable livelihood can be defined as “a livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for means of a living: a livelihood which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefit to other livelihoods at the local and global levels and in the short and long term” (Chambers and Conway, 1991:6).

Chambers and Conway (1991) further divide the term sustainable livelihood in two different categories: environmental sustainable livelihood and social sustainable livelihood. Together these two comprises tangible (resources and stores) and intangible (claims and access) livelihood assets, internal and external factors. The environmental means describe assets and resources that people depend on and that their actions makes no sense.. taken affect other livelihoods. The social sustainable livelihood describes the ability to cope with shocks and stress and to preserve for future generations. The two means of a sustainable livelihood forms a net sustainable livelihood and are under constant dynamic changes. One needs to elaborate further on the complexity and diversity of the small-scale farmers and local economic activities to understand the context of rural livelihoods adjacent to Mount Elgon.

2.2.4.1 Sustainable livelihood framework

The framework for analysing sustainable rural livelihoods that Ian Scoones (1998) has developed, attempts to cover how the context affects the resources available, capabilities and abilities of households and how this influences livelihood strategies, which outcomes are generated and the importance that the institutional arena has in this context. The framework has its main base at the rural livelihood as it identifies agricultural intensification/ extensification, livelihood diversification and migration as potential drivers for improving livelihoods.

Drawing further from the definition on sustainable rural livelihood, Scoones (1998) divides the statement into five key elements. The first element is the creation of working days. This gives a picture on how the individual or household plans throughout the year, helps to identify the work cycle of high seasons for cultivation and harvesting as well as the relation of on-farm and off-farm work. The second element he talks about is poverty reduction, the cash flow and strategies of income and expenditure. This is to measure the relevance of poverty and at what level of poverty the livelihood to be analysed is at. The third is of well-being and capabilities. When analysing livelihoods this aspect may have various definitions by the individual, to what extent they define self-esteem, security, vulnerability, power and exclusion. In addition to such non-material aspects, it also considers materialistic values as what they have access to and their capabilities of utilizing these. Following the three elements that focus directly on the livelihood aspect, the last two elements focus on the sustainability term, livelihood adaptation, vulnerability, resilience and the natural resource base, so that the definition of sustainable livelihood is brought together. The first is used to identify how the livelihood situated copes with shocks and stresses and thereby the ability of adaptation and resilience are vital. Shocks are sudden and unpredictable incidents which can cause traumatic outcomes, as natural disasters or epidemics spread through animals and/ or people. Stress is often more predictable and often continuous in its occurrence, but not necessarily easier to react to. Stress can occur through population growth, changes in climate, poor harvest and unreliable transport. The last, but not least element of natural resources is of great concern today. As the livelihoods in this research are of rural matters, the state of the natural resources is of great importance. Natural resources contribute to the livelihoods ability of diversification, poverty reduction and security. The financial situation of many rural livelihoods are quite poor and where they are able to access resources (timber and non-timber

forest products and environmental services), it might contribute to a pathway out of poverty. Therefore the importance of understanding the environmental dynamics are crucial, so that natural resources will not be depleted.

To understand the complex situation one needs to investigate the micro-level adaptation of the households, the meso-level of institutional intervention and the state intervention at the macro-level, as shown in Figure 1. One also needs to look at the historical context, to understand changes that have been undertaken, why and how they have occurred. In Mount Elgon, we need to look at changes enforced by the authorities and how people adjust to the changes. By using the sustainable livelihood framework, one can create a holistic analysis of the household, as there relations and priorities, and get an understanding of macro- micro linkages.

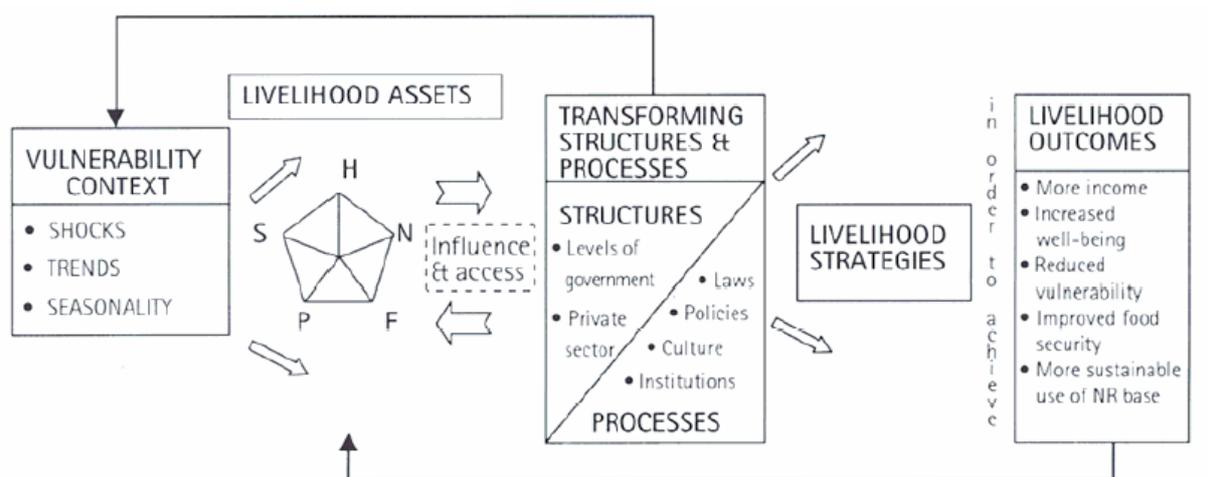


Figure 2. Sustainable Livelihood Framework
(Source: Scoones, 1997 in Allison 2005:7)

2.2.4.2 Livelihood assets

Scoones (1998) divides livelihood assets into four different types of capital: natural, financial, human and social. Natural capital is the natural resources available. As of the people surrounding Mount Elgon it can be seen as water, forest products and climatic condition. The economic or financial capitals are internal tangible assets such as cash, savings, technology and material in the household and external assets such as infrastructure. Ellis (2000) divides the economic/ financial capital further into two: financial and physical. By this he states that the different capitals have different matters. These two depend on and affect each other. The

financial capital is strictly on monetary terms: income; expenditure; savings and credit. The physical capital covers the materialistic and man-made assets: building material, accessible technology and infrastructure. The human capital can vary widely between the household within a same area. Human capital is measured in skills, level of education, diversification of labour roles, how many are able-bodied and health. In the case of communities surrounding Mount Elgon, children start to work at an early age, mainly men are active in wage work, roles are divided between activities connected to livestock and cropping. The last capital Scoones talks about is the social capital. Angelsen and Wunder (2003) divide the social capital into five sub-groupings: ownership; security; access; conflict resolution and rule enforcement. This capital is important due to relations within the community and higher levels of institutions, access to entitlements, within the household and their status when raising a voice to claim a statement. The social network can be crucial for knowledge, access to entitlements and support.

This research tries investigate the situation of households, individually, collectively and combined by using elements of the sustainable livelihood framework, and looking to the different levels of sequencing, substitutions, clustering, access and trade-offs.

In the surroundings of Mount Elgon there have been several activities in the past to try to improve the situation. Training and techniques are shared, people rent land and rent out land if possible to increase land area or to raise income, agricultural activities such as agroforestry is becoming more popular and off-farm labour is prioritised if the opportunity is there. Understanding strategies within these areas can be crucial when investigating rural livelihoods in a specific area, not only to understand the internal dynamics, but also to what extent external factors have an influence. As rural livelihoods often depend on natural resources, it is expected to see differences also in the matter of distance to the forest areas as this affects access.

2.2.4.2 Internal factors

Kinship can be seen as a base for the household's position in the community. Level of wealth is often inherited and difficult to escape due to hinders in the rural livelihood. The level of wealth of the household determines the possibilities of access to materialistic needs, education

level and health. By education it is not only the formal schooling, but also traditional based knowledge. Access to land in rural areas is often passed on through inheritance and family ties are strong. This regulates the location of the household and thereby access to natural resources, markets and other facilities.

Power relations within the household are crucial for the outcome of livelihood strategies. A common approach of research on this issue is to view the household as one single decision-making unit which has a joint welfare function. Sen criticises that such a method is not capable of identifying the distribution of resources access within the household. Gender relations can be defined as the social construction of roles and the relationship between men and women (Ellis, 2000: 139). Women experience more resistance to opportunities, responsibility, benefits in welfare, access to assets within both off- farm and non-farm activities. In many developing countries the women's bargaining power is low and her interests are underestimated. A traditional behaviour of women is also to prioritise the family members and thereby become more dependent on the man's contribution of household entitlements, underestimating the woman's needs and opportunities (in Francis, 2000). In this sense; equity between household members is further weakened and internal conflicts might evolve and the ability of developing sustainable livelihood strategies might decline. Such traditions are common in rural Kenya.

2.2.4.3 External factors

The external factors can be divided into two main categories, the vulnerability context and the transformation of structures and processes (figure 1). The vulnerability context is the degree of exposure to risk, shocks and stress. This can emerge from changes in climate, markets, support by near or distant relations (e.g. family or organisations). They differ in the degree of influence, due to the household's level of sensitivity and resilience. The goal of the household would be to have a low degree of sensitivity and high degree of resilience (Ellis, 2000).

The institutional process is formed through history, politics, economic trends, climate, demography and social differentiation (Ellis, 2000). These factors also affect each other. Local and governmental institutions develop laws and regulations that influence the choice of

livelihood strategy through market regulations, access to resources, welfare, national and local development strategies, ownership and the distribution of rights and duties.

The importance of natural resources is not easy to make quantify in terms of income. When the impact and importance of forest environmental incomes are not included in the national economical statistics, this can lead to an underestimation of rural incomes and therefore the national strategy for poverty reduction will not be suitable. The knowledge on appropriation of natural resources, why and how the diversification is developed and for what it is used (substantial, production or cash income) the national and local authorities are more capable of setting policies and strategies to maintain biodiversity and sustain what the forest can offer for future generations (Vedeld et al, 2004).

To be able to create effective and sustainable strategies on how to manage the forest, policymakers need to allocate the amount of resources that are used, which resources are most important and for what reason, and the degree of dependence on the resource by the dependant groups. In addition, policymakers need to have knowledge on who are the collectors and if there are major differences in diversification of allocation between households around the area. With such information, strategies can be presented in a way that has a positive impact both ways, for the policymakers as well as the dependent people. Knowledge and skills can be shared on how to maintain a sustainable collection of resources and new and more effective techniques of extracting the resources that creates higher incomes. In many forest areas, it is not only the “local poor people” that depend on forest resources. The government and policymakers also need to look in to larger consumers, such as industries.

2.2.5 Managing common pool resources

One of the most common theories to describe the challenges of managing natural resources is Garret Hardin’s Tragedy of the Commons (1968, in Ostrom 1990). His theory has a focus on negative outcomes such as degradation of the environment when several individuals has free access to a scarce resource, that the individual will use with no limit – in a world that is limited (Ostrom, 1990). Many scholars support Hardin’s theory and that the state should control most of the common resources. If not, the individual will overexploit to own benefit

which will lead to depletion. Elinor Ostrom finds that there is not yet a complete intellectual tool or model to manage natural resources or to understand the complex situation and why some people are able to carry out a successful management system as others only face problems. Through academic and empirical research she aims to lead a path to develop a new analytical framework for management. As the tradition of supporting the tragedy of commons, expectations have been that the actors of a common pool resource feel pressured to reach a suboptimal production due to their livelihood situation and this often leads to disastrous results. Elinor Ostrom's aim of study is to connect the missing link in the management approaches of natural resources that were highlighted until the 1980's. This missing link in analytical and practical tools for management is the ability of participants to collectively take action through self-organisation on sustainable use of the environment. All institutions are subjected to stress and shocks, weaknesses and failure, either they are formal or informal, at a large or small- scale. To understand the complex organisational structure to predict challenges and solutions, theory is needed in addition to empirical studies.

In the past, there has been an increasing interest in integrating conservation and development issues by developing community institutions to manage natural resources in developing countries. The idea of creating such institutions is important and is expected to be efficient. When developing institutions it is important to recognise the already existing ones; through history many community institutions have built up their knowledge on sustainable use of natural resources (especially forests and water resources) and they also know which actors have positive contribution to strategy planning on common property resources (CPR). Although traditional community institutions have gained knowledge in managing the natural resources, positive outcome is not given (Fischer et.al, 2005). When talking about management of CPR's there are some key definitions that should be clarified. A common property resource is a term when natural resources are used by many individuals in common, for example the Mount Elgon Ecosystem. Within the CPR there are resource systems and resource units, who depend on each other. The resource system are "stock variables that are capable, under favourable conditions, of producing maximum quantity of a flow variable without harming the stock or the resource system itself", such as grazing areas, ground water basins, river streams that people surrounding Mount Elgon (reserves and park) depend on for their livelihoods. The resource systems are used jointly. The resource units are "what the individual appropriate or use from the resource systems". Resource units of the Mount Elgon

ecosystem are the cubic meter of water extracted from the water catchments, amount of fodder for grazing and trees collected (Ostrom, 1990: 30).

Elinor Ostrom (1990) has through her work and research on common property regimes of small- scale institutions developed eight principles that seem conducive to secure long-enduring CPR's. This is to create a sustainable use of resource systems and for the sustainability of livelihoods. History of access, use and management shows a trend of over-exploitation and arising conflicts between the managers and the dependants. Reasons for this have been widely discussed and there is no definite answer; if the previous management have forced the local population to act individually to secure their livelihood, climate changes that forces to extract the resources with negative consequences or if it managers that have not considered the local peoples lack of choices.

This has been one of the most common frameworks to analyze operations of CPR's and it attempts to address the issues of maintenance of cooperation and potential for collective action within a social institution; that the ecological systems are dynamic and so should the rules and regulations also be, and that ecological systems can occupy multiple stable states and move rapidly between them (Anderies et.al, 2004). The principles also try to see the complexity and interaction of these three main issues.

Success Principles	Description
1. Clearly defined boundaries	Physical boundaries of the reserves and park must be clearly defined as well as the regulation of extraction of resources
2. Clearly defined membership and rights	There are multilayered rights systems (internal and external) and include decisions of the right to physical access the area, the right to withdraw resources, to manage or decide on use, to exclude others and to alienate others through sales or leasing.
3. Congruence between appropriation and provision rules and local conditions	There should be a balance between inputs and outputs of the forest area, as well as regulations for equipment, amount and timeframe of collection.
4. Collective choice arrangements	By establishing community based organizations and training groups, participation can increase and regulations are set to better suit local circumstances.
5. Effective monitoring procedures	Those who monitor and audit CPR conditions are accountable
6. Legitimate system for graduated sanctions	Rules and sanctions should be clear and graduated to the seriousness of offence. It should be assessed and imposed by accountable officials and/ or fellow users. Appropriators that act as monitors, should be appreciated.
7. Cheap/accessible conflict- resolution mechanisms	Conflict resolution should be swift, inexpensive and fair. Not only local participation in the management arena, but also to face conflicts.
8. Recognition of rights to organize	No challenge by external government authorities; if they come in and overrule local decisions, local authority is undermined.

**Figur 3. Modified design principles for long-enduring CPR
(Source: Ostrom, 1990 in Vedeld 2002:18)**

To organise the appropriators for collective action for management of CPR's several uncertainties can arise. External uncertainties for the people surrounding Mount Elgon can be rough and difficult to predict. The quantity of rainfall and periods may not come as expected, outbreaks of diseases between wildlife and livestock or humans and market fluctuations. Internal uncertainties are lack of thorough knowledge, structure and strength of the resource system and allocation of appropriators. The economic situation of the appropriator affects the ability and motivation to individual or collective problem solving. It is important that the

appropriator is ensured that the family will survive the present year before risks can be taken to improve conditions in the future.

When including the appropriators it can also motivate actors to follow the rights and duties and minimize the level of conflict. If regulations are monitored and sanctioned according to the dependencies and sustainability of the commons, an individual that reports violations can increase his or hers prestige and status and the violator will experience the opposite. All local institutions and local communities have rules and regulations. By this there is also a need for a conflict resolution mechanism between the actors. Theorists and practitioners agree that people often carry out sustainable resource management when they are able to participate in decision-making. Through participation membership rules, clear boundaries, congruence between provision and appropriation systems, regulation practice such as decision-making, monitoring and conflict resolution are clear and transparent and the people experience a stronger degree of guarantee (Fischer et.al, 2005, Vedeld, 2002).

2.2.6 The structure – process model

Trends in management of natural resources have shifted towards a more participatory approach as previous approaches (e.g. the fortress approach) have been proved not to successful. The process of including local participation is not an easy action. There are many actors or stakeholders that need to be taken into consideration, as well as the relations between them. Vedeld (2002) refers to the structure – process model as an attempt to analyze changes. The present management institutions of Mount Elgon, the Forest Department, the Kenyan Wildlife Authority and the Mount Elgon County Council, have all recognized the need of change in there management structure. It has been carried out as a top- down approach with minimal participation by the local people, who were the original managers of the ecosystem. The structure – process model can help to better understand the complexity of relations of actors or stakeholders, the institutional structure and of developing coping strategies for possible future scenarios.

Local participation and institution- building deals in particular with the redistribution of powers, resources, rights and duties. The life mode model helps to understand the mental ideas of social institutions. Social institutions are “going concerns that structure relationships

between individuals in a society” (Vedeld, 2002: 5). The social individual is formed through primary and secondary socialization processes. But local communities are not homogeneous, even though they have common ground rules. In both Trans Nzoia district and Mount Elgon district, many of Kenya’s tribes are mixed together. Ostrom’s eight design principals for long enduring CPR’s are included to better understand the local management of natural resources. Pretty’s idea on participation through level of intervention and as devolution of powers to lower or parallel levels helps understand the dynamics.

The structure- process model emphasises the dynamics of five components. First, the key challenge of biodiversity conservation is the resource(s) or area to be protected, are complex and dynamic. The resource or area has a physical structure which is crucial for problem description, explaining and solution. Secondly, the actor structure describes the relevant actors in the given situation, who should be involved or not, existing or new, analysis of values and interests of the various actors. The third component, power, rights and authority and duties structure, describes what issues are emphasised, who has the final control and how the power and authority is distributed between groups of actors. The rights and duties include economic, legal and organisational dimensions, how cases are approached and handled. Following is the forth component, decision- making arena structure, which describes where and how decisions are made in different arenas and further implemented. Lastly, the management culture within the organisation covers the internal overall interests and values of the group. The management culture describes how situations are understood and dealt with.

The process of institutional change is often a slow process of social change over time. As there are multiple factors (internal and external) and actors needed to consider in biodiversity conservation, the changes are time-consuming. When actors and their relationship are defined, the process of policy formulation can evolve. Ideas evolve, decisions are discussed and made, implementation process begins and managers evaluate. “One should see the identification, maintenance, enhancement or establishment and functioning of local institutions as a starting point for a process of local social change that implies an improved management of biodiversity in a local setting” (Vedeld, 2002: 20).

Historically there has been an ongoing tension between local people and the FD and KWS. The local people have for a longer period of time felt excluded. Their interests and knowledge has not been taken into consideration and the feel that they have not gained any benefits nor

compensations for their losses due to the past and present management of the forest area. There is often a lack of competence in designing good processes to increase the level of local participation. In the revised Forest Act 2005, it was emphasised increased local participation through the “Kenyan Forest Service”. The main implementation of this forest association is to be carried out from January 2007 (MECC, 05.12.06). To be successful, a thorough analysis and understanding of the structures, identifying the interests of the actors are crucial.

3. Study Area and Methodology

This first part of this chapter gives a brief of the study area where the research was conducted. The location of study area and what the ecosystem has to offer are important to gain a holistic understanding of the rural communities' situation. The second part briefly describes the procedures of data collection and methods used. Lastly, the chapter mentions validity, reliability and limitations of the research.

3.1 Study area

Mount Elgon is located in the Western Province of Kenya and falls within Mount Elgon district and Trans Nzoia district. Mount Elgon Ecosystem is located approximately 100 km northeast of Lake Victoria and lies on the border of Uganda and Kenya. The mountain is of volcanic origin and reaches an altitude of 4320 meters above sea level. This makes the mountain one of the highest mountains in the East African region. Volcanic eruption and the climate have over a long period created a varied landscape of both gentle and steep slopes, valleys and gorges (Vedeld et al, 2005).

3.1.1 Water catchments

Due to its biodiversity, geology and landscape, the mountain has an important influence on the climate, soils, topography, hydrology and land use patterns. Mount Elgon is one of five major water catchments in Kenya. It is the major water source for Lake Victoria, two major rivers in Kenya: the Nzoia and Turkwell. The Nzoia river runs south through 123 sub-locations on its way to Lake Victoria, the Turkwell flows north and crosses 25 sub-locations towards Lake Turkana and westwards the Malakisi River provides water for 18 before flowing into Uganda. The good water conditions make provides good conditions for both agriculture and forestry, which are the main land uses in this area (Laman et al, 2001, Soini, 2006).

3.1.2 Biodiversity

The ecosystem contains an exceptional variety of flora and fauna which makes the ecosystem a priority for research and conservation. Many species are endemic to the area.

Flora: The vegetation of Mount Elgon can be divided into 4 broad classes within the altitudes; (i) a community of mixed montane forest below 2500m, (ii) a broad belt of bamboo and low canopy montane forest between 2500 m and 3000m, (iii) a zone of high montane health from 3000m to 3500 m and (iv) high moorland community above 3500 m. In addition the area includes lowland forest and wooded grassland. The majority of plant species is between 2000 and 3500 meters above sea level and includes several endemic species (Vedeld et al, 2005). Local variations in topography, slope, aspect, rainfall and soil impose variation in vegetation composition.

Fauna: There are about 240 species of birds, larger mammals, insects and reptiles in the Mount Elgon ecosystem. As there is no physical man-made separation of Mount Elgon along the borderline between Uganda and Kenya, it is difficult to specify which species that is special for each country. The size of the mountain is sufficient to host viable populations of several larger (and rare) species of mammals. The main species of larger mammals that are found here are buffaloes, leopards, forest hogs, bushbuck, and the various monkeys. But some higher numbers are expected to exist on the Kenyan side, as regulations for hunting are different. For example, elephants are found on the Kenyan side, but no longer exist in Mount Elgon, Uganda.

There have been less research on smaller mammals and most quantitative registration inventories are dated back in the 1950's and 60's. In addition to old research, the location of data collected was limited. The state of research is stated as far from complete, but indicates that the Afrotropic highland biome species are above average for East- Africa region. Some species that are mentioned are the African Crowned eagle, the Ring-necked Francolin, the hyrax, the fruit bat and insectivorous bats (Cameron et al, 2000).

IUCN has identified 22 mammals, 2 insects and 13 bird species as globally threatened.

3.1.3 The People

In 2001, the population census of Kenya found that there are 645 170 people living in Trans Nzoia district and 158 130 in Mount Elgon district. The population growth is respectively 4,2% and 3.2 %. Trans Nzoia district covers 2467 square kilometres and Mount Elgon covers 937 square metres.

The inhabitants constitute several diverse ethnic groups. The majority, over 80%, live in rural areas, with subsistence agriculture being their main economic activity securing their livelihood (Soini, 2006). Most of the cultivated land is divided between small-scale farmers, with an average land on 2 acres (Ongugo et al, 2001). In the Endebess- Kitale plain, the Agricultural Development Corporation (ADC) runs some large-scale farms which cover the total of 66 000 ha (Soini, 2006).

People living around the Mount Elgon ecosystem belong to several different tribes. The tribes that represent the majority are the Luhya, the Teso and the Sabaots (Soini, 2006). Other tribes presented in the area are; Kalenji, Kikuyu, Turkana, Teso, Kisii, Luo, and some tribes that have immigrated from Uganda. The main religions are Christianity and Muslim. The languages include Kiswahili, English and local languages (NEMA 02.11.2006). In Endebess, Trans Nzoia local people often refer the multi-ethnicity as their cosmopolitan community. Original inhabitants, who were primarily livestock herders and the immigrants, have had strong influence on each other.

The complex assemblage of tribes has been, and still are, a major source of conflict in the areas. Tribes have different claims of land, livestock raiding is common and historical events are crucial. It is not only within or between tribes conflicts occur. Management of protected environmental areas have forced displacement and shifts in livelihood strategies and constrained the access to resources and entitlements. As the “fortress approach” has been widely used in Kenya, people have felt neglected and alienated and that rights have been taken away from them.

3.1.3.1 Resource use

Communities surrounding have used the Mount Elgon Ecosystem for a variety of reasons or many years. The value of Mount Elgon resources can be categorized into three: traditional socio-cultural values, ecological and economic and livelihood related values (Nield et al, 1999). The forest area contributes to traditional religious and cultural activities, such as circumcision ceremonies and spiritual gatherings. The most common resources that are extracted from the forest today are firewood, timber, ropes, pole wood, bamboo shoots and stems, and non/timber forest products such as vegetables, honey, bush meat, bark, fruits, roots, herbs for traditional medicine and for grazing (Scott, 1994).

3.2 Data collection and analysis

3.2.1 Sampling procedure

Kenya is administratively organised in a hierarchically system of six levels, including village, sub-location, location, division, district and province. The study area is located in two districts, Mount Elgon district and Trans Nzoia district. Further more, the study area is again divided in six divisions in the two provinces including Cheptais, Kopsiro, Kapsokwony, Kaptama, Saboti and Endebess. Some divisions only cover the border of reserves or of park, while others touch two of the protected areas. The visited areas were selected due to their distance to the forest reserves or national park in each district. Administrations are decentralized mainly down to locations, but the forest management of decision-making have their locations at the district level; Kitale in Trans Nzoia and Kapsokwony in Mount Elgon.

The different research areas will be referred to as *Trans Nzoia*, *Mount Elgon* and the *National Park*. As there are two forest reserves, these will be referred to by the district they are located in: the forest reserve in *Trans Nzoia* and the forest reserve in *Mount Elgon*. The National Park is also located in Trans Nzoia. To avoid to many confusions, it will be referred to by the management regime. Further, the villages are categorized to be able to determine the more specific locations and their distance to the management regimes.

Collection of household information and management information was carried out during November and December 2006. The target groups for this research were all households surrounding Mount Elgon, forest resource users or not, as they could better help understand livelihood strategies chosen in the area. A sample of 134 households was made, between 10 and 15 in each village. Stratified random sampling was used to include certain segments of the population in a limited sampling size, in this case the distance to forest products being the strata. The assumption was that households face different challenges and opportunities according to distance and access to forest products.

Management institutions and key informants were contacted to supplement the information gathered in the field. This could help clarify formalities and relations present in the different villages. Management institutions were important to interview to survey the different management regimes in the three conservation areas.

The study focused on four districts: Kapsokwony, Kaptama, Saboti and Endebess. Within these districts, nine villages were stratified selected according to their distance to reserve or park border: three towards the Mount Elgon Forest Reserve (MEFR) in Mount Elgon division and six in Trans Nzoia: three according to the Trans Nzoia Forest Reserve (TNFR) and three to National Park (NP). There were some out springs from selected villages as many villages are not clearly divided. They still accessed common chiefs, markets, roads, local administrative regulations and norms. The distance is divided into close to the reserve or the park (within 5 km) or distant from the reserve or the park (more than 5 km).

The selection in Trans Nzoia according to the forest reserve:

- Kiboiwa, Endebess division, within 5 km from the border. Some out spring to Basale village.
- Namwichula, Endebess division, 5-10 km from the border.
- Chesitia, Endebess division, 5-10 km from the border. Some out spring to Kapkomon (Saboti division).

The selection in Trans Nzoia according to the national park:

- Sendera, Endebess division, 0-5 km from the border.

- Kokwo, Endebess division, 0-5 km from the border. Some out spring to Musemwa.
- Simita, Saboti division, 5-10 km from the border. Some out spring to Nasianda.

The selection in Mount Elgon according to the forest reserve

- Sogirkit, Kapsokwony division, 0-5 km from the border.
- Kamptiong, Kapsokwony division, 0-5 km from the border. Some out spring to Kween.
- Chepinyini, Kaptama division, 5- 10 km from the border.

3.2.2 Reconnaissance visit and recruitment of interviewers.

A reconnaissance visit was made in the study area with the purpose gaining acquaintance with the area and people, testing the semi-structured interviews and guidelines, testing the assistants and enumerator competence, identifying key informants and gathering groups together. Two assistants, one enumerator and the researcher shared the task of conducting household interviews and group interviews. The researcher, together with the enumerator, was the only one who conducted key informant interviews. At the end of the day, the group discussed the collected interviews for possible clarifications. The criterion for selecting the assistants was based on their background: education, language and local knowledge.

3.2.3 Data collection techniques

The primary data for this research was obtained through key informant interviews and semi-structured household interviews, and participatory rural appraisal tools, such as group discussions and observation. Secondary data was conducted through reading policy documents and literature reviews. These were collected from among the Forest Department, the Kenyan Wildlife Service, NEMA and NGOs present in the area (SCC-VI), as well as relevant literature found through the library of UMB.

(i) Pre-testing of the questionnaire: Pre-testing of the questionnaire was carried out to as an attempt to clear up lacking information, overlapping questions and misunderstandings

throughout the questionnaire (Bryman, 2004). This was also an opportunity to get an idea of how the researcher and assistants performed.

(ii) Key informant interviews: Key informant interviews were conducted to gain special knowledge on Mount Elgon, how its resources are managed and the local communities (Mikkelsen, 2005). The key informants included relevant stakeholders as local chairpersons, elders and employees at the FD, MECC and relevant NGOs. Some of the key informant interviews were carried out as group discussions as we were able to join meetings held for the village elders and CBO's,

(iii) Semi- structured household interviews: A semi-structured interview refers to a context in which the interviewer has a series of questions that are in the general form of an interview schedule but where one is able to vary the sequence of questions. Also, the interviewer usually has some latitude to ask further questions in response to what are seen as significant replies (Bryman, 2004: 113). The semi-structured household interview (see Appendix 1) was conducted to examine the different livelihood strategies and the extent of dependence and access to natural resource. This method was also used to ensure the flow of interview so that they could be used for comparison during the data analysis process.

The head of household was the preferred interviewee, but if he or she was not present, the eldest member was selected. Most households were willing to be interviewed. Before starting the interview, the interviewer (and interpreter) introduced themselves and the scope of the study. The questions contained open- ended questions and closed-ended that covered household background, social and economic household activities, natural resource use, dependence and management, and historical information. By this, the interview could capture qualitative and quantitative measurements (see Appendix 1).

The information collected can be organised by the following themes: socio-economic and demographic information, knowledge about natural resource management, perspectives of management and possibilities and abilities for change. Due to the large amount of data necessary to cover all objectives, the time-period of interview ranged from 45 minutes to two hours, depending on the amount of information given.

(iv) Participatory rural appraisal (PRA)

PRA gives researchers the opportunity and skills to facilitate local people to articulate their opinions, identify and prioritize their problems and needs (Nemarundwe and Richards, 2002: 168 in Campbell and Luckert, 2002). Research shows that local people often know more than they show or portray, and PRA is a tool to increase the space for participants to elaborate on their knowledge and values. PRA can be a two way stream: outsiders learn about situations from inside and insiders can analyze their own problems and empower the rural people. In this research, group interviews were held. The group discussions were carried out in villages close and distant to the forest boundaries to gain general information of the local community perceptions. There was an emphasis on a natural conversation, and a guideline was used to ensure that all wanted topics were covered.

3.2.4 Observation

Participant observation was used to assess major economic activities and livelihood diversification, location of settlement and protected areas, accessibility to resources, as well as access to markets and infrastructure.

In addition to the participant observation in households, visits were made to Agricultural shows, visits to reserve and park sites and participated meetings with NGOs and extended agricultural and forestry institutions.

3.3 Variables and definitions

A total of 207 variables were entered in the excel sheet from the household surveys (see Appendix 1). All can not be described here. Most of them were entered as they were asked in the interview. The main determinant variables to be explained are following:

Household is defined by the permanent residents at the household unit. The members of household are the people who contribute to production and consumption, and who share costs and income. Connected to the household, the head of household is specified to identify the relations of male and female head of households

Occupation explains the primary and secondary occupation of the household, to later be connected to diversified income strategies.

Reason for settlement is categorized to length of settlement in the area and the reason for settling in the specified area. This is to identify demographical trends and benefits and challenges at the different locations.

Land ownership includes own land and rental land, but are specified in the survey.

External factors that are expected to influence the household income are location, distant to the park, demographical trends, natural vagaries, access to markets and market prices, relations to reserve/ park officials and its management.

Household opportunities and challenges include the relationship to internal and external household factors. This is to see the household's ability to cope with stress and shocks as well as to determine future preventions.

3.4 Income activities

The total income is estimated through economic activities that are carried out in the household that participated in this research. These are further elaborated to specify the subsistent base, cash flow, expenditures and influence by external factors.

Agricultural income is the sum of activities carried out to cover subsistent needs and to generate income (cultivation and livestock). The economic values are estimated through the production costs the household faces and the individual market prices, as there are no fixed market price for agricultural products in Kenya.

Environmental income is the sum of activities attached to the forest resources used. The majority of informants collect or purchase forest products, but no one informs that they sell these. This makes it difficult to estimate forest related income, but does help to identify the

dependency as amount collected is shared. Regulations of resource extraction varies, but has been clarified by elaboration and through talking to stakeholders.

Off-farm employment is estimated by all revenues formed by activities carried out outside own land. This might include market activities and non-farm employment.

3.4.1 Empirical models

From the livelihood framework, it shows that a mix of strategies can maximize the utility. The income strategies can be divided into following four groups:

- 1) Purely subsistent agriculture
- 2) Combining strategy 1 with collection of forest products
- 3) Combining strategy 1 with off-farm activities
- 4) A mixed strategy, combining strategy 1 to 3

(Tumusiime, 2006)

3.5 Validity and reliability of the data collected

Validity and reliability of the data collected is to ensure good quality research. Validity concerns that whether the concept really measures the aimed concept, and the reliability measured the consistency of data (Bryman, 2004).

To obtain this, it was made clear in the introduction of interviews the purpose of the research. By clarifying the scientific and academic purpose and that they would not experience negative affects when contributing to the research. Triangulation was used to cross-check the response given. Assistants and interpreter was recruited locally to minimize the tension towards and outsider intruding their personal space.

3.6 Survey limitations

During the data collection, there were some challenges to follow the strategy step by step.

- The data collection was carried out in November and December. These months are expected to be the end of rainy season around Mount Elgon. In 2006, the rainy season

was prolonged. Heavy rainfall led to challenges of moving around in and to the villages to be visited. Flexibility was demanded, both from researcher and respondents. As the road conditions varied on a daily basis, some of the aimed villages were not fully accounted for. For example in the case of visiting Kokwo, a village bordering Mount Elgon National Park. The second day of visit to fulfil the number of respondents, this village was inaccessible. Musemwa, the closest accessible village to the original selected was visited instead. In such incidents it was taken into consideration the distance the original village and to park/ reserve border. The flexibility was also needed in consideration of timing.

- Some respondents hesitated in giving thorough and correct information. This concerned especially questions concerning collection of forest products and its regulations. There is no free access to the forest products and the low income level of the households makes it challenging to follow all regulations. The information flow was improved by explaining that the information to be collected was purely for academic matters and that the questionnaires would stay anonymous.
- Total net income (from farming, off-farm work and collection of forest products) was difficult to assess as there is minimal book- keepings and memory recall problem were obvious.
- The time of visit was in the beginning of harvest season of maize. Farmers were busy working and preparing on farm land. There are strong fluctuations in market prize in the main harvest season and this makes it difficult for the farmer to predict next month's income.
- The researcher experienced some reluctance by forest officials. This lead to rescheduling of meetings, biased information flow and in the case of KWS, a meeting with the headquarters was not possible.

For the analysis, I have mainly based on response from the household interviews. These responses have been analysed using Scientific Package for Social Scientists (SPSS 15.0) and Microsoft Excel.

4 Results and Discussion

This chapter will introduce the findings and results of the research and draw connections to theory and literature presented in chapter 2.

4.1 Present livelihood situation in districts around Mount Elgon

Strategies for sustaining the rural livelihood and the most common diversification methods are described. Rural households produce mainly for subsistent use, but are not able to manage on one source of production. External household factors and internal socio-economic assets both influence strategies chosen on how to produce and generate incomes. As on-farm activities cannot cover all basic needs, environmental resources also become important contribution. The households are described according to their location to the forest reserves in Trans Nzoia and in Mount Elgon, and to the national park, also in Trans Nzoia.

4.1.1 Internal household factors

Internal factors that contributes to shape the livelihood can be described through Scoones (1998) and Ellis' (2000) livelihood assets; access to the 5 capitals. The 5 capitals are represented by Ellis as physical capital, human capital, natural capital, financial capital, and social capital.

1) Physical capital

The most important capital for the present rural livelihoods surrounding the Mount Elgon ecosystem is physical capital such as access to land, livestock and related man-made necessities. This was stated in surveys and group meetings. As agricultural activities are significant for the rural population's livelihood, access to land and livestock are crucial to reach or maintain a sustainable livelihood.

Access to land: All respondents have access to land and most households own some or all of their land privately (97%). Some also rent additional land to increase their production. The average rent per acre is 4000 KSh (in 2005) with little variation. Few have fragmented land and the average total access to land (own and rent) is 3,8 acres per household. Total access to land in the respective research areas are shown in Table 4.2 and shows that people in Mount Elgon district have an average access of 4,5 acres, which can make a considerable difference in production as the households do not contain more members. The most common acquisition of land is through purchase (56%) or inheritance (37%). This relates to all three research areas.

Access to livestock: Livestock have a dual importance for livelihoods, such as improving diet and generating income. As shown in Table 1, many animals are kept for subsistence. While doing this they also act as safety nets and on substitutes. Animals are kept in case of emergencies, for exchange and to sell to cover school fees. Hunting of wildlife is banned in Kenya. One outcome from this change of policy was that rural people saw a stronger need to keep livestock to maintain food consumption level. The distribution of the most common livestock activities are shown in this table. Income generation from livestock will be discussed further in 4.1.3.1.

Table 1. Livestock activities around Mount Elgon, Kenya 2005

Livestock production		Trans Nzoia (N= 47)	Mount Elgon (N= 49)	National Park (N= 47)	Total sample (N=134)
Cattle	Keepers	70	93	68	76,9
	All for subsistence use	36	38	37	37,2
	Safety net	2	0	6	3
Poultry	Keepers	85	73	64	74
	All for subsistence use	58	48	60	55
	Safety net	5	0	7	4
Goat	Keepers	17	23	32	29
	All for subsistence use	38	67	80	61
	Safety net	1	22	27	21
Sheep	Keepers	47	63	28	46
	All for subsistence use	46	56	85	62
	Safety net	18	18	31	22
Donkey	Keepers	28	20	13	19
	All for subsistence use	54	50	83	62
	Safety net	23	13	0	4
No livestock		2	3	9	6

All numbers are described in percentage of the research units.

2) Human capital

Human capital refers to the labor available to the household, its quantity and quality (age, education, skills) (Ellis, 2000). This source of capital is determined by the household composition such as sexual division, age and size (including births, deaths and marriage). This composition influences the decision-making arena in terms of how activities are distributed. Besides this, the human capital is determined by external inputs, such as education and health facilities. Higher education leads to the possibility of higher waged off-farm employments, and good or improved health increases the labor capacity on the farm and off-farm. Socio- economic characteristics of the households are shown in Table 2.

In the surroundings of Mount Elgon ecosystem, the average household size is 7 members, with little variation. The average age of the head of household is 46 years with the majority within the group 31-50 years (45 %) in all research areas. The general education level is quite low; the majority of head of households have primary level (49 %). Most household members (including head) have some education, the main portion at primary school level. Primary education improves the literacy rate (individually and regionally), but do not lead to specialization, nor greater skills that can contribute to improve the household situation. The low level of education might be because the majority of households have parents with remaining children of relative young age. Older children marry and join their spouses household or settles on own land. This increases the household consumer worker ratio (Tumusiime, 2006). As the majority of members do not lie within the expected working age (15-64), the household depends more on the children's participation in production activities, hence making them unable to attend full schooling. Many of the older children that have reached the working age migrate to find work or education elsewhere, without being able to share revenues with their parent's household.

The health situation is crucial to labor diversification and production intensity. Physical strength is needed to carry out heavy duties in effective ways. The household are vulnerable to illness and debilitating health problems. With frequent health problems, direct and indirect costs increases through treatment and loss of important labor time.

Table 2. Socio-economic characteristics of the household head in areas surrounding Mount Elgon, Kenya 2006

Socio-economic parameters	Variables	Trans Nzoia (N=47)	Mount Elgon (N=40)	National Park (N=47)	Total sample (N= 134)
HH members (mean)		8	7	7	7
Head of household (%)	Man	85	90	90	88
	Women	15	10	10	35
Education level of head (%)	No education	17	5	15	12
	Primary	60	37	51	49
	Secondary	21	43	17	27
	Tertiary	2	15	17	11
Age of household head (%)	18-30	13	25	23	20
	31-50	55	38	43	45
	> 50	32	37	34	34
Occupation of head (%)	Farmer	94	80	89	88
	Business	21	10	21	17
	Employed	13	10	11	11
Total access to land (acre)		3,3	4,5	3,5	3,8

The distribution of activities is mainly decided by the head of household. 13 % specifies that the male head of household appears as the umbrella of the household, and several of the remaining respondents describes the head of household as the one with most responsibility. Households that were led by women informed of additional challenges as they experience restricted opportunities. In these situations, the eldest boy(s) often contribute when important decisions need to be dealt with. All members of households contribute to some extent, but equity between genders seems to be low, which is a common tradition in rural Kenya (Francis, 2000). Activities within the household that contributes to production and consumption is diversified according to the members situation and capacity; younger children are mainly pupils, but help with lighter duties. The workload typically increase through age, women are mainly caretakers of the household, men are the main contributors to the household entitlements and elders spreads knowledge and advice to the household and community members.

3) Natural capital

For the people under study, natural capital is associated with access to environmental resources. Resources that the rural people surrounding the Mount Elgon ecosystem depend most on today are water, firewood and building material. Access to these can be crucial for

the day to day survival. These resources are found inside the protected areas and also outside, in the local community. Findings show that everyone around Mount Elgon has access to natural resources: 99% collect resources themselves or purchase from other collectors. Only 1 % inform that they do not use any timber or non-timber forest products at all. The distribution of and access to environmental good differs, due to the composition of settlements, location of household according to the reserve or park area, and the management of resources. The reserves are accessible, with certain restrictions, while the park is strictly prohibited for collection. 51% acknowledge collection within protected area zone and 75 % collects outside boundaries.

Purchases are carried out in the local community, through traveling collectors or at the local market. During the research, traveling collectors were observed, but we were not able to interview any of them. All respondents informed that the total quantity collected or purchased is used for own consumption and substitutes, none is used for further sales. Though some trading activity do exist. Even though environmental resources are not always easy to make quantify in terms of income, they make a big contribution to sustaining and/ or improving the livelihood situation. This be further discussed later in the chapter.

4) Financial capital

The financial capital is assets of monetary terms such as income, savings and credit. These are assets that contribute to the household's wealth, diversification strategies and improved livelihood activities. Definite information on this issue proved difficult to gather in the surroundings of the Mount Elgon ecosystem, as income is for many a vulnerable topic. Scholars and respondents agree on that fluctuating price, low levels of income, high expenses and the operational planning of day-to-day activities constrain savings. Some 54% of the respondents mention capital (formal/ informal credit markets, loans and savings) as a main challenge to improve their livelihood. Few or none have access to these assets. The main form of access to credit is through reciprocal activities from family, kin and closest neighbors.

5) Social capital

Social capital is often referred to as social networks: “the structure of relations between actors and among actors” (Colemann in Pretty and Ward, 2001: 211). Such social networks compound norms and values of a certain group of people to create a sustainable livelihood. Angelsen and Wunder’s (2003) sub-grouping (ownership; security; access; conflict resolution; rule enforcement) clarifies the position in the network and how the position can affect access to the previous capitals. Important positioning can be traditional relations to kin, chiefs, village elders and forest officials that can improve your position through access to entitlements, resources, starting position and support. Such social capital is often built on trust; reciprocity and exchange; common rules, norms and sanctions; and connectedness, networks and groups (Pretty and Ward, 2001).

Other important networks in the areas surrounding Mount Elgon are CBOs (e.g. self-help groups, tree nursery groups, women groups and youth groups) and NGOs. Environmental change and regulations of protectorates have made local people seek for substitutions through reciprocity, cooperation and investing in group activities. Access and relation to such networks can contribute to the ability of diversification of livelihood. 16 % have started to grow trees and Napier on own land; NGOs and CBOs are present in all research areas for training on substitution activities and the importance of sustaining the forest area. For instance, the Swedish SCC-Vi is currently educating self- organized groups on tree nurseries and capacity building. Scholar’s description of the importance of social networks is also acknowledged by the rural people living in communities adjacent to Mount Elgon. When arriving in the various communities, the willingness of sharing information was improved when the approval was stated by chiefs, village elders or key actors within NGOs and CBOs.

The social structure and organization can also benefit access to resources within the protected areas and to collective action. Some respondents stated that local people with good relationship and connection to the forest officials benefited mobilization and access to the forest. Some have been given plots at the encroached areas for cultivation and they get to collect at lower prices. The main reason mentioned for collective action is when forest fires

occur. Regardless of relationships and roles in the society, everybody contributes to extinguish fires as it aggravates security for the whole population as well as the environment.

Development of new environmentally concerned groups is supported by the governmental institutions due to their future strategy to increase the level of participation by local people. This is to improve the management's relationship to the local people and to improve the cooperation of preserving the environment. Some recently developed CBOs are: Mount Elgon Focusing at Forestry Network (MEFAFN), Forest Action Plan (FAN), and Participation Forest Management (PFM), all located in Kaptama, KAMKWEMI in Kapsokwony, and Kapseta Womens Group (KWG) and TECHKA in Saboti division.

Summary internal household factors:

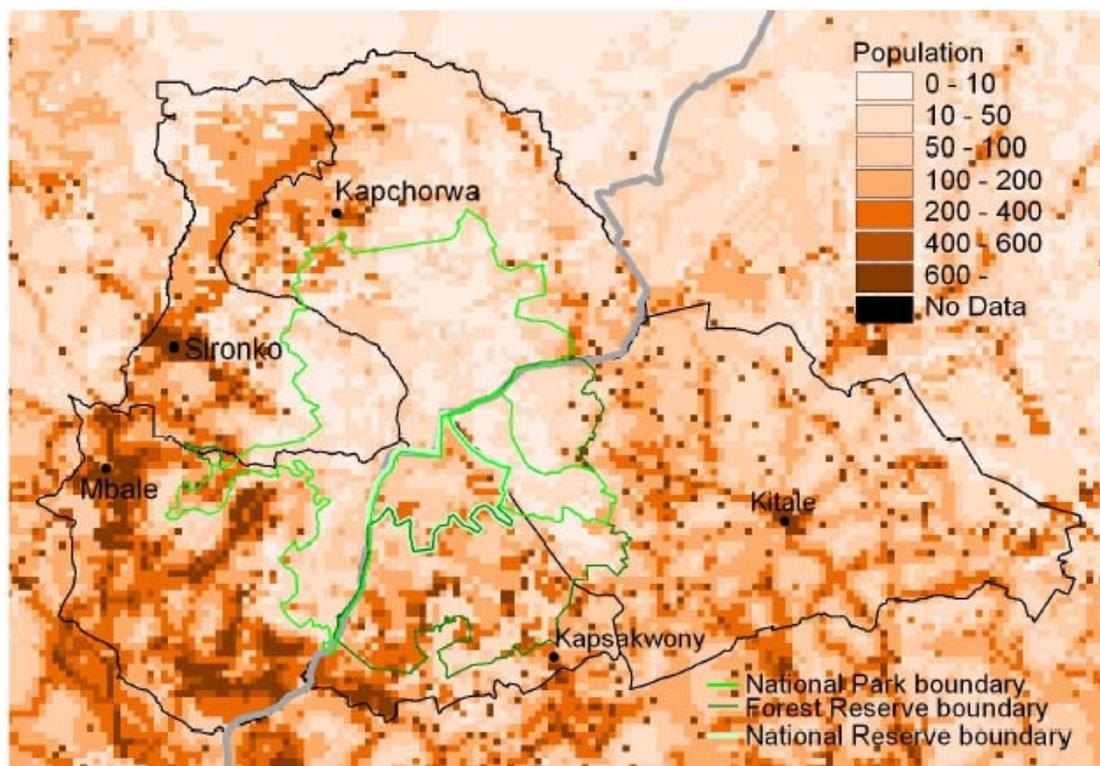
Rural livelihoods are often recognized as homogeneous through their dependency on access to the five capitals mentioned above. When looking further into the individual household, one discovers the variation. All households differ, based on access, use and composition of endowments. The five capitals have their significant contribution to the rural. Financial and social capitals influence access to land and endowments. Land increases opportunities as security, agricultural production and livestock keeping. The strategies used by the household members contribute directly to production and consumption through workforce, competence and further motivation. Few experience surplus from their agricultural income or have access to credit markets and long-term planning and improvement are challenging, but through social networks and exchange of knowledge give ground to benefits. The various strategies analyzed later in the chapter, under household livelihood activities and diversification outcome.

4.1.2 External household factors

Many external factors influence the decision-making process of the households surrounding Mount Elgon. This research focus on five factors: demographics, land issues and management of natural resources. These three fall under the institutional process in the livelihood approach, as they are formed through history, politics, economic trends, climate, demography and social differentiation. The two last: market related conditions and natural vagaries are linked to the vulnerability context, as they are affected by the exposure to risk, shocks and stress (Ellis, 2000).

1) Demographics

The population census of Kenya 2001 found that there are 158 130 people living in Mount Elgon district (937 square kilometers) and 645 170 in Trans Nzoia (2467 square kilometers) (Soini, 2006). As shown in Figure 2, the population density is slightly higher in Mount Elgon district. In the areas of this research, the demographic around the forest reserve in Mount Elgon district, lies between 100 - 400 people per square kilometer, some denser closer to the boundary. The population in Trans Nzoia is lower, between 50 and 100 per square kilometer; the forest reserve and national park have quite similar demographical trends.



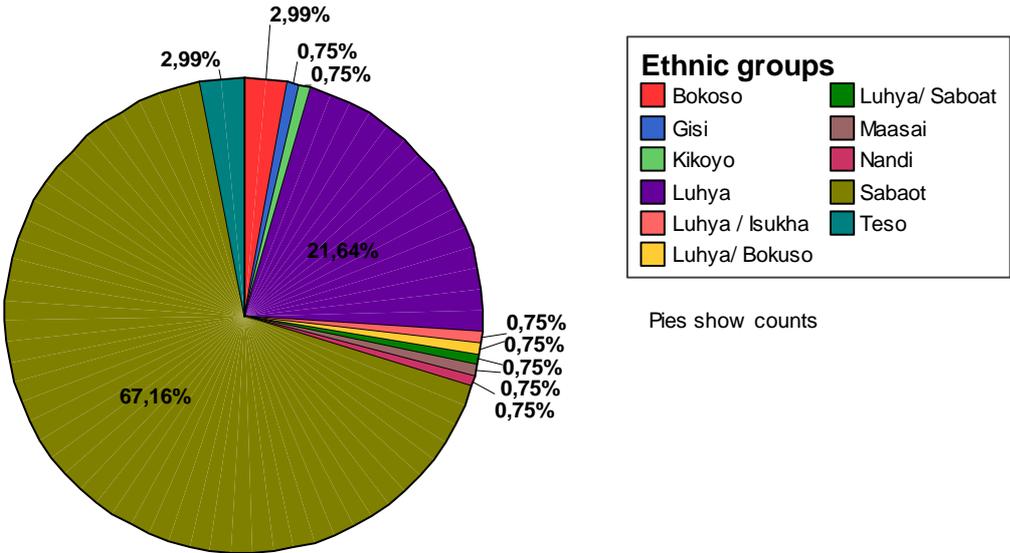
Figur 4. Population densitu in and around the Mount Elgon ecosystem, 2006.

Source: Eija Soini (2006): Past and present land tenure and incentives for land management in the five districts surrounding Mount Elgon (Kapchorwa, Sironko and Mbale in Uganda, and Trans-Nzoia and Mt. Elgon in Kenya), p. 5. (Data used are from the Poverty database, 1999).

The numbers have probably changed some in proportion to the current situation. Change in forest management have influenced the demography, especially within the forest reserve in Mount Elgon division causing eviction of larger groups and due to national population growth (respectively estimated to 3,2% and 4,2%). Today, people are not allowed to have permanent

settlements within the boundary, but Figure 2 shows that the forest reserve of Mount Elgon district is strongly encroached and the reserve demarcations are unclear at some locations. As was also observed when we visited the area. An example of eviction of tribes causing demographic changes within and around the ecosystem is the eviction of the Sabaot's from their original land, the present Chepkitale National Reserve. The location of the national reserve is shown in Figure 1 and Figure 2. Since the 1930's, national development planning have, in periods, forced the Sabaot's to move from their original land without sufficient compensation, neither of information nor resources needed, such as land. Some excision has also been forced upon by white or large-scale farmers. The majority of the Sabaot people migrated to the forest reserves of Mount Elgon, and have since been forced further away (Kenya Red Cross, 2007) Population growth, the need for land, permanent settlement of nomads, tribal clashes, and inheritance are other factors, mentioned by the interviewees, impacting on the current settlements patterns around Mount Elgon.

Population movements has lead to a great mix of ethnic groups. The Sabaot (67%) and the Luhya (23%) still represents the majority in all three research areas. Other ethnic groups present are Teso, Masaai, Bokoso, Gisi, Kikuyu and Nandi's. This reflects on the changes that have occurred in the region through history. The average permanent settlement duration is 20 years.



Figur 5: Distribution of the ethnic groups represented around Mount Elgon in percent

Data from research findings show that income generation through employment is higher in Mount Elgon division (Table 4.5) and the division has a newer establishment. This, combined with less demarcation of boundaries, might be a cause to the existing demographics. Income factors will be further discussed in section 4.1.3.

2) Land issues

Access to land is the major reason for settlement in the research area (67%). After independence and the exodus of colonial masters, land availability was high. People who worked for the white colonies expected to settle on this land. Some were able to, but most of the land was occupied by people in powerful positions, such as politicians, army officers and business men. In addition, larger tracts of land in Trans Nzoia are managed by the Agricultural Development Corporation (ADC).

Migration and population have increased; land clearing on the other hand has not, which has led to shortage of land. Simultaneously, the focus on nature conservation has grown and the strategies chosen here have not been in accordance to the needs of the rural people. These are factors that have led to decreased augmentation of existing land and maximized utilization.

Table 3: Description of land, Mount Elgon - Kenya, 2005

		Trans Nzoia (N=47)	Mount Elgon (N=40)	National Park (N=47)	Total sample (N= 147)
Average land size		3,3	4,5	3,5	3,8
Average length of stay		22	2	12	21
Acquired through	Purchase	64	30	74	56
	Inherit	28	68	15	37
	Rent	30	35	28	31
	Society	4	0	2	2
Reason for settlement	Access to land	72	55	72	67
	Security	15	0	21	12
	Nomads	4	15	0	6
Rent out		23	3	11	12
Rental land		30	35	28	31

Average land is measured in acres.

Average length of stay is measured in years.

Acquirements of land (including rent out and rental) and reasons for settlement is measured through percent of households in the respective areas.

Security includes eviction/ forced to move from original location, tribal clashes and conflicts.

3) Management of forest resources

All areas studied are in some way connected to one of the protected areas of Mount Elgon. As they are located relative to three different management regimes, the communities studied have to abide by different policies and regulations. The park has a ban on collection and all access to the park requires a fee. The main reasons for people to enter the park today are for recreation purposes and for educational purposes of students and forest officers. Local people and local schools are not able to cover these fees to enjoy the park area, neither for leisure nor for training intentions.

The two forest reserves are accessible, with some regulations. The licensing system controls who gets access and what is collected. To enter the forest reserve, no entry fee is required, but permits for all types of collection are needed up front. This is done at the local forest stations situated along the borders. In Trans Nzoia, there are four main forest stations and in Mount Elgon three. Collection permits follow national guidelines and are not locally adjusted. The permits are contained by amount and period of collection. There are some disparities given on the information about the permit requirements, from officers and local people. There are also regulations of cutting down trees on private land, where permits are also required by the FD.

Bigger companies such as PPM and RaiPly have special agreements with the FD for industrial collection and contribute to the national economy through engaging markets as well as being tax liable. During conversations and group meetings it was stressed that the companies' agreements have a negative effect on small-scale farmers. Larger quantities are extracted by the companies and this led to stricter collection regulations for the individual. This unequal distribution is claimed to be due to the tangible contribution by the companies to the national income and their requirements are prioritized as they increase governmental revenues.

There has been minimal participation offered to local people and information on changes is not well dispersed. Therefore, local people feel that their needs and interests are excluded from the decision-making arena. As the majority is subsistence-oriented, small-scale farmers, they depend on substitutes from the forest, which require minimal cost, skills and technology, to achieve a sustainable livelihood. Historically, forest resources and services have provided substitutes to most basic needs. Since the gazettement of forests and its national development planning, there has been an increase of challenges for a sustainable or improved livelihood for

most people in this area, concerning both collection and settlements. This has led to an increase of corruption and illegal activities, which is risky and costly for all active parties. The FD and KWS are forced to use more resources on patrolling and sanctioning. Encroachers risk their security through sanctions and physical punishment.

When there are little agreements on management by all stakeholders, it reduces the chance of success for the environmental management, state and local people. Local participation is expected to increase in the revised Forest Act of 2007.

4) Market related conditions

The market situation in Kenya can be divided into two; 1) big companies and large-scale farmers sell their products to larger factories for processing and 2) local and regional markets for small-scale farmers and middlemen. There are unequal prices to be obtained related to market activities and market size. As larger quantities can give a stronger position, the first achieve higher and more stable prices and beneficial conditions. Smaller markets are more vulnerable to external factors such as climate, infrastructure, technology, producer - consumer balance and seasonality, and thereby becomes less reliable for the producers.

Markets act as an external influencer through its particular properties. The condition of markets has a direct effect on the access and utilization of endowments. It generates cash flow and can be a place where people adapt technology and methods used by others to improve their own skills. The governments focus on agricultural policies benefited both companies and individuals from independence and up to the mid 80's, but since then the individual position has been weakened. The liberalization of markets has continued and the lack of price regulations by the state has squeezed the small-scale farmer out, simultaneously as productivity has declined (Nyoro and Jayne, undated). There are several local and regional markets that small-scale farmers make use of in the Mount Elgon region, but their conditions strongly differ.

The access to market(s) is mainly influenced by the households distance to the market and the household's economic situation. The location of household pursuant to the market(s) affects the transaction costs through means of middlemen, transport and labor. These costs are stated

as a challenge for many local people (30%). The local community markets have little diversification between producers and consumers, especially those close to the forest borders and far from semi-urban areas. As the infrastructure is poor, it complicates the access to the market(s) and both producers and consumers experience little input from external actors. Poor access to proper markets has made the small-scale farmers more dependent on middlemen to sell their products at larger regional markets. Middlemen often exploit producers who are not able to access the market themselves and offer low prices. When farmers sell their produce at the market themselves, much time and effort is required as transport is challenging. The unpredictable market situation often forces the producers to return with their produce as it is not sold. This lowers the quality of products and thereby lower prices. Milk is the only product that is mainly sold by the farm gate, as it is difficult to store and transport.

There are no fixed prices for agricultural produce in Kenya. Due to this, price fluctuations occur frequently and leads to uncertainty and risk for the producer. When prices fall, farmers can end up with selling at a loss, instead of revenue, because of the direct prices and the transaction costs. When living far from the market, correct information about demand and customer relations can be difficult to get hold of and can make the planning of market activities difficult.

In Mount Elgon district, it was informed that farmers organize themselves to improve their knowledge of market related issues. One person is responsible for doing research for market improvements and differences and costs are shared by the group. No such information was given in the Trans Nzoia district, neither around the reserve or park.

5) Natural vagaries

Even though the majority of people living in the surroundings of Mount Elgon see the local climate as a benefit, it also has negative effects. Hailstorms, drought and prolonged rainy season create problems to those depending on nature. Crops can be destroyed, food collecting for people and animals become unpredictable and infrastructure aggravates. Amongst the respondents for this research, 16% have experienced severe challenges through natural vagaries. The small-scale farmers have seldom enough surpluses to be able to store their produce or create substitutes, thereby; the unpredictable climate can lead to disaster.

4.1.3 Household livelihood activities and diversification outcome

Households combine their internal assets, under influence of external factors to produce outcomes to secure a livelihood. What is mentioned above influences strategies chosen for household activities. Scholars emphasize that few rural households are able to survive on one single source of income, and this was also observed in the field. None of the small-scale farmers interviewed carried out only *one* activity. The prominent rural livelihood strategies in the research areas are mixed farming in Trans Nzoia and multi-tasking farming with additional waged labor (casual employment and trade business) in the Mount Elgon district (WRI, 2007). An agricultural activity includes a variety of activities, such as food crops, cash crops and livestock-keeping. The Mount Elgon ecosystem supplements the mixed farming activities with its timber and non-timber forest products. The environment does not only create energy and substitutes to the livelihood through the resources it offers, but also through its services such as climate, water and biodiversity, which increases the potential for agricultural production. Off-farm employment is highly sought, but not easy to get. When diversifying livelihood activities, it is important to understand how the activities complement each other.

4.1.3.1 Agricultural features of the communities around Mount Elgon

Agriculture has multiple purposes and output is strongly influenced by land productivity. The sections of agricultural features of the households surveyed are of on-farm productivity: production, consumption and commodities of crops and livestock and makes access to land crucial. Data of land productivity shows that there is a shortage of land and that they all produce mainly for subsistent manners. 76% are able to generate some income from their crop production, but none feel that the income level is high enough to improve their livelihood.

Maize is the staple food in Kenya and can be utilized through a range of ways. In Trans Nzoia district and Mount Elgon district, the climate is highly suitable for this crop. During observations in the field, the range of use was visible through harvesting, storages, housing, fodder and fencing. There are some large scale seed factories located in Kitale, as the Kenya

Seed Company (KSC) and Agricultural Development Cooperation (ADC). These enhance the motivation for maize production.

95% of respondents grow maize. The main cost of production is on this crop, as most land areas and labour time are used here. Intercropping is common to save costs of inputs and labour. Several farmers who grow for commercial production, experience loss instead of revenue. 16% of the maize producers experienced this in 2005. Expensive inputs, as quality seeds; fertilizer; chemicals; labour, and price fluctuations led to higher cost than the income made. This increases the need of good planning of planting and harvesting, substitutes as storage, market knowledge and adequate infrastructure (communication and transportation). Beans are the second most produced crop. Costs are lower, due to the intercropping and is easy to store and treat, but generates low levels of income.

In addition to the crops described Table 4 shows in relation to number of producers, that vegetables, grains and fruit were grown mainly for subsistent use. Some of the most common were: sweat potato, onions, kales, millet, cow peas, black night shed, sunflower, sukuma and bananas. Many farmers mentioned that they also used to grow coffee beans and tea as cash crops, but they have been squeezed out of the market by large-scale plantations. 31% of all respondents carried out a second harvest (mainly beans, irish potato, sweat potato, tomato, cow peas and cassava) and continuous fruit crops (banana). These were all for subsistent use.

Table 4: Description of the most common produced crops around Mount Elgon, Kenya 2005

Crop production		Trans Nzoia (N= 47)	Mount Elgon (N=40)	National Park (N=47)	Total sample (N=134)
Maize	How many produce (%)	89	98	98	95
	Average amount produced (bags)	20	20	30	23
	All for subsistence use (%)	26	31	35	31
	All for sale (%)	0	7,7	2,2	3,3
	Average price per bag	940	1025	1035	1000
	Average cost	12907	13791	14372	13690
	Average total income	10295	5963	13202	10051
Beans	How many produce (%)	79	98	96	91
	Average amount produced (bags)	3	3	2	3
	All for subsistence use (%)	37,8	58	69	55
	All for sale (%)	0	10	6	6
	Average price per bag	1805	2361	1832	1999
	Average cost				
	Average total income	2780	8681	4622	5361
Irish Potatoes	How many produce (%)	23	30	28	27
	Average amount produced (bags)	6	6	4	5
	All for subsistence use (%)	36	42	85	54
	All for sale (%)	0	0	0	0
	Average price per bag	800	715	800	772
	Average cost				
	Average total income	1817	2714	4350	2960
Tomato	How many produce (%)	2	18	6	9
	Average amount produced (bags)	35	13	21	23
	All for subsistence use (%)	6,7	14,3	0	7
	All for sale (%)	33	14	33	27
	Average price per bag	673	450	467	530
	Average cost				
	Average total income	10250	- 142	10467	6858
No production		4	0	0	1,4
Sum of income/ year		25836	17216	32641	25230

Average price/ cost/ net income is measured in Kenyan shilling (1 USD= 67,98 Ksh)

The most common livestock kept in the study areas are cattle (76%) and poultry (73,8%). Cattle contribute to higher income through the sale of animals, milk, meat and labor (plowing and transport), but are more expensive to keep as they need more inputs (fodder, water, treatment). Chicken are easy to acquire and keep and need little maintenance, but have lower prices due to income contribution. For the remaining animals, it is sale of animal/ meat, eggs and labor (plowing and transport) that is most common after the subsistent needs are covered. Income here is difficult to measure as there is no set behavior on turnover on the products from animal, besides the animal itself. The farmers have poor book-keepings of income and

costs and are unpredictable as it relies on external factors such as costumers, market situation and weather.

Livestock may have a dual importance for livelihoods. As shown in Table 5, most animals are kept for subsistence purposes. While doing this they also act as safety nets and substitutes (12,5% of total livestock keeping). Animals are kept in case of emergencies, for exchange and to sell to cover costs such as school fees. All hunting of wildlife is today banned in Kenya. After this prohibition was implemented, rural people saw a stronger need to keep livestock to maintain the food consumption level, and meat access in particular.

Table 5: Livestock keeping around Mount Elgon, Kenya 2005

Livestock production		Trans Nzoia	Mount Elgon	National Park	Total sample
Cattle	Keepers (%)	70,2	92,5	68	76,9
	All for subsistence use (%)	36,4	37,8	37,5	37,2
	Average income	26030	12070	19943	19248
	Safety net (%)	2	0	6,3	2,8
Poultry	Keepers (%)	85	72,5	63,8	73,8
	All for subsistence use (%)	57,5	48,3	60	55,3
	Average income	836	1294	917	1016
	Safety net (%)	5	0	6,6	3,9
Goat	Keepers (%)	17	22,5	32	23,8
	All for subsistence use (%)	37,5	66,7	80	61,4
	Average income	-	-	-	-
	Safety net (%)	12,5	22,2	26,7	20,5
Sheep	Keepers (%)	46,8	62,5	27,7	45,7
	All for subsistence use (%)	45,5	56	84,6	62
	Average income	3832	5663	-	3165
	Safety net (%)	18,2	17,9	30,8	22,3
Donkey	Keepers (%)	27,7	20	12,8	20,2
	All for subsistence use (%)	53,8	50	83,3	62,4
	Average income	-	-	-	-
	Safety net (%)	23	12,5	0	11,8
No livestock (%)		2	2,5	8,5	4,3
Sum average income		30698	19027	20860	23429

Average income is measured in Kenyan shilling (1 USD= 67,98 Ksh)

4.1.3.2 Income through land

The majority of the rural households in these regions own all or most of their land (97%) and the average owned land is 3,8 acres. In addition to productivity on the on-farm land, through cultivation and livestock, 12,2% are able to rent out some of their land. This generates an average income of 6912 KSh per year. Rental prices seem to be constant. The majority of

respondents informed that the price was 4000 KSh per acre per year in 2005. This was prevailing for rented and rental land. The respondents that did not follow this price estimate had special agreements with family or neighboring households, where some or all of the payments were through exchange of goods, services or support. 18,6% more households rent land in proportion to the ones who rent out land. Through this and relatively scarce access to land, it is more likely to expect costs on land compared to the relative income. Income from land rent, supplements 9,3% of the total income (see Table 8) and is of considerably lower value compared to agriculture and off-farm employment.

4.1.3.3 Environmental resource contribution to the household

Rural households around Mount Elgon depend most on agricultural activities, for cash, trade and subsistent need, but the contribution of environmental income is of great importance (Vedeld et al, 2004). Even though forest resources (timber and non-timber) do not contribute substantially to income earnings, the support it provides to rural livelihoods are crucial as for energy, food, substitutes and safety nets for current consumption and to maintain or improve the livelihood situation. The most common forest resources utilized are firewood, grazing, building material (trees and ropes), food (fruits and honey) and herbs for medicinal purpose. These are all substantial resources in all areas studied, irrespective of distance to the border. Main difference is how and where they were obtained. The research will not be able to clarify the exact costs and income, as the respondents were reluctant to share such information and they keep no records. Estimations are made through the answers given through household surveys and when interviewing key informants.

In this section the three study areas are further divided to their location according to the protected areas. This to identify what resources the specific locations acquire for production and consumption and how they are acquired.

Information given by forest officials and policy documents, state that collection of many resources are legal in the forest reserves, as long as permission is provided, and totally prohibited in the park, but some negotiations can be done in special occasions, such as funerals. Differences in collection within the different protectorates are shown in table 6.

Table 6 : Collection activities compared between location

	Trans Nzoia Forest Reserve		Total (N=47)
	0-5 km	5 – 10 km	
Collect inside the FR	65%	48%	56 %
Collect inside the NP	0%	8%	8%
Collect outside the boundaries	59%	77%	66%

	National Park		Total (N=47)
	0-5 km	5 – 10 km	
Collect inside the FR	26 %	75 %	51 %
Collect inside the NP	20 %	0 %	20 %
Collect outside the boundaries	68 %	87 %	76 %

	Mount Elgon Forest Reserve		Total (N=40)
	0-5 km	5 – 10 km	
Collect inside the FR	63 %	46 %	55 %
Collect inside the NP	0 %	0 %	0 %
Collect outside the boundaries	96 %	85 %	90 %

In rural livelihoods, environmental resources make a strong contribution to sustain and/ or improve the livelihood situation. The findings show that only 0,7% do not use any timber or non-timber resources at all. Thereby, over 99% collects or purchases such resources from other collectors. All is bought in the local community, by traveling collectors or at the local market. The data also shows that all quantity collected or purchased is used for own consumption, none is used for further sales. But this is assumed to not be applicable for all households in the Mount Elgon surroundings as it was often observed individuals carrying firewood offering to sell. Information given by the firewood-purchasers also describe that they bought from local people or acquired received reciprocity.

When further investigating the shared information of collection activities, it gives several dimensions. Findings on the different acquisitions of forest resources show that:

55% of the forest users that live closer than five kilometers from the forest reserve border in Trans Nzoia obtain the permission upfront, while 45 % inform of illegal activities. Among those who live more than five kilometers from the forest reserve, only 12 % admits that they collect illegally.

In the national park, some activities are carried out inside the electric fence. In this connection it should be mentioned that firewood is the only resource attempted to be taken out of the National Park. The ones who informed of the illegal activity, reasoned it with firewood being a main base for survival as for heating stoves. Women are mainly given the role of sneaking inside the park boundaries and firewood is often the easiest and most efficient resource to collect, when the activity is carried out illegally. Branches are easily gathered and carried out. Building materials require heavy tools to be cut down, and smaller goods, as seeds and food are often covered in the deeper forest.

Few informed of this during the surveys, but it was observed during field visits. During time spent with settlements located all up to the border, one could frequently see women running away from park guards carrying firewood or small poles. None of the distant communities (located more than five km from the border) saw any possibilities nor benefits of accessing the park illegally as the distance to the reserves are almost equal. 80 % gather the forest goods from the forest reserve, either on the eastern and the western side. 75 % need to buy most or all firewood from markets or travelers.

In Mount Elgon district, 95 % inform of only legal gleaning and tree plantations were more visible and spoken off. The major difference in the sequence of forest use is of grazing. Population density is higher and no free land fortifies the need of entering the reserve.

All households have costs connected to obtaining forest resources. Direct cost are when purchasing the good or permits, and indirectly transport, workforce and time. Indirect costs of collection are expected to increase in proportion to distance to the boundaries. Poor transportation means increase the time required for collection and reduce the production capacity due to off-time from own land. There are no set market prices and the middlemen are known to claim high prices.

The most attractive resources to collect within the boundaries are firewood (53%), building materials (22%), medicinal plants (14%) and seeds (5%) and 19% of the total sample informs that they use the forest for grazing grounds.

Firewood, building materials and grazing are the activities who create most direct cost. The average fee on firewood is 40 Ksh per head load or 50 Ksh per bicycle load. As no records are kept for the exact amount needed for a household with an average of seven members, we estimate that the minimum amounts needed are three head loads a month. This covers a cost of 120 Ksh per month per household constant throughout the year (1440 Ksh). A minority of the households visited had well developed infrastructure (demarcated access, electricity or communication means) to their land. This makes the firewood crucial for the sustaining of livelihood, for example for cooking.

Building materials do not require the same frequency of collection, but attacks by wildlife, rebels and extreme weather causes material breach. The average price for trees are 1000 Ksh and/ or 12 Ksh per post. Based on sharing of knowledge and empirical evidence, a rough calculation estimates that the average household would expect a minimum cost of 10 000 Ksh per year to cover maintenance.

The third major cost is through grazing. Average land holdings are 3,8 acres per household. The prioritized range of use on this land is for housing and agricultural production and little is left for grazing areas. Little free land is available in their surroundings and thereby forces the livestock keepers make use of the forest reserves. Average price for grazing is 20 Ksh/ animal per week. When looking at the information given by the informants, the household have an average of 6 animals. The cost of grazing is roughly estimated to 480 Ksh per month (5760 Ksh per year). This calculation does not include cost of work force and travel that is additional, especially for grazing. Due to regulations made by the Forest Department, animals need supervision at all times when grazing inside the Forest Reserve to reduce damages on young trees. Fees for additional forest goods, such as water, medicinal plants, food and seedlings, where not able to get hold of, as the collections of these are more sporadic and hidden easier. Estimation of direct cost on essential resources offered has a total of 17 200 Ksh/ year per household.

Rural people around Mount Elgon face several challenges by living close to protected forest areas. These will be discussed later in the chapter. At the same time, they are aware of the

importance of protecting environmental goods. People that have been settled in the area for a longer time, clearly see changes as forest cover and climatic changes. The local people feel that the blame for forest depletion was originally on them as they did not have enough knowledge on the importance and could not control the amount of extraction in remote areas. Presently, they feel that it is more due to the bigger companies: Pan Paper Mill and RaiPly. The understanding of this is that on the basis of their contribution to the national economy, they also gain power to control the amount collected. They also encroach non-harvesting plantations.

The scarcity of trees inside and outside protectorates have motivated tree planting on own land. During group meetings, the desire for more NGO's, like SCC-Vi, were stressed. People could clearly see beneficial outcomes. The concern of climatic change was also brought to awareness. The past three years, the local population has experienced irregular rainfalls and drought, hail storms, falling temperature and stronger winds, all affecting the planning of planting and harvesting.

There is an increasing number of people establishing tree nurseries and planting own trees. Tree nurseries can contribute to revenues, by selling seedlings and matured stems to fellow farmers. Trees are planted for domestic needs such as firewood, construction, demarcation and protection of the households land from intruders. Women often contribute most to planting and caretaking within agroforestry activities. When the tree has matured and is ready for production (the tree itself or fruits), men takes over the possession (Mukoya et al, 2005). In the traditional dividing of roles and internal income distribution, men have a stronger position. *Acacia ssp* and *Grevillia robusta* are of substantial expansion as this has been encouraged by experts and are strong trees with fast maturing rates. Napier is often used as a fodder substitute.

There seems to be no specific pattern or regulations of who collects the different resources at the different location, as the majority has informed that everybody contributes to this. In the park area, women were observed crossing the borders, and there were comments on that men are more often punished by violence when caught. Previous to field visits, it was expected to learn more on traditional and cultural values of Mount Elgon. This was not the experience. There seems to be few traditional activities connected protected areas of Mount Elgon today. This is due to some restrictions on access and as one man said: "*that was only in the old*

days". For example, circumcision ceremonies are celebrated in the townships, to be able to share the special occasion with more family members.

4.1.3.4 Off- farm employment

Since the late 1990's the areas around Mount Elgon have experienced a decrease in labor opportunities due to increased land scarcity and market fluctuations (Nyoro and Jayne, undated). For the rural household to survive throughout the year, off-farm employment is sought to increase income. The most common off-farm employment among the respondents are small enterprise activities, teaching, casual labor, activities on other farms and within the church societies. Only 2 % are employed in relation to the reserve or park as forester and soldier. In Mount Elgon district, it was discovered that the communities hire people to search for markets in order to improve earnings from sale. Only 1 % of the respondents informed of employment which requires special skills, this can also be linked to the low levels of education amongst the households (the majority falls with primary level and 11% have tertiary level).

Data show that an average of 41 % of all households have one or more members working off-farm. It was expected higher levels of employment, due to the districts newer establishments. During group discussions, there was an emphasis on opportunities as an outcome of separating Mount Elgon district from Bungoma. The detachment created expectations of a improved district control through administrative and economic power, since it covered a smaller area (people and land). The topography in the research areas have some differences. The lower slopes of the ecosystem in Mount Elgon district have more exposed bedrock. This basement has, by many, been a motivation for small enterprises.

Little tendencies are revealed in data on off- farm employment according occupational variation, with the exception of small scale enterprising. Such business is often found on farm or at the nearby market ground and sell self produces goods. The major difference discovered which describe the variations on average income between the three main research areas are the level of income and how many members work off-farm. As shown in Table 7 a greater number "other members" in Mount Elgon district are employed, and thereby a greater income is shared. When looking at the data of socio- characteristics (Table 2) , some fewer in Mount Elgon inform that their main occupation is farming and less have additional second and third

occupation. The majority of head of households are within the working age and education levels are somewhat higher. These are all factors that contribute to the working ability. In contrast, data from Trans Nzoia (in relation to the forest reserve) farming takes a greater share of main occupation and there is a stronger dependency for several occupations.

Table 7: Distribution of off-farm income according to nearest protected area of Mount Elgon, Kenya, 2005

	Trans Nzoia Forest Reserve (N=47)		Mount Elgon Forest Reserve (N=40)		National Park (N= 47)		Total sample (N=134)	
	HH	OM	HH	OM	HH	OM	HH	OM
Off-farm employment (%)	38	48	37	85	47	51	41	61
Average income contribution	29559		97429		58118		61702	
Uncertain of income (%)	30		35		37		34	
No off-farm income (%)	49		50		51		53	

Average income is measured in Kenyan shilling per year (1 USD= 67,98 Ksh).

HH= Head of Household

OM= Other members

Through group meetings and household surveys, it was shared that the issue of off-farm employment was challenging to plan. Even though families have an average of 7 members, they constitute of the nuclear family (parents and children). In younger households, children are still attending school and assist on on-farm activities. The parents use most hours of the day on farming or running their on-farm or near by enterprise. This leaves few to leave for off-farm labor. For the households that need increased labor on their own land to increase productivity, there is a lack of labor and capital to hire.

Few people surrounding the reserve areas are offered employment within the FD. More people connected to the national park could inform of employment benefits of living close to the protected area. Local people are hired to work as informants between the communities and the KWS, as tour guides, fencing building and maintenance and within the schools and health facilities that are built in supported by revenues of the KWS. As the relationship between the KWS and local people has been tense, sharing of revenues is shared through employment and public benefits as schools, health centers and infrastructure.

The sum of “Uncertain of income” is included in the table to state the poor record-keeping. Accounting is not common in rural livelihood, neither from subsistent farming, cash crops, environmental contribution, nor employment. The people are more concerned about short-term effects. In times of hardship, a day – to – day survival exceed the concern for future planning.

4.1.3.5 Summary distribution of outcome

In light of Barrett et al’s (2001) identification of the four livelihood strategies in agrarian society, the majority falls within the farm and farm worker strategy and the mixed strategy. The majority have farming as their main occupation, but several household members seek off-farm employment as a supplement to agriculture. 52 % of all respondents inform that they do not have any off-farm income, but it expected that many of these exchange their goods and services through favours and reciprocity.

The use of land contributes to income at a larger extent than the land itself (land rent). For people living adjacent to Trans Nzoia forest reserve, on-farm activity is the main source of income (68 % of the total income), including husbandry. They experience more challenges when seeking paid employment, and this result in the lowest total income.

Survey data show that households in Mount Elgon district have access to more land. Even so, their share of income through land is considerably lower than in the research areas of Trans Nzoia. Findings show a clear contrast to the respective research areas: 37 % of the income is generated from agricultural related activities. Bedrock and topography are factors which complicates cash cropping. Higher population density minimizes free land for grazing of animals. Little alternative methods for grazing are known and the forest reserve increases cost of husbandry. Casual labor opportunities and the household’s socio-economic features benefit off-farm income in the Mount Elgon district (WRI, 2007 and data survey).

Households off the national park, have an equal dependence on on-farm and off farm income (49% too 51%). The local people in this area have the largest portion of income from cash crop and several factors contribute to this. Park dwellers grow larger quantities of maize. As mentioned earlier, maize is the staple food and climate is highly suitable for this crop. Roads

maintained by the KWS are in accessible reach for many of the National Park respondents and they are able to access larger markets. As many respondents access roads that are maintained by the KWS diminishes transportation efforts. This road passes a factory compound owned by the ADC on its way into Kitale, which is the main town centre of Trans Nzoia. Overall, they have the lowest amount of livestock and more animal are kept as safety nets.

Table 6: Description of average total income by the different income activities by households surrounding Mount Elgon, Kenya 2005

	TN	ME	NP	Total sample
Agriculture	25836	17216	32641	25230
Livestock	30698	19027	20860	23429
Land rent	7300	20000	6800	11367
Off-farm	29559	97429	58118	61702
Environmental	0	0	0	0
Total Income	93393	153672	118419	121728

All number are measured in Kenyan shilling (1 USD= 67,98 Ksh)

The table above describes the income after direct costs are subtracted to show the distribution of outcome due to main household economic activities. Thus, environmental income does not give a genuine description of outcome. As discussed under 4.1.3.3, environmental income was not possible to obtain, as none of the respondents experienced returns. Therefore assumed costs were estimated. When comparing costs generated though the dependency of timber and non timber forest products one can clearly see the costs of living close to a protected area. We estimate that costs are 17 200 Ksh/ year per household, irrespectively of distance to border. Respectively, this claims 18 %, 11 % and 15 % of the household's total income per year.

4.2 Key constraints for improved livelihoods around Mount Elgon, Kenya

Major constraint for improved livelihoods is many. Vulnerable small-scale farmers tend to experience multiple challenges, compared to large-scale farmers who have higher production, more capital, modern technology and a stronger position when voices are raised. All respondents were asked what they felt had been major challenges of maintaining or improving their household situation the past three years. Answers were many, various and complex. The following constraints have been subdivided into key constrains who affect 25 % or more. Further, they are categorised into two main groups; constraints counting income and constraints regarding the Mount Elgon ecosystem.

4.2.1 Constraints counting incomes

Population movement: The population movement and demographic trends can challenge by the livelihoods through strangulating opportunities. Population growth through migration and large household sizes, has led to an unbalance between demography and land. The main reason for moving to this area has been the access to land. Following the exodus of colonial masters, large areas of land was expected to be easy to obtain, but this did not fall through. Power elites and the protected areas obtained most land areas. The population growth is rather high in the area, an average of 4 %. Access to land and large families are security factors, which are common in developing countries. By accessing land, the family expects to be able to cover basic needs such as food. In addition the many household members reflect strong family bonds, by taking care of younger and elder generations, and covering on-farm labour demand.

Ancestors are of importance to the local people of Mount Elgon. Traditions, values and norms are passed on through generations and this is the second main method of obtaining land (36 %). In addition to the information given of inheritance of land, 6 % stated that is was to keep in touch with ancestors. The forest also had traditions of contributing to traditional and ancestral activities, but in the present this is not habitual. Younger households comment that this belonged to the older generations and is today obsolescent.

Eviction of people from the protected areas has contributed to the influx. As mentioned in section 4.1.2, the composition of people is multiple. The main tribes in the research area are Sabaot's and Luhya's. Poor and unreliable income, combined with the complexity and relations between different ethnic groups can be a source of conflict.

Human conflict is to some extent more stressed in Mount Elgon district. This is not only nationally, but also between the tribes across the Kenyan and Ugandan border. Disputes over land and livestock have led to many minor as well as major clashes. Land and animals are claimed according to traditions and ancestral relations. Before gazettelement and formalisation of the mountain area, the main livelihood activities were as nomads and pastoralists. Evictions

caused by governmental development planning interrupt power relations, access and rights between and within the original groups.

Land related issues: Access to land itself does not seem to be a major challenge for the people surrounding the Mount Elgon ecosystem. The challenge they face in relation to land is the capability of land utilization. Lack of capital, inputs and skills, and natural vagaries, to maximize the utilisation of the land they already access is mentioned as more crucial. As a farmer in Kaptama, Mount Elgon district commented: *“the access to land and capital might be there, we are just not able to maximize it”*. As land, capital and inputs are expensive and difficult to access, insufficient and challenging, the improvement of existing crops and livestock, are more than enough as they do not feel capable of handling more acres of land.

Capital: Lack of capital is substantial due to low levels of income (34%) and is the major constraints of the small-scale farmers. Poor access to capital and low levels of income can have multiple side-effects. With little surplus (production and cash), few are able to create savings to cope when emergency or hardship occur. Lack of financial resources complicates collection activities as purchasing permits, travel cost and labour time. Minimal cash surplus alter access to inputs for improved production or prevention of production problems. There were some comments that the capital was there, but difficult to maximize as expertise on economic planning is poor.

The respondents and group attendants of this research have little information on formal and informal financial networks in the area. Access to formal credits and loans are restricted as local people have to travel for longer distances to contact banks or organisations which offers financial support. None were members of such. The main method of accessing financial support is from relatives or related households. This is mainly based on trust between the involved actors. As the average access to land is 3,7 acres, it is difficult to create surplus and high income from the agricultural production. The households depend strongly on their own flow of production and consumption and thereby little surplus of supporting others.

Lack of capital and general low income challenges the household’s pathway out of poverty. With little surplus to improve factors for improved production, as health, (higher) education, labour, inputs and investments, the people remain poor.

Market related resources: The market factor has been discussed earlier in connection to external factors influencing household strategies (section 4.1) and is mentioned as a major constraint by 25% of the respondents. All available surpluses are aimed to be sold. Preferably, this is personally sold at the market as middlemen demand high prices.

The location of household pursuant to the market(s) affects transaction cost through means of middlemen, transport and labor. Such costs are stated as a challenge by 30 %. Access to market strongly influences the level of income and inputs. As most households stick to the local market centers, little variety occurs in the range of consumers, products and decisions on pricing. Stronger markets are mainly controlled by the large-scale farmers and companies.

Natural vagaries: Climate is desired to be predictable in agricultural societies. Natural vagaries interrupt the cycle of planting and harvesting. During the last three years, especially unstable rainy season has occurred frequently. This has led to loss of income as harvesting fails and market behavior is stressed. At the time of field visiting, the rainy season was already prolonged by a month. Production fell and the preparation of maize was challenged. Before selling the maize, preparations such as cleaning and drying is essential to improve the quality. At the time, they were not able to do this properly and the product decreased in value. Local markets became crowded as an attempt to be able to sell as much as possible. Quality of domestic and regional infrastructure was also aggravated by the extreme weather.

Infrastructure: Infrastructure in all study areas is quite poor, regarding communication, power and transportation means. The management regimes (KWS and FD) and the big companies entering the protected areas for industrial collection are all required to contribute to maintenance and improvements of the roads, but this has been neglected. Poor construction, maintenance, topography and rainy seasons make crucial areas inaccessible at times, both by foot and by motor transport. Nevertheless, people who live along the road to the national park elude benefits as sharing transport with park officials.

Poor communication means hinders important market information, important knowledge and transparency of policies, the spread of changes within regulations which can be beneficial. Few of the small-scale farmers have electricity. This increases dependency on forest resources, e.g. for cooking manners. Substitutes such as stone stoves are starting to be introduced by extension workers, but are not common yet.

4.2.2 Constraints regarded the Mount Elgon ecosystem.

Access to natural resources: 99 % of the people living adjacent to Mount Elgon state that they are to some extent resource users and all complained of how on, irrespective of which research area they belonged to. Management of natural resources is essential to forest dwellers through its regulations on how and what people access. As expected, more people living close to the park border stresses that the ban of collection is a major constraint as all forest resources are also difficult to get hold of outside the protectorate. All areas emphasised that they wished for the possibility of participation between local and management actors, so that they together could develop a sustainable management for the future.

Wildlife: The Mount Elgon ecosystem is the home of many larger mammals, and the ones who cause most problems are elephants, hyenas, buffaloes, monkeys and wild hogs. Wildlife can cause multiple negative effects. Due to the human wildlife conflict, most collection is carried out in the buffer zones of the forest. Even though there have been improvements of security towards the movements and activities of animals, there are still frequent incidents. Guards are not able to control all animals; elephants can walk through, and monkeys can climb over the electric fence that is built as park demarcation. All hunting of wildlife was banned in 2005 (MoENR, 2006) and this makes it difficult for the individual to take action. When local people experience damage by wildlife, there is little or no compensation. Policy documents state that compensation is applicable, but the procedure is difficult and time-consuming. Papers have to be filled and distributed to state authority for further discussion, and feed-back is rare.

Wildlife do not follow man-made boundaries and penetrate the households land. 55% of the households surrounding the forest reserves, and 36% surrounding the national park reports this as a problem. This is clearly emphasised by the settlements 5 km or closer to the respective border. Animals destroy crops, damage constructions, injure and kill human beings and livestock. Some have build fences and shelters, but these are seldom strong enough as lockout. Many access the forest reserve and national reserve for grazing space (22%) and the same insecurity is met.

The human- wildlife contact is also a major contributor to spread of diseases, pests and ticks. Modern and traditional treatments are known to cope with such, but demand inputs are not always easy to access.

Rebels: Even though there are regulations to access the protected area, this is a suitable hide-out for rebels. The rebels are a cause to many previous and ongoing conflicts as they are forced to be on a constant move. This decreases the security level for collectors and settlements near to the boundary and little collection is carried out in the core forest areas. Theft often occurs, people and livestock are injured and accessibility is complicated. The rebels increase cost by living near the park or reserve and increase vulnerability of the farmers.

The forest reserves have no physical boundary, which makes it easy for rebels to move about unseen and topography of the ecosystem makes it easy to hide. The KWS, FD and MECC lack resources and facilities to alleviate this problem.

4.3 Management regimes and their impact on rural livelihood

In the final part of the research, we will investigate the structures of the different management regimes. Description of institutional structure will be based on information given by the management institutions themselves, either through interviews or through published documents. This will indicate the principles of management and its goal.

We will here be focusing on the management of forest reserves and national park. People still take use of Chepkitale National Reserve, but since there are no settlements inside or up to its border, it does not have as strong influence on the majority of rural livelihood.

Through the structure-process model, the description of the various structures gives, are from the management institutions point of view and will show how regulations are sedated. This is to rise the opportunity of comparison with perspectives given by the local people. As a goal for regulations and policy making on conservation, it is not only for the conservation purpose of the natural resource, but also as a remedy towards the original consumers. The comparison is to get a better understanding of the three different management regimes who have direct

contact with the local settlement, the Forest Department and the Kenyan Wildlife Service will be prioritized in the analysis. The information input is gained through interviews with key informants in the respective management regime and public documents,

4.3.1 The management structures of the Forest Reserves

1) Physical structure: The physical structure of that is to be protected, covers the whole Mount Elgon ecosystem (Kenya and Uganda), including its range of biodiversity, goods and services. As mentioned in the description of study area in chapter 3, the ecosystem contains an exceptional variety of flora and fauna. Many species are endemic to this area. Its composition and dynamics caused by encroachment has led to a strong focus on conserving the ecosystem, nationally and globally. Simultaneously, the resources found in the forest (timber and non-timber forest products) have been viewed as common pool resources by the forest dwellers and are significant in the day to day survival.

The two forest reserves, which are both under the management of Forest Department, covers an area of approximately 73 705 hectares and are classified as governmental land (Cameron et al, 2000). The borders of the reserves are enclosed by a tree line. The demarcation consists mainly of planted exotic trees, but in some areas indigenous plants are retained. The line is in principal for the rangers and control keepers to intercept movements around and crossing the borders, as well as to show the forest dwellers to follow the regulations made and to keep clear of the protectorate. Individuals and companies are permitted to extract forest resources as long as they follow the license agreements. Forest regulations through amount, types of resources removed and collection methods are used to stabilize the condition of the ecosystem.

Challenges: Important biodiversity are impoverished. The reserves' topography has complicated structure and covers large area and the density of population surrounding the ecosystem have risen drastically since gazettement. The settlements comprise mostly of small-scale farmers who depend on goods and services from the nature to maintain their livelihood. This makes it challenging for the managers to keep records on changes in and overview of quantity and quality of the biodiversity in the remote, as well as buffer zone areas.

2) Actor structure: Actors involved can be divided into two groups; protectors and users. Main protectors are FD staff. Their main objective is to carry out a sustainable natural resource management. Other protectors are NGOs focusing on biodiversity. Recently, there has been a rise of CBOs in the area. Such organizations can be formal or informal groups who are either self- initiated by the local people or by NGOs working in the area. They consist of people with a concern of the impoverishment of forest resources and the impact this has on rural livelihoods.

User groups consist mainly of companies and individual collectors. Their main focus is on access to resources, which is regulated by the FD. The main companies in the area are RaiPly and Pan Paper Mills. Due to their contribution to regional employment and to national revenues, they are able to some extent to manipulate the set regulations. The individual user has less power, though their access to resources is no less important. Regulations made for individual collection can be crucial for survival as they have minimum assets for substitutes.

Challenges: Actors are heterogeneous and many. This makes it challenging to perform a thorough analysis of the different groups and how they interact. None the less, it is important to interpret to be able to understand the positive and negative effects they have on the forest, due to their different perspectives on values, interests and needs. Further, strategies for management and implementation of regulations become stressful as so many varieties need to be taken into consideration. Thorough knowledge and analysis on actors is needed to be able to reach agreements on policies to prevent disputes and conflicts between the varieties of actors.

3) Authority, rights and duties structure: Distribution of power to rule is contained within the governmental institutions. The executives are the Ministry of Environment and Natural Resources (MENR) and the FD's headquarter in Nairobi. Little power is left to the district administration, except local control; MENR and FD headquarters formulate policies and guidelines that local management is to follow when adjusting rules and regulations to their specific area of preservation. This formulates access and usage principals.

The main purpose to access the forest reserves is to collect certain resources and/ or to reach grazing land. The license system is formalized to be able control this and to generate revenues. All collectors are expected to apply and pay for their license upfront, which also

describes regulations for extraction (amount, period and methods used). Permit fees have become the major revenue to the local FD, but still, little power is directed to financial control. The better part flows into the national administration. The poor economic control within local management puts constraints to improve important factors, such as equipment, local knowledge, training and motivation of the forest staff. The internal spirit strongly influences the public opinion and respect of the administrative body.

Challenges: Poor records on how revenues and cost are distributed, has weakened the FD's accountability outwards. The majority of the revenues are still carried forward to the national treasury. Little is assigned to local departments and its staff. In practice, this aggravates the accountability of the visible FD group and thereby it is difficult for their surroundings to understand how financial resources are distributed and spent. Low levels of local divisional income, retrenches the opportunities for improvements on employment, infrastructure, training, communication mechanisms and planning. Lack of accountability also exaggerates motivation for illegal activities. Many household informants shed light on direct economic benefits living close to the forest borders. Sneaking in the buffer zone and corruption through exchange of favors between the Forest staff and the local people are frequent incidents.

4) Decision- making arena structure: The decision- making arena of the FD is structured in a top – down dimension. Main decisions and guidelines are made within the government ministries and at the FD's headquarters in Nairobi. Further, it is the local Forest Department duty to distribute information on rules and regulations to key actors in the local environment (town councils, chiefs and village elders). These are further expected to inform their fellow villagers. Regulations and policies are also shared through media (posters, radio and newspapers), but as many settlements are difficult to access in remote areas, transparency of law fails. Feed back mechanisms are weak, both from the villagers to the local FD and from here towards the executives.

Challenges: A major challenge is the ability to share information to the relevant actors. As population density is high and topography and climate makes the infrastructure challenging, people in remote areas are often to reach. The physical boundaries of the reserves have, from time to time varied, and this can be confusing to user groups when new decisions are not well distributed. The changes of boundary have especially been an issue in Mount Elgon district.

NRC-systems, encroachment and establishment of the new divisions have led to fixed boundaries and a exact line has not been clarified.

5) Management structure: The Forest Department under the MENR are main decision- makers of the forest and its regulations are stated in the Forest Act 2005, chapter 385. Staffs of forest management are expected to have forestry or environmental training background, thus the practice of this has been criticized of not being well maintained. Regarding the local control of activities, the forest officials are expected to be the supervisory body and responsible of keeping records of input and output data. Communication between the levels of management is poor and neither local stakeholders nor local forest officials have the initiative of suggestion to the main board.

Challenges: Communication, transparency and knowledge is crucial for successful management of natural management. Direct users and managers have the better insight on the environments condition and thereby see which measures should be taken. Without bilateral communication (within the FD and between important actors), motivation for maintenance will remain poor.

During conversation with forest officials, we were informed of the upcoming changes. The newly established Kenya Forestry Sector is predicted to succeed the Forest Department during 2007. This will require restructuring in management and NGOs, CBOs and local key actors are to be invited in to negotiations and planning.

4.3.2 The management structures of the National Park

1) Physical structure: The National Park covers an area of 16900 hectares and is controlled by the Kenyan Wildlife Service. It contains the same biodiversity of flora and fauna as the forest reserve, as it belongs to the same ecosystem and the dividing by management regimes are man-made. The main difference between the forest reserves and the national park is the management strategy. All access has been restrained since 1990 when the park was established. Exceptions are when visiting for recreation, training purposes or special happenings such as local funerals. Humans are prohibited from extracting any of the forest

goods. People benefit from the same services, such as climate and fertile soil, but there is a strict restriction line drawn there. The park has defined its borders with electric fences where settlements are situated. Local households are settled up to the demarcation. The Kenyan Wildlife Service states the dual purpose of the material used for the segregation. Fencing, supplemented with the armed guards, are to keep people clear of the protectorate. The fence also serves as to protect people from wildlife, to keep them within the borders.

Challenges: The KWS have more benefits counting resources regarding their “fence and fine” control; larger group of staff, special training centers are better endowed to assets. Simultaneously, local people are recited that their right to access and collection has been deprived due to governmental decisions. Even though local people are clearly aware of the prohibition of collection, they sneak inside the park to collect forest goods, especially firewood, to cover basic daily needs. This forces the KWS to reallocate their funds. Instead of spending more resources on training and improvement projects, they need to continue the frequent control of border area.

2) Actor structure: The actors can be classified in the same groups as according to the forest reserves, but do not count as many users. Main protectors are all KWS staff. CBOs and NGOs focusing on the environment and rural livelihoods are also located here, but they are not considered as contributors to management of park area. User groups of park consist of illegal collectors and visitors with recreational or educational purposes.

Challenges: As mentioned, the main challenge is the illegal dependent forest users. The contradictory perspective on who are legal actors, have lead to a large gap between communication between KWS and local people. Survey data shows that the main group of rule violators are the ones living closer to the border, as the households in more distant locations have the same range to the reserves.

3) Authority, rights and duties: Distribution of power is strictly within the KWS actors. Their main aim is to conserve wildlife with its surroundings and has the legal mandate to enforce laws. Everybody may enter the park area as long as they register and pay the entrance fee. As an attempt to show that the KWS recognize of the importance of sharing knowledge of sustainable forest conservation, entrance fees are adjusted. Local people and school groups have discounted fees when visiting the park. Foreign tourists are the ones with the highest

prices. The Service generates their main revenues through visitors and through project and research funding.

Some share of revenues is clearer in contrary to the spending by FD. Some local schools and health centers have been built with contribution by the Service and new institutions still receive some funding for maintenance. Park dwellers also benefit from infrastructure. The main road that leads to the park gate is constructed by the KWS. Even though the roads become especially rough in harvesting period with a lot of mobility and during wet seasons, they were some of the better roads when going visiting the field. The KWS is financially stronger equipped, which also shows by their uniforms, vehicles and arms.

Challenges: Even though there are fixed prices when special groups of people enter, the local people have seldom enough surplus of cash or time to make use of this opportunity. Thereby this emphasis is not recognized by the local people. The neighboring households feel excluded from all forest activities within the electric fence. They feel discriminated compared to reserve dwellers, since they are also restricted from all fetching, for example water from streams within the park.

4) Decision-making arena structure: All decisions to management of the national park are made by the KWS. Decisions have a main focus on KWS' mission "To sustainably conserve and manage Kenya's wildlife and its inhabitants in collaboration with stakeholders for posterity" (www.kws.org). When considering the whole ecosystem, there are collaboration between the KWS, FD and environmentally concerned organisations, such as the World Conservation Union (IUCN) and Kenya Forestry Research Institute (KEFRI). Experiences from different projects are discussed to form improved future strategies and to learn, more about the dynamics at different locations. The KWS has the mandate to enforce laws and regulations that consider wildlife (KWS, 2005)

Challenges: When local people are totally excluded from decision-making on forest management, it widens the gap between actors and valuable knowledge is neglected. It can also hinder rural development.

5) Management culture: The KWS management is perceived by the government. Training of employees is emphasised and collaboration with other organisations are seen as positive for

biodiversity maintenance. One can see in their strategic plans (e.g Strategic Plan 2005 – 2010) that their structure is more formalised for the viewer than the FD.

Challenges: The KWS do collaborate with other institutions when being involved in projects and research considering wildlife and biodiversity.

4.3.3 Process of structural change

All social change is time consuming. When restructuring well established organisations as the FD and the KWS, their desired focus needs to be set and an extended knowledge base is required. Not only on the organisations' vision, mission and how to get there, but also on its surroundings. In all areas there has been a population boom and thereby an increased pressure and demand on land and forest resources. People are diverse and not all intentions are trustworthy. Many NGOs and CBOs are today established and their knowledge and networks can play a vital role to management's future. A demand of change towards a participatory management is pressured by both the government, as well as the local people. In principle, this has been on the schedule for some time, but little has been done in practice. During 2007, the Revised Forest Act is to be taken into life and changes are expected to also happen in practice.

To do this successfully, good communication skills are needed as this is poor today, briefly described above. To be able to get in contact with the most relevant and suitable actors (individual and organisations), the existing gap needs to be reduced as a start for improving the trust by local people. During visits in the field, most local people responded negatively when referring to changes mentioned by the regimes; many big words have been said, but little has been done. The relationship through history has led to little trust and lack of accountability towards the management structures. When interviewing key informants, the gap between forest officials and local people did not seem to be that wide, but a different perspective was learned when interviewing households. Not all were resistant. People living near by forest stations and had an ongoing communication had more positive expectations. There were also clear differences in individuals and in groups. The Kenyan Government are promoting formal groups to contribute to conservation of natural resources and this shined through their motivation and intention when contributing to change.

Some actual changes have already started. The development of forest association and the Kenyan Forestry Service (KFS) have been promoted. Several positive outcomes are expected. Firstly, due to better communication with relevant stakeholders, conflicts will decrease. Secondly, proposals by private stakeholders for future strategies have been invited. This is expected to improve funding and intentions. The proposals may include suggestions for definite regulations and this will be addressed to the local authority. The government will still be the superior, but only through certain regulations and by-laws.

4.3.4 Response to institutionalized forest management

Gazettement of the Mount Elgon forest has led to strong institutions that allow little or no participation by local people. A common local perspective is that they themselves should be the superior manager of the natural resources, as it is they who have managed the area for centuries before gazettement took place. As describes in the previous chapter, change of management is time consuming and challenging. As an attempt to identify how locals affected and to predict future outcomes of the present managements rules and regulations, we will investigate these through Ostrom's eight design principles for a successful long-enduring common pool management (1990).

1) Clearly defined boundaries (physical and social): The Forest Department has set up a tree line to demarcate the borders of the forest reserve, but has not been stable. The surface has from time to time been changed due to movements of plantations, encroachment and changes in area structure. This was visible especially in Mount Elgon, where population density is high and supply of land is not. One can also see this in Figure 5 which describes this situation, that there are some settlements inside the border.

Although the majority of local people and companies are aware of regulations for withdrawal, it is not always carried out legally.

Less encroachment of forest is reported by the National Park. Their fencing is very clear and more difficult to trespass. The dwellers are well informed, metaphorically and verbally, of the

restricted access and withdrawal. This does not mean that no illegal activities occur, but though less is reported.

2) Congruence between appropriators and provision rules and local conditions: The direct appropriation and provision have a tradition of not being to successful in the forest reserves. Even though a license system is in order, book keepings of access and withdrawal are minimal and the FD receives little data on research done on existing biodiversity. Due to the financial situation of the FD, they have not been affluent to carry out own research or take advantage of updated studies. Some plantations are maintained in the reserve, but these do not make up for the withdrawals. Re-establishing lost forest-cover is a time consuming process when done properly. To shape healthy and strong tree-stands, they need to be carefully maintained and harvested at the right age and size. This was of the causes that the previous NRC-systems were shut down. The system was regulated by a cycle of tree planting and cultivation. When the superiors were not able to procure new space tree planting, the harvesting was accelerated so one would secure land for production. Tree planting on private land and free land is today encouraged by governmental bodies in the surroundings of Mount Elgon, but is meet to some extent hesitation by the locals as they still need permission to harvest.

The congruence of inputs and outputs in the park area is expected to more stable conditioned as withdrawal is banned. The KWS has a record of better knowledge on the state of biodiversity. As the ecosystem contains of several endemic species, it attracts several specialist. The enclosed area attracts researcher. Through increased attention, KWS gain knowledge on the present situation.

3) Collective choice agreement: As earlier mentioned, local people are not included in the decision-making arena, neither the forest reserves nor the national park. Management bodies are discussed to undergo an improvement through drawing attention towards participatory management. Still, the tradition of forest management is still dedicated to the command and control approach.

The boom of CBOs establishing around the mountain has occurred recently, in Trans Nzoia and in Mount Elgon district. During conversation, it was shared that associations have been initiated by present NGOs. Many agroforestry workers contacted existing groups to increase

the efficiency of learning scale. As mentioned earlier in this paper, CBOs are started to be recognized and valued, also by the authorities. The establishment of the Kenya Forestry Service is an attempt to build a bridge between the authorities and locals. It is not only within forestry that CBOs work, but these were the most evident. Some other associations visible were within agriculture training (of crops and husbandry), fish ponds, bee-keeping, empowerment through women and youth groups, health training and enterprises, who all have in common to improve rural development.

Collective choice arrangements have multiple positive effects. Already existing groups are easier reached by governmental bodies and NGOs. Such groups have often already established their internal social structure. This again makes it easier to get in touch with highly motivated people with a common set of rules and goals. When working with groups, there is a higher scope of training and again become more visible. In most situations, this is intended to have a positive trickle down effect to fellow villagers. The trickle up effect is also strengthen as groups gain higher voices and power. Their motivation to take part in actions for improvement can open the eyes of authorities and show their local knowledge and what they are capable of. 25 % of all respondents are aware (but not necessarily a member) of CBOs in their local area and have been informed that these have attended meetings with the authorities.

4) Effective monitoring procedures and legitimate system for graduated sanctions: Accountability of the FD was briefly described earlier as not to strong among the local actors. Forest officials and rangers have the authority of monitoring the activities within the reserve. There are no set regulations on how violators are to be punished; this is up to the individual ranger who detects the breach of the law. Most common sanctions are to bring the violator to the local forest office where he or she is fined, or that they are taken to court. Then it is up to the judge to set the grade of punishment. Due to the non consistent sanction systems, it is difficult to clarify what is expected to happen when trespassing. The local people seemed to be quite easy-going collecting without permission. When there is a lack of formal legitimate systems, corruption tends to thrive. None of the interviewees admitted that they took part in any corruption, but it was clear that people were aware of corrupted activities.

The KWS have frequent patrolling alongside the fence and carry arms. The weapons are meant as a tool to prevent violation and to protect themselves and the locals from aggressive wildlife. Settlements bordering the park area feared more of violent behaviour if caught

trespassing. Incidents such as shooting and beating were spoken of by the users, but not by guards.

When interviewing households, the majority of respondents were informed that the respective forest officials (either of the reserve or park) were the ones who monitored and carried out sanctions. 9% answered that they did not know. No information was obtained of local participation, nor local motivation to contribute to monitoring in either areas.

5) Cheap/ accessible conflict-resolution mechanism: Lack of participation in the decision-making arena, poor communication between the protectors and users of the forest, and scarcity of assets, results in frequent disputes and conflicts. This might not only be between the protectors and users, but also within user groups. The surroundings of Mount Elgon have a history of unstable settlements. Internal conflicts, eviction and natural vagaries have forced people to move from their homes and thereby increase the pressure at their new location. Which again put pressure on the need of forest products? The expulsion management activities also weaken the interest of an effective and cheap conflict- resolution mechanism. Village elders and village chiefs are often used for the cause of spreading information given by the governmental institutions. These are often the actors with the strongest social network and communication skills. By including such actors when disputes occur, important information may be shared in more respective way and agreements may be reached.

6) Recognition of rights to organize: Today the superior body is the governmental ministries. Only minor local adjustments are done. This complicates the relationship between actors directly involved.

4.3.5 Summing up

Through the descriptions above, one realises that the existing of Mount Elgon is complex and it highlights the gap that is between the direct actors. According to Ostrom's theory of long-enduring CPR's the present structure of institutions are not able to carry out a sustainable management of Mount Elgon. Lack of local involvement does not strengthen the protection of natural resources, nor does it enhance rural development. Before restructuring the existing institutions, there need to be carried out thorough stakeholder analysis.

5. Conclusion and recommendations

5.1 Conclusion

The aim of this study was to investigate rural livelihoods surrounding Mount Elgon, Kenya. To be able to understand their present situation, it was necessary to study opportunities and constraints influencing their livelihood. Opportunities were made visible through the 5 capitals who help shape the livelihood and through the capabilities of transforming endowments to income (either subsistence or cash). Challenges were categorised through external factors, natural-given and man-driven. It was also of interest to see to what extent forest management affected the present situation as management has a quite special composition; one ecosystem lies within two countries is further divided between several regimes.

When analysing the socio-economic characteristics, we found a major difference within the educational level. Settlements belonging to Trans Nzoia had the lowest level of education. The majority of head of households had reached primary level. 17 % have no education at all and only 2% have attended tertiary level. The location which benefited the most within educational institutions were the people in Mount Elgon districts. None had no education and 15% had reached tertiary level. Overall average level is primary schooling.

Comparing the education facilities and off-farm employment, Mount Elgon settlers also benefit of increased off-farm employment. 80 % inform that farming is their main occupation, but more household members contribute with off-farm income.

Findings revealed that all research areas have farming as their main occupation, and off-farm employment as the second biggest economic activity. Mount Elgon district benefits from multi-tasking income culture and enterprises are more frequent. These also have the lowest share of income through livestock and it was stressed that pressure on land was stronger in the district.

None of the respondents could inform that they benefited in monetary terms from forest resources, as no one sold their collections. Even though, forest resources do play a vital role as

the household spends an average 15 % of their annual income on such. The main way of access to forest resources were collecting themselves.

It was expected that a variety of resources withdrawn from the forest had equal importance, but data shows that the main resources collected are firewood, building material and grazing area. Little emphasis was put on cultural and traditional values of the forest. This is irrespective of which location the collector belong to. As expected, big differences towards the importance of location to the forest were discovered. In general, households living closer to forest reserve collect more inside boundaries, than the ones distant. Though, people living far from the national park's electric fence, rather collect outside the borders or travelled to the closest forest reserve to get hold of necessary resources. Another interesting reveal was that even though people live close to the forest border (0 – 5 km) in Trans Nzoia, 59% collects their resources outside border. Majority of national park dwellers collect legally, even when living all up to the fence.

Findings from management issues follow international trends in recognizing the importance of including local people in forest management. Present management structure and the lack of participation increase the gap between actors. Activities within the forest reflect that reserves are seen as common pool resources, irrespective of connection to research area. People depend on resources, especially firewood and building material for survival. Few of the informants agree on the existing management strategies and believe that they are entitled to be heard when raising their voice.

Forest dwellers show interest for participation in forest management and rural development through establishing CBOs. The existing CBOs have a wide range of focus; empowerment of women, health improvements, training skills within agriculture, livestock enterprising and zero grazing, business sectors, introducing fish ponds are some of the many that are found in the area today.

5.2 Recommendations

If including the following, the relationship between the local people and the forest managers may improve:

- The top – down management approach should be softened and allow for feedback from people working on the ground. Internal communication can also contribute to improve communication outwards.
- It is important for the forest management to see that structural change is a time consuming process. When rushing into change, many important factors may be overlooked.
- Thorough stakeholder analysis should be carried out to identify who should be incorporated in the decision- making arena and who should not. It is here important to recognize the knowledge base of individual and groups, as well as the role they play in established social networks. This may be applicable for the local farmer, experts, financial stakeholders and groups.
- Then, the management regimes need to look at their structure approach. The need for participation has already been given attention, but from road from recognition to positive outcome is a challenging step. As many associations are succeeding, the management institutions should take advantage of this to improve their knowledgebase and to be able to lower costs. Empowerment of the local people may be beneficial to all.
- The mission of both the KWS and the FD should strengthen their focus on rural development, in addition to nature conservation. These will most likely benefit each other.

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APPENDIX 1:

Household Questionnaire

Questionnaire number:

Date:

Name of respondent:

Village:

Sub-location:

Location:

Division:

District:

Province:

Start time:

End time:

Interviewer:

1. Basic household information

HH member	Sex	Relationship with hh head	Age	Education/ years	Primary occupation	Secondary occupation	Other occupation(s)
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							

1.1 Which ethnic group do you belong to?

1.2 Which religion do you identify with?

1.3 How long has your family lived here?

1.3.1 Where did you live before?

1.3.2 Why did you move to this area?

2. Information on land, use and productivity

- 2.1 Do you have access to land?
 2.2 If yes, how much land have you got? Is it fragmented?
 2.3 Is the land rented? Owned? Or both?

	Plot # 1	Plot # 2	Plot # 3	Plot # 4	Plot # 5	Plot # 6	Total
Size							
Year acquired							
How acquired							
Own							
Rent/ price/ year							
Rent out / price/ year							

2.4 Types of crops

Type of crop/ 2005 harvest 1:	Unit size	Amount Produced	Subsistent use/ amount	For sale/ amount	Value	Associated cost	Total

Type of crop/ 2005 harvest 2:	Unit	Amount produced	Subsistent use/ amount	For sale/ amount	Value	Associated cost	Total

If additional harvest, note in new table.

3.5 Can you collect similar products outside the NP/ NR boundaries?

Type of product	Subsistent use/ reason/ amount	For sale/ amount	Cost of collecting	Value	Total

3.5.1 Do you face any challenges when collecting outside the NP/ FR?

- Specify:

3.7 Are there any important resources you have to buy, that can not be collected?

3.8 Which major changes have there been, in relation to management of the National Park/ Forest Reserve?

- Specify: year and what?

Changes	Year	Affect

3.8.1 How were you informed of changes?

- Directly from the KWS/ FD?
- From the Local Chairman?
- Elders?
- Media?
- Others?

3.9 Are there local organisations/ groups / individuals who participate in decision- making and management of the NP/ FR?

- Are you a member of such group?

Committee / role	Estab. year	Nr of members	Criteria for participating	Are you member

3.10 Have you attended meetings regarding the NP/ FR planning and management?

3.11 Who participates in the monitoring of the rules made?

3.12 When violation of rules, who punishes the violator, how?

3.13 In the following statements, to what degree do you agree?

3.13.1 “The regulations of the forest resources helps to maintain a sustainable livelihood.”

1) strongly disagree 2) disagree 3) no opinion 4) agree 5) strongly agree

3.13.2 “The livelihoods of the people surrounding are taken into consideration when regulations are made”

1) strongly disagree 2) disagree 3) no opinion 4) agree 5) strongly agree

3.13.3 “The management of the NP/ FR affect the people equally (small scale/big scale, gender, age)”

1) strongly disagree 2) disagree 3) no opinion 4) agree 5) strongly agree

- Specify:

3.13.4 “There is a good relationship between the wildlife officers and the people”

1) strongly disagree 2) disagree 3) no opinion 4) agree 5) strongly agree

3.13.5 “There is a good relationship between the forest officers and the people”

1) strongly disagree 2) disagree 3) no opinion 4) agree 5) strongly agree

4. Market information

4.1 Where do you sell your products?

Where/ market	Product/ amount	Associated cost	Income	Total

4.3 Do you face any challenges by selling at the market?

- Specify:

5. Roles within the household

5.1 How are the different roles divided within the household? (farming, collection, diverse occupations, duties, rights etc)

- Specify:

Father:

Mother:

Children:

Elders:

6. Constraints for the local people

6.1 Benefits and challenges by living close to the national park/ forest reserve:

Appendix 2:

Checklist for Forest Officials

- 1) Name:
- 2) Role/ employment:
- 3) Education:
- 4) Which division/ area do you work in?
- 5) Approximately, how many communities are living adjacent to the forest reserve boundaries? People?
- 6) How long have you worked here?
- 7) When was the area established as Forest Reserve/ National Park/ National Reserve?
- 8) How are boundaries defined?
- 9) What are the main objectives of forest management?
- 10) How are decisions made? As of level. Nationally, district, locally?
- 11) What are the regulations for extraction of resources from the forest area for the people surrounding? License and agreements
- 12) How would you explain the importance of the forest resources for the people surrounding?
- 13) Is anybody allowed to use the areas inside the reserve for agriculture?
- 14) Is anybody allowed to use the areas inside the reserve for grazing?
- 15) Is the collection reported? To who?
- 16) How are regulations monitored?
- 17) Does anybody in the local community participate in the monitoring? Are there benefits?
- 18) How are illegal activities handled?
- 19) Does anybody in the local community participate in sanctioning? Are there benefits?
- 20) Are the people in general informed of violation/ sanctions that are carried out?
- 21) If changes occur, how is the information given? (through leaders, elders, media, etc?)
- 22) If there are meetings held between the FD/ KWS/ MECC and the communities, who are invited?
- 23) Do you feel that the local communities agree in the regulation?
- 24) Do you see the regulations as sustainable for the resources and the livelihoods?
- 25) Does the forest management create any specific opportunities or challenges to the local people?
- 26) Are there any agreements with bigger companies? As of industry?