

**LAND USE CHANGES IN OLGULULUI GROUP RANCH IN**

**LOITOKITOK DISTRICT: THE IMPLICATIONS ON PASTORALISM.**

By

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**A Thesis submitted in Partial fulfillment of the Requirements for the degree  
of Master of Arts in planning, University of Nairobi.**

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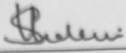
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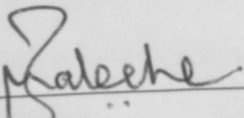
**Declaration**

**This Thesis is my original work and has not been presented in any university.**

*To God the Almighty and to the entire Kidemi family.*

Signed  Date 5.9.07  
Kidemi Susie N.  
(Candidate)

**This Thesis has been submitted for examination with my approval as a university supervisor.**

Signed  Date 5<sup>th</sup> September, 2007.  
MR Z. Maleche  
(Supervisor)



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This study has been successfully completed through the assistance and contributions of organizations and individuals. I am first and foremost grateful to my supervisor Professor Ndegwa who saw me through the preliminary stages of this work, and to Mr. Z. Maleshe for the guidance and support that saw me finalise this work. I will also not forget the entire staff of the LAJRP particularly Prof. Ngau for support.

**To God the Almighty and to the entire kidemi family.**

I am also indebted to the former Director of Land Adjudication and Settlement Mrs. L. Njenga for being understanding and supportive during the entire course of study. The DLASO Kajicho Mr. J. Muia for his support he rendered to me, and Mr D. Letareah of Olgululul group ranch for the logistical support. I am indebted to all my colleagues at the Dept. of Land Adjudication who contributed in one way or the other to my success, not forgetting Mr. W. Kocir for the encouragement.

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I extend my heartfelt gratitude to my dear friends and family. I am indebted to individuals like Ms. C. Merayo and Mr. O. Tiaupasi for being there for me, to Mr. J. Mwangi for prayers, and to you all. I sincerely say thank you. I also fully take responsibility for the mistakes that may arise out of this study.

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### Abstract

Land use changes have resulted from interactions between society through influences of economic, social and political processes on the physical environment. These changes have occurred between different scales over time. The coming of the Europeans and colonial government introduced new land use policies as from 1904 which resulted to diminishing land resources for pastoralists. The independent nation states further aggravated the problem by adapting the same colonial principles.

The study has examined land use and tenure systems within the Maasai as presented in different historical epochs: pre-colonial, colonial, and post independent eras. The research has further examined the existing land uses and forces that have contributed to land use changes in the study area through various primary and secondary data collection methods. Primary data collection methods included; House hold questionnaires, focused group discussions, participant observation and interview schedules. A sample size of 75 households was interviewed. Secondary data was gathered from literature review of journals, internet, and government reports and so on.

The study has established that land uses have changed from pastoralism before colonial period to agro pastoralism (crop farming and livestock keeping). Livestock keeping, crop farming and wildlife conservation are the major activities that utilize land resources in the study area. The forces that have contributed to the land use changes include; poor political decisions, economic paradigms, institutional weaknesses, population growth and land tenure systems.

The study concludes that the changing land uses brought about by various forces have led to marginalization of the pastoralists and have negatively impacted on their livelihoods and production systems due to diminishing rangelands. The study recommends various strategies that will ensure sustainable land resource utilization. These include among others land use planning, environmental management, formation of pastoralists' organizations and conservation of dry season grazing areas.

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## CHAPTER ONE INTRODUCTION

### 1.0 Background to the Study

#### List of Abbreviations

ASALS	Arid and Semi Arid Lands
ALDEV	African Livestock Development.
CBO	Community Based Organization
GDP	Gross Domestic Product
GR	Group Ranch
ILRI	International Livestock Research Institute
KARI	Kenya Agricultural Research Institute
KWS	Kenya Wildlife Services
MPIDO	Manyoito Pastoralists Intergrated Development Organization
NGO	Non- Governmental Organizations
PRSP	Poverty Reduction Strategy Paper
UHT	Ultra Heat Treated Milk

## CHAPTER ONE INTRODUCTION

### 1.0 Background to the Study

One of the key production systems in the world's dry lands is pastoralism. Pastoralism is a culture, way of life and an ancient mode of livestock production in the rangelands.

Land is a key means to livelihoods and survival. The majority of land in Africa lies in arid and semi-arid regions, where animal husbandry is the livelihood for pastoral and agro-pastoral communities. In Kenya, 80 per cent of the landmass constitutes the arid and semi-arid lands (ASALS), which supports 20-25 per cent of human population, 60 per cent of livestock and 65 per cent, of the wildlife (Kenya Gov. of, PRSP, 2001).

While pastoral production is determined by land use patterns, it in turn determines whether the herders are mobile or not. The pressure on land results in the exploitation of the social-economic potential of the ASAL areas, which have largely remained underdeveloped.

Herding systems in East Africa have experienced pressure to alter their land use patterns as a consequence of multiple forces including government policy towards livestock, farming and wildlife, in-migration and population growth, encroachment of crop agriculture, governments cultural bias against pastoralists who are viewed as resistant to change, extreme environmental circumstances particularly droughts and floods.

Pastoralism is less well understood in its ecological, agricultural and sociological components than is settled agriculture. To understand the interface, one must understand the pastoral mode of production. A better understanding of pastoralism will lead to a greater awareness of natural resource management and production issues as the ecological issues become harsher.

Such understanding is vital to the long term development of such areas, both as an economic imperative, increasingly driven by population pressures, and an environmental imperative due to incipient and real degradation.

## 1.2 Statement of the Problem

Pastoralists make a substantial contribution to the economies of developing countries, in terms of both supporting their own households and of supplying protein- meat and milk- to villages and towns. The governments of these countries rarely respond to the contributions made by pastoralism by investing in the sector.

The pastoralists depend heavily on livestock products which are milk and meat, and practice a nomadic lifestyle in the ASALS. Before the colonial period in 1900<sup>s</sup>, pastoral areas have been managed 'traditionally' under common property resource and they utilized land resources sustainably.

There are various forces that influence land use change which includes the social, political and environmental drivers, and the interaction of those drivers over time. The influence of past policies in pastoral areas impacts on land use which is critical to their economy. Many countries are forcing widespread sedentarization, which leads to livestock losses and contributes to rapid land use changes.

The colonial government for instance, introduced new policies and laws in 1904 which impacted on the land use patterns among the Maasai pastoralists. The forces of change have exerted pressure to alter their land use pattern as a consequence of multiple forces which includes; government policies, encroachment of crop agriculture farming, and wildlife related activities and population pressure. Their migratory nomadic lifestyle and the ecological significance of their adaptive strategies in harsh environment is little understood and consequently much interfered with, especially by governments anxious to modernize their people.

The independent nation state from 1963 adopted the same colonial principles and further contributed to land use changes in pastoralist areas. The Government state and private interests have encroached into the pastoralist land through individualization of land holding through land adjudication and consolidation, often this results in alienating the wet lands for agricultural production which under pastoralism are meant for dry season areas for livestock. Influential government decisions have affected land use on the slopes of Mt. Kilimanjaro, which for



centuries were the dry season pasturelands for the Ilkisongo Maasai who are based in the study area.

Pastoral areas in Kenya remain under developed due to lack of infrastructural facilities owing to policies made by the colonial government and later enhanced by the Government after independence. For many countries striving to achieve a progressive role among modern nations, the pastoralists have been regarded as 'backward' and resistant to change.

In Olgulului group ranch (GR), the range resource has continued to diminish due to an increase in crop farming and an increase in population of both human and wildlife. This in turn has affected the availability of water systems which has exacerbated the human wildlife conflicts. Land alienation through other activities like subdivision of arable land for cultivation and setting apart areas for wildlife conservation is a contributing factor to diminishing range resource which is vital for livestock production. There is also a substantial increase in mixed crop-livestock systems which are a significant response to the changing economy.

The impact of these changing systems is competition for the available resources which leads to conflicts in pastoralist areas. Land use conversion to crop farming has led to reduced productivity of livestock, although it has in turn contributed to higher incomes at the household level.

The study aims at assessing the land use changes in the study area and propose a land use strategy that would contribute to sustainable land resource utilization.

### 1.3 Research Questions

The study seeks to answer some of the following questions;

- What are the land use changes over time in Olgulului group ranch?
- What are the causes and effects of land use changes on pastoralism?
- What are the existing land uses in Olgulului group ranch?
- What strategies would be necessary for sustainable land resource utilization in Olgulului group ranch?

## 1.4 Study Objectives

The study explores the forces that have contributed to changing land uses in pastoral areas and recommends sustainable land resource utilization.

The specific study objectives are:

1. To assess land use changes over time in Olgulului group ranch.
2. To determine the causes and effects of land use changes on pastoralism in Olgulului group ranch.
3. To assess the existing Land uses in Olgulului group ranch.
4. To recommend sustainable land resource utilization strategies in Olgulului group ranch.

## 1.5 Study Hypotheses

The study is guided by the following hypotheses as they enable one to approve or disapprove some propositions.

- Land use in the Olgulului GR has significantly changed over time.
- Traditional pastoralism is negatively being affected by changing land uses in Olgulului GR.

## 1.6 Study Assumptions

The group ranch in which the study is undertaken is undergoing sub-division of land and this study assumes that such subdivision will not lead to the break up of the group ranch set up.

- Change in land tenure and use is taking place and is mainly driven by government policies
- Maasai people in Olgulului GR still value traditional pastoralism
- Settlement patterns are reflective of the overall change in Maasai lifestyle and economy

## 1.7 Justification of the Study

Policies related to rangelands have not been given adequate attention in the country, and this has contributed to changes in land use in pastoralist areas. Land tenure and other factors have had an impact on land use as well as the management of natural resources in ASAL areas in Kenya.

Herding systems in these areas have changed due to pressure to alter their land use pattern as a consequence of multiple forces including government policy towards livestock, farming, and wildlife; in-migration and population growth; a governmental cultural bias against herders who are viewed as resistant to economic development, extreme environmental circumstances, particularly droughts and floods.

Olgulului GR had a rapid and extensive land use change caused by expansion of agriculture on the slopes of Mt Kilimanjaro and an increasing pressure from wildlife conservation.

This research explores the various policies and paradigms employed by the Kenyan government in dealing with problems and challenges in the development of ASAL regions in Kenya, and more specifically the area occupied by the Maasai pastoralists.

This research should make planners more familiar with the situational condition of the study area so that development programmes can be based on existing structure. New changes in development are normally met with resistance not only with the Maasai but among many communities of the world.

## 1.8 Scope of the Study

The study will cover Olgulului (GR) of Loitokitok district which was hived off from Kajiado district. The study area borders Tanzania to the South, and the Amboseli National Park is situated within the ranch. It also boards a high potential zone of Mt. Kilimanjaro slopes and Chyulu hills which acted as dry season grazing areas for Maasai pastoralists before the land reforms of adjudication and alienation of land.



## 1.9 Organization of the Study

The study is organized into six chapters. Chapter one is the introduction and provides the statement of the problem, objectives, hypothesis, and the study methodology. Chapter two is the literature review on secondary data pertaining to the pastoralist production systems and begins by highlighting on the historical footprint on the Maasai land use patterns as influenced by external forces, and is presented into three epochs; the pre-colonial, colonial and post-colonial eras.

Chapter three looks at the background to the study area, and covers the socio-economic patterns of the people. Chapter four is the analysis of the results of the research as obtained from the field. Chapter five forms the discussion of the results and highlights the relationships between pastoralism and land use changes. Chapter six is the summary and conclusions of the study and gives recommendations on the emerging issues.

## 1.10 Research Methodology

The Study aims at identifying and assessing the major land use changes in Olgulului GR in three epochs; pre- colonial , colonial and post-independence eras. Land use change within the study area is as a result of forces including government policies on land. The study seeks to relate the changing land use patterns to the physical, socio-economic and human settlement factors in order to increase understanding on the land use change process and its implications on pastoralism. The methodology is adopted to achieve the study objectives.

## 1.11 Data Needs and Sources

In order to meet the intended objectives, various data needs are required. The historical data brings out past events so as to analyze the land use trends. Other data required include geographical, socio- economic, environmental and infrastructural data for the research.

The data sources are derived from the secondary data which involved a review of literature relevant to the research. The primary data is derived from household questionnaire and focused group discussions. The data collection methods are outlined below:



### 1.11.1 Questionnaire

The investigator designed a standardized questionnaire for the households before setting out to the field. The questionnaire enables the respondents to freely express their views on the information asked and creates interests to the informant. Data to determine changes on traditional lifestyle and potential sustainable land uses was also gathered using the same questionnaire and targeted household.

Current land use status was evaluated through questionnaire methods and focused group discussions. Questionnaire method has been used in gathering data on land use change by a number of workers in this area (Okello et al., 1999). Ideally questions are designed such that respondents give land value and development parameter that have changed over time in their area.

### 1.11.2 Focused Group Discussion

The focused group discussion is a process which encourages exchange of views and it facilitates the identification of vested interests and perceptions in the use of land resource. This method was used to come up with strategies that would facilitate improved land use resource. A group of fifteen people was interviewed and the discussion recorded.

### 1.11.3 Participant Observation

This was used to collect qualitative data and involved a conscious view of the interests, circumstances and activities taking place in the study area.

### 1.11.4 Photography

The observation method was supplemented by photography. Thematic photos were taken during the field work to illustrate the land use activities.

## 1.12 Justification for Choosing Olgulului

Olgulului group ranch was selected out of the many group ranches owing to its unique characteristics. The group ranch has a trans-national boundary characteristic, surrounded by mountainous areas of Mt Kilimanjaro and Chyulu hills which formed critical dry season grazing

areas. The ranch is also endowed with wildlife resource and encompasses the Amboseli National Park, and these are some of the factors that created interests to the researcher.

### **1.13 Sampling Procedure**

There are mainly five (5) agglomerations of settlement areas within Olgulului group ranch with a total of 81 villages (Mutinda et al, 2006). All the clusters that form the 81 villages were purposely selected and are spatially distributed as follows; to the north the areas of Nkiito, Remito, Namelok and Nauyakare form one zone, to the West of the group ranch is Olgulului, Esiteti and Laimutia, to the South / South East is Ilmarba and Murtot, to the East is Namelok and Osoit and to the West of the Park is Meshanani and Moruaibor.

Each cluster consists of several villages that form typical Maasai settlements (kraal). From the five settlements, five villages were purposefully selected from each cluster. The non-probability technique (purposeful) was found adequate since the population in each cluster is fairly homogenous and any village almost bears similar demographic characteristics.

For each of the 5 villages in every agglomeration (cluster), 3 households were selected through simple random sampling. This was achieved by assigning numbers on each household within a kraal, these numbers were put on a basket and randomly picked. The respondents to be interviewed was then randomly selected, men and women who were above 18 years.

From the above, it was possible to interview 3 households for 5 villages in 5 agglomerations making a total of 75 households. The sample size was thus found adequate because according to Mugenda & Mugenda (1999), a sample of 30 and above is adequate. In addition, the population is fairly homogenous as the area is predominantly inhabited by one ethnic group (Maasai).

### **1.14 Data Analysis and Presentation**

The analysis of the data was mainly qualitative and done using Statistical Package for Social Scientists (SPSS) software. This choice was arrived at owing to the nature of the problem to be investigated. Both qualitative and quantitative methods of analysis were used, to show statistical distribution of variables for instance cumulative frequencies, graphs and percentages. Statistics were used to illustrate the distribution and the relationships with other variables.

### 1.15 Study Limitations

The problems encountered during this study were mainly time as the limiting factor owing to my full engagement in employment and finding time off for study and research was a challenge. Financial constraint was another limiting factor in carrying out the research the study.

Lastly, the respondents were not willing to be taken photographs, hence some photos on the socio-economic set up could not be supported in the study.

### 1.16 Definitions of Key Terms:

#### Group Ranch:

A group ranch is a livestock production unit or enterprise where a group of people jointly own freehold title to land, maintain agreed stocking levels and herd their livestock collectively which they own individually (Ministry of Agriculture, 1968).

Membership to the group ranch was based on kinship which formed part of the larger clan.

#### Land Use

Land use is the way in which man manipulates the natural systems in order to produce materials useful to him ( Mather, 1986).

#### Pastoralism

Pastoralism is the use of extensive grazing on rangelands for livestock production.

#### Nomadism

Nomadic pastoralists are livestock producers who grow no crops and simply depend on sale or exchange of animals and their products to obtain foodstuffs and other goods and services. They are nomads' i.e. their movements are opportunistic and follow pasture resources in a pattern that varies from year to year. They wander from place to place in search of forage resources and have no permanent settlements.



## Transhumance

Transhumance is the regular movement of herds among fixed points in order to exploit the seasonal availability of pastures transhumant pastoralists establishes permanent homesteads. A characteristic feature of transhumance is herd splitting; the herders take most of the animals to search for grazing, but leave the resident community with a nucleus of lactating females.

## Agro pastoralism

Agro pastoralism can be described as settled pastoralists who cultivate sufficient areas to feed their families from their own crop production, but still keep livestock for their sustenance.

## Sub-division

Refers to parcellation of the larger group ranch to individual members. The resultant parcel is registered to the individual owner under the freehold system. It's the passage of communal ownership to individual ownership.

## Kraal

Maasai households live together in large compounds or bomas (enkang), which comprise of 6-12 households.



## CHAPTER TWO LITERATURE REVIEW

### 2.0 Introduction

This section highlights the land use change patterns as experienced by the Maasai over an uneven time, as a result of varying driving forces. The land use changes are highlighted as a historical event that occurred in three epochs; pre-colonial, colonial and post-independence periods to analyze the implications of such changes on pastoralism as a source of livelihood. The review includes the pastoralist production systems in ASAL areas and compares to other practices in the world. The chapter concludes with a conceptual framework of the study.

### 2.1 Land Use in Pre-Colonial Era

In the pre-colonial period, land was shared on communal basis. Among the Maasai, land was owned and used by a family, clan or section on communal basis. There was a social system of sharing resources such as grass, land, salt licks, food and firewood. The arid lands were the domain of wildlife and livestock herders with scattered settlements.

The Maasai socio-spatial organizations were composed of the household (the basic unit), the boma (a number of households in the same compound), the neighborhood (a cluster of bomas), and the section (a group of neighborhood and section levels), (Grandin, 1991). Land management on grazing and water resources was controlled by the elders at the neighborhood and section levels and they dictated on the grazing patterns. Each section enclosed enough dry and wet season pastures and water. The wetlands represented secure sources of water during the dry seasons.

Traditional land represented a controlled access resource and not an open- access resource. The Maasai are divided into 8 sections each occupies a closely defined area of the land unit varying from 100,000 to over 1m acres. The Maasai practiced transhumance lifestyle and moved between designated dry and wet season grazing areas, and particular rules and norms developed for the management and use of pasture and resources.

There was an open access to communal use with reciprocal arrangements where land, forage and water supplies are communally owned. During severe droughts the Maasai from one sectional clan could request the other the access of grazing areas in their territory, and at some future time the same gesture will be reciprocated. The Maasai at the turn of the century of the 19<sup>th</sup> Century occupied a territory in the rift valley measuring about 500 miles from North to South and East to West, (Mwangi E., 2003).

The attitudes, customs and pattern of the Maasai way of life evolved around their communal economic, political and social structure, but now new elements were beginning to change these communal structures such as land by the coming of the colonial government.

The Maasai regarded land as a right passed down from their ancestors. The Europeans idea of land was different and introduced foreign concepts of 'land -ownership' and 'individual' which was based on their mercantilist concept of land private property rights. The European land ownership was associated with political power and administration, and land belonged to him who paid the most of it. These socio- economic factors impacted on the Maasai cultural set up leading to land use changes.

## **2.2 Land Use in the Colonial Period**

### **2.2.1 Eviction of Maasai from the Rift Valley**

The period between 1884 to 1890 is important because it witnessed the European conquests in East Africa. The European agents comprised of explorers, missionaries and administrators whose interests on land were for trade and commercial purposes.

When the British government declared Kenya a protectorate under its rule, the Maasai were deprived of most of their land through a series of agreements. An agreement was drawn up between the British and the Maasai elders in 1904, and signed to the effect that the Maasai were to move to the South of the railway line. According to the terms of agreement, two areas were designated to remain exclusively in the ownership of the Maasai people, and the Europeans shall not be allowed to take up land in the reserve.

The British Government took advantage of the Maasai ignorance and illiteracy and proceeded to evict them from the land they had occupied for many generations. It was further suggested that the Maasai should be evicted from Laikipia and be pushed to the waterless and tsetse infested lowlands, south of the railway line and away from the European –occupied areas.

In 1911, the Maasai leaders were forced to sign another agreement that saw the Maasai expelled from Laikipia plateau. The agreement meant that the Maasai leave their best and favourite grazing grounds in their central highland.

The 1904 and 1911 agreements saw the eviction of Maasai people from Rift Valley and Laikipia. By 1913 the Maasai occupied only 40,000 square kilometers which is the same area they occupy today of Narok and Kajiado districts. These two agreements of 1904 and 1911 resulted in a serious economic loss of their best grazing grounds on which they had lived and been accustomed to tend and to rear flocks for many years. The Maasai agreements heralded the beginning of the Native Reserve Systems.

The two agreements had impacted negatively on Maasai livelihood, where they were pushed to the arid lowlands and left their best and favorite grazing grounds in the central highlands for European settlement. It created an economic hardship for the people who lost thousands of cattle and who depended on milk and meat for their subsistence. This impacted on their land use patterns since it meant a reduction in spatial area where they once occupied an expansive region in the Rift Valley which affected their economic production system.

### **2.2.2 The African Reserves**

The Africans were placed in reserves that were officially recognized and protected under the Crown Land Ordinance of 1915. The African Reserves created challenges and sufferings among them, and hardly produced enough food for them. The alienation and pattern of settlement was such that a line is drawn to separate the areas of white settlements and the African areas. The native reserves (later known as non-scheduled areas after independence) comprised fifty thousand square miles, or about 22 per cent of the total area of Kenya (Soja, 1968).

The creation of native reserves directly affected the distribution of lands between native peoples and colonial settlers. The land in the African reserves had become overcrowded, exhausted,



eroded and agriculturally impoverished, that its yield continued to diminish instead of increase which disrupted the pre-existing land use among the Africans. The land alienation by the European settlers impacted on the pastoralist land use patterns where the settlers occupied the best watered areas of their lands that were vital in dry seasons. The implication of the reserve policy relegated the Maasai to harsh environment, and their animals were drastically reduced and therefore leading to changes in land use.

### 2.2.3 Swynnerton Plan of 1954

Recognizing the need to invest to improve the status of African livelihood systems, the colonial government initiated policies designed to improve the African agriculture.

#### 2.2.4 The Creation of National Parks and Forest Reserves

In 1946, the Government of Kenya initiated a Ten – Year Development Plan which covered all aspects of development. The African Land Development board (ALDEV, 1946-1962) made a report on Agricultural development specifically in the African areas and African settlement.

The swynnerton Plan of 1954 extended the ALDEV programmes, and it was a Five year plan to intensify the development of African Agriculture in Kenya (Kenya Rep. of, Swynnerton plan, 1955). Its main aim was to multiply by ten times the average cash income of as many as possible the 600, 000 African families in the lands of high rainfall, and to increase the annual exportable surplus of 600,000 cattle from the African lands.

It was a major reform that impacted on the pastoralist land use patterns. It was a major land use policy involving land consolidation and land adjudication in high potential areas and extensive communal grazing in pastoral districts. Its aim was to multiply income to African families in lands of high rainfall, but in pastoralist areas the scenario was different since a large portion of land is poor quality, semi-arid, usually overgrazed and experienced droughts.

The Kenya Meat Commission was established earlier in 1950 as an outlet for the disposal of surplus stock from the African pastoral areas. But for its success it must rely on better grades of meat for export according to the report of the Swynnerton plan. However, the African cattle offering for sale was often because they are emaciated and of low quality, therefore an outlet for low-grade meat products was to be found. The plan did not stress too strongly on the importance



of establishing a steady market for the African livestock and therefore semi-arid areas were left out in development. The policy undid the need to correct the development imbalances inherited from the colonial policies. It proposed a means of balancing the less developed areas. The recommendations of the Swynnerton Plan was however implemented on Maasai land through the application of land consolidation and adjudication processes. During the period of adjudication, there was pressure on the well-watered areas of Ngong and Loitokitok by an influx of migrations, particularly Kikuyu and Kamba, who were adjudicated these lands into individual holdings. These areas are very important because it was land that provided critical dry-season grazing.

#### **2.2.4 The Creation of National Parks and Forest Reserves**

During the colonial rule, there was the introduction of protected areas for wildlife conservation. The southern Game Reserve was gazetted in 1906 and later abolished in favor of Amboseli Reserve which was established in 1933 covering an area of 3260km<sup>2</sup>. The alienation of land for game reserves and protection of forests in Maasailand, implied a further loss of land meant for traditional dry season grazing areas. The protection of forest areas like Chyulu Hills and Ngong hills prohibited access to the Maasai pastoralists and thus impacted on change of land use patterns.

#### **2.3 Land Use in Post- Independence Era**

The post- independence period witnessed a number of law reforms which had a significant influence on land use change in Maasailand. At the time Kenya attained political independence in 1963, the economy was characterized by distinct unbalanced regional development, with the white highlands region of relatively more modern commercial development contrasted with the Native Reserves areas mainly based on traditional production activities.

There were also the high potential areas of the country with more favorable rainfall hence better agricultural production potential contrasted with the low potential regions consisting of the arid and semi-arid areas.

To articulate the policy themes and objectives, the government had formulated the Parliamentary Sessional Paper No. 10 of 1965 on 'African Socialism and its Implications to

Planning in Kenya'. This articulated the critical development issues, problems and challenges of independent Kenya. The policy underlined the need to correct the development imbalances inherited from the colonial policies. It proposed a means of balancing the less developed provinces by investing in the education, health and encouraging some people to move to areas richer in resources.

However the pastoralist areas were left out for the reason that 'some districts with economic potential remain underdeveloped simply because the people will not accept new ways and the necessary discipline of planned and coordinated development (Kenya Gov. of, Sessional Paper No. 10 of 1965- pp: 47). In those areas the plan proposed a concerted effort and prolonged effort to overcome prejudices and suspicions before the development can take place.

The economy was also characterized by duality of development in the form of the existence of a distinct modern-commercial, and industrial sector versus the traditional farming sector. There was the duality of the large predominantly rural sector versus the small urban sector. A further duality existed between the sectoral policy approach to development and planned development approach. However, these approaches employed by the independent nation state in Kenya affected the land use systems in ASAL areas.

Other reforms introduced after independence includes the enactment and implementation of land consolidation and adjudication Acts in Kenya in 1968. The laws saw the alienation of wet lands for agricultural production, for instance the alienation of land on the slopes of Mt. Kilimanjaro and Ngong Hills which were dry season pasturelands for the Maasai for centuries in Kajiado district affected land use in these areas. The implementation of these land laws transformed the Maasai social systems of communal management of resources to one of private and economic systems.

#### **2.4 The Dominant Economic Paradigms**

Land has become a commercial commodity, which was never viewed traditionally and one of the policies introduced by the colonial government was the land consolidation reform that saw land registration to individuals. The imposition of land consolidation reforms and the introduction of individual private ownership of land among the Africans posed as a problem to their inability to

adapt to changing rural consolidations and the European dominated economic systems which had implications on land use (Wa Githumo, 1981). The colonial government hoped that with the introduction of economic reforms, the Maasai would gradually abandon their nomadic pattern and engage in other activities like cultivation.

The dominant practices and doctrines of free market economies and capitalist development theories were put in place in response to global economic crisis, where they imposed on governments through the International Financial Institutions.

Africa as a whole in the post-independence era has been a situation of steady decline in its economic production. The crisis of Africa development has been variously addressed by aid agencies and national government, where various approaches and models of development have largely failed to transform for the better, the material and social realities of African life. Approaches like Rostow's stages of economic growth, the theory of structural adjustment have yielded little tangible benefit.

The structural adjustment policies (SAPS) were implemented in 1990<sup>s</sup> in Kenya which had far reaching effects on the agricultural sector and the resultant changes in land use. The liberalization of markets and removal of subsidies on inputs all affected land use and resource management. For example, the privatization process led to the collapse of Kenya Meat Commission, which had far reaching effects on beef production and was a major beef market for the pastoralists.

African paradigmatic responses to the development problem have tended to reflect a reproduction, often with little revision or adaptation of the Eastern and Western approaches to the problem. The traditional rural people's understanding and knowledge of the dry lands is often by passed as people are forced into change, usually due to circumstances beyond their control, such as famine. Governments view nomadism as a constraint to development because services are difficult to supply if people are mobile. Dominant economic development paradigms have been applied to address pastoralist issues and which are dependent on high potential areas.



This therefore illustrates that influential government decisions and policies have a significant impact upon patterns of land use change such as regional and temporal variations in government investment like road infrastructure, agricultural extension, primary education and health care.

## 2.5 Colonial Heritage, the State and Pastoralism

Governments have played a major role in affecting the economic status of pastoralists and it affects the way land is used. The colonial planners ignored the need of the local population development perceptions including dry lands and were entirely concerned with market oriented agricultural production. Infrastructural development was geared towards colonial priorities particularly in the white settlement areas leaving out the African native reserves.

The Africans were placed in native reserves as a resettlement policy, for example the Maasai were brought into one territory in Southern Kenya for reasons of divide and rule. The dry lands became major suppliers of high quality livestock for cross-breeding with European stock especially in Northern Kenya, (Anders Hjort, 1993).

Independence brought a shift in power structures, the leadership was national, urban and farming based. The dry land people were poorly represented, their ways of perceiving problems were generally not respected, instead the modern development models were followed. The production systems were had to be more market –oriented, faster producing and more cost effective (Anders Hjort, 1993). The development planners and agents were inexperienced in dry lands where pastoralists live.

There have been negative experiences of indigenous peoples with nation states and mainstream development. In some countries there are policy shifts away from paternalistic approaches which regard pastoralists as primitive or vulnerable sectors who will benefit from modernization and integration into the dominant society.

Poverty among pastoralists finds its roots in colonization, the destruction of pastoralist economic and socio-political systems, racism and discrimination, social exclusion and non-recognition of indigenous peoples, individual and collective rights. After independence these dominant populations in turn perpetuated internal colonization, and the pastoralists felt betrayed by nation-



states. Doctrines and laws used by colonizers disenfranchised the pastoralists of their territories and resources which were later invoked by new nation states.

Proximity and close interaction at the major transportation networks and major towns like Nairobi provided a close association with high levels of modernization, best developed trade and best developed transport and communication. An interaction with the white highlands created an opportunity to receive an education, an income primarily from agriculture and participation in politics.

The non-scheduled reserves remained poorly developed and the colonial and post-independence governments left these marginal regions to fend for themselves. The grey areas were seen as functionally operating outside Kenya. The state assumed that the marginalized peoples in the grey areas should functionally tap in from the resources available in the scheduled areas. The Maasai were seen as stateless people who roamed about across the borders of Kenya and Tanzania, and who resisted the few attempts made to induce change.

## 2.6 Social Cultural Institutions of Pastoralism

The social structure gives a basis for understanding the extent to which social relations have formed and still shape the pastoralists framework of production. The Maasai as a whole form a distinctive social unit sharing a culture, language and social structure. A Maasai is identified primarily with his section 'iloshon'. This is in effect a sub-tribe of the Maasai with a unified political and administrative structure. Each section has a fixed territory that belonged to section members, there are 12 main section among the Maasai, these include, *ilkisongo*, *ilpurko*, *iloitai*, *ildamat*, *loodokilani*, *ilKeekonyokie*, *ilkaputiei*, *ilmatapato*, *isiria*, *ilwuasin-ngishu*, *ildalalekutuk* and *ilaitayiok*. This study is based on the *ilkisongo* clan. The current administrative boundaries follow the sectional boundaries.

The basis of pastoral organization almost everywhere in the world is the clan. A clan is a group of people who recognize descent from the same (putative) ancestor. Maasai clans are patrilineal, and clan mates help in each other in the event of marriage or one is impoverished through drought or other misfortune. The Maasai traditional political organization was based on age-sets.

### 2.6.1 Natural Resource Management and Gender Roles

The elders had responsibility for the administration of the land use, and they dictated the areas where grazing should be conducted and when and where a household should migrate. At the household level, grazing zones (*olopololi*) were set apart for the female and heifers during the dry seasons while the rest of the herd migrated to distant areas. This system enabled provision of continuous animal feed during all seasons.

Reciprocity is the key to the Maasai system of resource utilization (Halderman, 1970), where the Maasai elders allowed other clans to graze their herds on their land during a dry season. For instance the ilkisongo clan allowed the ilkaputiei large number of herds to move into their territory between 1969-1970, this was allowed because the ilkisongo had taken their herds into ilkaputiei in the past. This traditional reciprocity existed in the past up to mid 1970<sup>s</sup>, but due to land use changes of sub-division of group ranches in the ilkaputiei areas of Kiboko, Kitengela, Emali etc. areas, such hospitality is no longer possible today since communal land has been turned into individual holdings. This represents a departure from tradition influenced by modern development policies, although Maasai herdsmen during the dry seasons are seen to move their herds into major urban areas like Nairobi and its environs as well as Ukambani areas in search of forages.

Gender roles are strongly marked, where women are typically responsible for milking and dairy processing, they may or may not sell the milk and normally have control of the proceeds in order to feed the family. Men are responsible for herding and selling meat animals. Women usually stay at fixed homesteads while men go away with the animals. Pastoral societies tend towards monogamy because of the importance of division of labour. A key aspect of pastoral systems is the strong relationship between wealth in livestock and labour.

There has been a change in household composition as observed by Grandin (1994), that the Maasai until recently lived in large compounds or bomas of 6-12 households and acted as defense to protect themselves from cattle raiders. Over the last 20 years, however, the average size of the boma has declined markedly and the single family boma has become increasingly common as the Maasai became increasingly sedentary and moved towards individualization of

production. The traditional nomadic lifestyle is waning as observed by Mutinda (2004), as cattle numbers per family decline leading to sedenterization which has an effect on land use patterns.

## 2.7 Land Tenure Systems

Changes in land tenure are perhaps one of the driving forces of land use among the Maasai. Before the colonial period land was held under customary land tenure, which is land holding according to African traditional norms, standards and rules of ethnic groups, and indigenous property rights. This tenure system is mainly found in the pastoralist areas, it reflects the communities' rules of land holding and ownership of property. There are three attributes of this tenure system; land is equally accessed by all members of the community, land is not seen as a commodity in economic sense, and in relations to land are chiefly governed by customs and taboos.

### 2.7.1 The Group Ranches

The group ranches were formed after the recommendation of the Swynnerton plan of 1954 which recommended an approach that would address communities sharing common interests with benefits accruing to individuals and with flexibility to change as people progressed from traditional to commercial production. The recommendations included an introduction of security of tenure that would reduce the pastoralists' tendency to overstock the ranges, and would provide security as collateral for loans. It was hoped that the Maasai will abandon their traditional practice of semi-nomadism and settle in group ranches with the provision of infrastructural services and practice subsistence production system like other agricultural communities in Kenya.

The Maasai were initially opposed to the ranch system, but due to the anxiety over the fact that the 1911 treaty between them and the British was not invalidated after independence, then the only way to compensate for the loss was to obtain title to land (Helderman, 1970). Group ranches were established through the adjudication of trust land and registered under the Land (Group Representatives) Act that was enacted in 1968. Land was allocated to members as grazing quotas to limit animal numbers to the carrying capacity.



However, ecological considerations were not incorporated in the design of the development projects and were not in touch with the local reality. The group ranch concept failed since the groups were not big enough to accommodate the wet and dry season grazing areas where rotational grazing systems was limited. The Maasai were not willing to destock after a build up of large number of herds.

In general the group based concept has brought in privatization where members wish to subdivide the assets including land where former communal assets were divided among themselves. Such privatization of resources which began in 1980<sup>s</sup> has contributed to conflicts among members and complicates the sustainable management of a resource such as wildlife. The privatization of land has also led to a rise in land markets where land can easily be sold by individuals and has significantly contributed to land use changes from formerly land dominated by pastoral activities to other commercial uses like agricultural farming, flower farming, poultry keeping and residential activities. These changes in land tenure are affecting land resources such as streams, dry season grazing, and wildlife migration corridors. These changes impact how livestock are raised, wildlife viability, and have social effects regarding the distribution of resources.

## 2.8 Agro pastoralism

Agro pastoralists make up around 15 percent of kajiado districts' population (Kenya Food Security Update: USAID, 2005), and they derive an estimated 25 percent of their income from crop production and 48 percent from livestock production.

Agro pastoralists hold land rights and cultivate the land and grow staples, while livestock is still a valued property. Rainfed and irrigated farming have extended into ASALS over the past 40 years. With certain conditions of sufficient rainfall, good soils and transportation systems, land and labour, economic returns to cropping have shown to be higher than economic returns to livestock in pastoral areas.

In Kajiado district, the amount of irrigated land expanded from 245 to 4768 ha. between 1973 and 2000 (Maitima J. et al, 2006). Both rainfed and irrigated areas in ASALS, has been facilitated by changes in land tenure policy as introduced by the government. The increase of

land under cultivation has affected land use in pastoral areas in that wet areas meant for dry season grazing has been converted to farming thus pushing the pastoralists into more marginal areas.

## 2.9 The Pastoralist Economy

Livestock are central to pastoralism, which is based on such animals as cattle, camels, sheep and goats. They depend heavily on milk products for nutrition, through both direct consumption and the sale of dairy products.

Livestock population in Kenya is estimated to be over 60 million (Min. of Agr., 2001), comprising of 21 million chicken, 10 million beef cattle, 3 million dairy, 9 million goats, 7 million sheep, 800,000 camels, 520,000 donkeys and 300,000 pigs. At present over 50 per cent of the country's livestock population is based in the ASALS.

Kenya derives an estimated 10% of GDP from livestock sector (Min. of Agriculture, 2001) particularly the dairy and beef sub-sectors. Improving the productivity of livestock production systems would make a significant contribution to poverty reduction in ASAL areas where most people depend on livestock for their livelihood. As outlined in the Poverty Reduction Strategy Paper (PRSP) of 2001-2004, the Kenyan government priority is to improve marketing systems and infrastructure. The current system where live cattle are trekked up to 1,000 Km along poor roads that take up to 3 days or more, leave the animals in a poor condition. There are no sufficient holding grounds in Loitokitok district, so traders are forced to sell their animals immediately at whatever price the well organized buyers may offer, (Kenya Gov. of., PRSP, 2001).

National planning usually perceives livestock in the drylands in terms of meat, yet pastoralists normally manage livestock for milk. Female animals make up  $\frac{2}{3}$  –  $\frac{3}{4}$  of pastoral herds. This milk production oriented strategy enables traditional nomadic pastoral economies to support a considerable greater number of people on the land than do commercial ranching enterprise.

During good seasons, milk yields are sufficient to sustain human needs. During poor season, milk yields are inadequate and must be supplemented by meat consumption. In Kenya in 2003, the total milk production was estimated at 3195.9 million kg, where the dairy cattle decreased by

0.9 per cent while the zebu increased by 6.6 per cent (Min. of Livestock, 2001). Table 2.1 indicates milk production by breed species in the year 2003 in Kenya.

**Table 2:1 Estimated milk Production by breed /species in the year 2003**

Type of Animal	Estimated yield per Animal ( Lts per Lactation)	Estimated No. of Animals milked ('000)	Total Estimated milk production in million Kg
Grade cattle	1,500	1563.0	2,344.5
Zebu cattle	250	1,900.1	475.0

Source: Ministry of Livestock Annual Report, 2003.

The Ministry of Livestock and Fisheries is strategizing to increase milk production through intensification of production systems, more emphasis on camels and goats, and improvement of the indigenous animals (zebu) through crossbreeding with exotic breeds in order to upgrade milk production.

The marketing of milk is mainly dominated by private processors. In 2001, the 25 active registered processors could only process about 600 – 700,000 liters per day. The leading processors are Brookside, Bio Foods, Limuru milk Processors, Delamere and KCC, which are located in the high potential areas of Thika, Nairobi, Limuru and Naivasha (Min. of Livestock, 2001). However little benefits are being reinvested into the ASAL areas to improve the system of pastoralists' economy. The country can produce adequate milk and milk products like UHT milk, butter, ghee, yoghurt and cheese. Effective tariffs should be put in place to discourage dumping of these products from other counties.



The advantage of large herds in pastoralist communities is that the owner of a large herd produces more milk in good years and has greater meat and skin reserves for sale or barter in poor years than the owner of a small herd.

The Maasai bleed live animals for blood, and meat is occasionally consumed during the dry seasons. Hides and skins are also sold for leather.

Many pastoralists functioned essentially without cash, in the command economies, prices were completely arbitrary, fixed at the centre without regard to availability or access costs, and thus an inverse of a market system. The general problem of operating in a monetary economy is that pastoralism is essentially a slow-response system, the reproduction cycle of livestock is not adapted to making major changes in strategy over a short period. Thus, if the price of dairy products falls dramatically, a herd cannot suddenly be switched over to meat production.

Since most rangelands are characterized by a low and highly variable in animal feeds per hectare yield of forage, mobility is necessary to be able to respond to temporal and geographical variation in rainfall and fodder availability. This may be achieved through transhumance or nomadism. The more productive and reliable the pastures of an area are, the less important mobility becomes.

The Kenyan government through the PRSP strategy envisages encouraging private sector to invest in small abattoirs in the producing areas, by provision of infrastructure, including weather roads and electricity for refrigeration. It will also support the development of facilities for milk handling such as collection and cooling centres. It hopes to encourage the establishment of value adding process like milk powder in order to conserve the higher milk off-take and stock for lean periods.

### **2.9.1 Reduction in Economic Viability of Pastoralism**

Certain factors have threatened the viability of extensive livestock production. These include the encroachment of farming in ASAL regions thereby reducing access to dry-season water and grazing resources. The demarcation of national parks that enclosed perennial water and grazing, and highly variable rainfall and severe droughts.

The highly profitability of the cropping systems have carried out by non-pastoralists have encroached upon traditional herding resources which have resulted in in-migration by non-herders, and in some instances herders settling and diversifying into farming.

### 2.9.2 Globalization of the Trade In Livestock

A major factor transforming the situation of pastoralists in the twentieth century and beyond has been the globalization of the trade in livestock products. The pastoral products could be divided sharply between those that required rapid consumption, such as fresh milk and meat, and those that withstood long distance movement, such as live animals, fibres and skins.

In Europe roads opened up new markets for livestock products. As urban consumers became more demanding, especially with regard to hygiene, the balance of the market shifted against pastoralists and towards enclosed systems. No pastoralists can compete in this market.

The other consequence has been that the large scale livestock production characteristics of developed economies who frequently produce unsaleable surpluses, often as a consequence of an intricate nexus of subsidies. Frozen meat and milk powder periodically glut world markets and eventually end up being sold in developing countries at unrealistic prices or distributed as food aid. There is need to prepare milk powder and frozen meat during glut periods in pastoralist areas in Kenya so as to be able to enter and compete in global markets.

## 2.10 Livestock and Rangelands Biodiversity

It has become apparent that the high diversity of breeds in many tropical or marginal areas is crucial to overall livelihood strategies. For pastoralists, the maintenance of high levels of biodiversity in rangelands is crucial to their survival strategies.

### 2.10.1 Maintaining Livestock Biodiversity

The breeds that are most relevant to biodiversity concerns are those that have co-evolved with a particular environment and farming system and that represent an accumulation of both genetic stock and management strategies in relation to a particular environment. These have usually

taken long time to evolve and have characters, such as humidity- resistance, that cannot easily be developed.

Typically, animals are bred for their ability to survive sub clinical pathogens and to digest poor and variable pasture, local breeds are thus a key element in ensuring food security. Approaches to livestock issues in the context of biodiversity are still uncommon and often inadequately coordinated. The breeds commonly found in the Kenyan pastoral systems are the East African Zebu, Boran and Sahiwal cattle.

Kenya Agricultural Research Institute (KARI) aims to improve livestock breeds through introduction of new breeds like sahiwal and boran that is suitable for arid and semi-arid lands. The breeds have been adopted very fast by pastoralists in Loitokitok and other districts. Dairy breeds like Friesian are found in isolated pockets of Ngong, Loitokitok and Namanga divisions which are mainly zones nearer the urban areas.

### **2.10.2 Maintaining Rangeland Biodiversity**

Pastoralist species have the ability to digest woody vegetation. Camels have an advantage of browsing on thorny species with leaves that other species cannot reach. Unlike goats, which uproot or strip shorter plants, camels rarely damage the biodiversity of environments in which they graze thus the ability of conserving fauna and flora diversity.

Conservation of biodiversity in rangelands involves the cooperation of different stakeholders, including foragers, pastoralists, ranchers, arable farmers, local and national governments and international bodies. Conservation approaches must recognize that rangelands are physically and institutionally fragmented. As populations increase, the numbers and types of claim on these lands expand, cross-cutting and interlocking with one another.

Rangelands are more perplexing in conservation or creating biodiversity than most others. They are not lost visibly in the way that forests are, neither do they elicit sympathy or funds, yet they play an important role in supporting subsistence households around the world.



It is therefore important to create local-level incentives to conserve biodiversity. Bio diversity incentives include subsidies for conserving biodiversity like preserving the wildlife migratory corridors which has been proposed in Kitengela area.

The KWS and other development agents have helped communities in the creation of community owned wildlife enterprises like the wildlife conservancies. KWS have shared revenues accrued from National Parks with the local communities in form of educational bursaries and also it is in the process of ratifying a proposal for sharing revenues of Ksh. 50-100 million with the local communities.

Elephant and lion consolation fees by local NGOs namely Elephant Trust and Oldonyo –Wuas organizations has offered compensation to local communities in Loitokitok district in the event for the loss of their livestock.

## 2.11 Grazing and Nutrition

Grasslands are an important resource for pastoral livestock production, and pastoralists take advantage of the natural resource for the nutrition of their animals.

### 2.11.1 Rangelands; Opportunistic Use of Patchy Resources

Rangelands is a broader term than 'grasslands' and includes regions where woody vegetation is dominant. In recent years, agriculture has taken much of the grasslands, as a result the remainder has been exploited by pastoralists.

Australian arid and semi-arid lands occupy 70 per cent of the continental land mass and much is used for extensive livestock production. Australia's rangelands were transformed subsequent to European settlement by the following: provision of sources of water, introduction of cattle, sheep and rabbits which are species best suited to environmental diversification, introduction of exotic forage species (e.g. buffel grass, stylosanthes), changes in traditional burning patterns, elimination of incompatible land users like the dingo from sheep areas and clearing of overstorey trees for biomass multiplication which enhances production.

Rangelands are strongly characterized by patchiness of resources and resilience in the face of climatic extremes. Where water resources are short, vegetation has become adapted to patchy and variable rainfall. Reserves of seeds of particular species accumulate in the soil which will germinate when particular precipitation regimes occur. Traditionalists adopt their social and herding systems to take best advantage of these opportunities in nature, by working with nature and not against nature.

In enclosed systems (in many parts of arid or semi-arid rangelands of Australia), a strategy used has been to seed rangelands with exotic species supposed to have greater nutritional properties, there are quiet a number of artificial water sources, which maintains a constant high level of grazing pressure. The consequences of introducing exotic species into vegetation systems where there is a degree of endemism, such as that of Australia, has had *Acacia albida* (an important browse plant in Sahelian Africa), is now characterized as an aggressive weed in Australia where it has out-competed local species and become the subject of an expensive elimination campaign. The same experience has been experienced in some ASAL areas of Kenya with the invasion of *mathenge* plant, and in Kajiado district the invasion of invader species *ipomea kituensis* as shown in Plate 1 denotes the degradation of soils.

**Plate 2.1 Invader plant species that affect Rangelands in Kajiado district.**



Source: Field Survey, 2007.

Research in livestock and pasture production at the National Dryland Farming Research Station (NDFRS) Katumani is principally aimed at increasing feed resources of small holder agricultural systems of semi-arid areas and developing technologies and management systems that would raise livestock production from the subsistence level to a more commercial or a semi-specialized enterprise system. It has adapted the natural pasture as forage through re-seeding of various species. The common forage species adapted are *eragrostic swiperba* (Maasai love grass), *digitaria milanjiana*/1, *cenchrus ciliaris* etc., while browse fodder shrubs adapted are *grewia similies*, *Seliwa naiposa*, and various acacias like *senegal*, *nilotica*, *totilus*, etc.

Demonstration experiments have been carried out in pastoralist areas like Kajiado and Loitokitok districts mainly Mashuru and Isara for feed resources of small holder systems which were not successful since demonstrations were based on small holder farming which was not sustainable for nomadic pastoralism who owned large herds.

### 2.11.2 Supplementary Feeding

Supplementary feeding seems to have little place in traditional pastoralism in the world. In the recent past, changes in supplementary feeding have been extremely significant following an increasing availability of agro-industrial by-products, transport systems to deliver them to remote areas. In semi-arid Africa, products such as cotton seed, mineral licks and groundnut cakes and molasses are being sold to pastoralists.

KARI is encouraging the development of post-harvest technology of industrial crops whose by-products can be used as animal feeds. Crop residues from maize, pigeon pea, sorghum and beans are collected and used during dry season. Silage –making and hay- making is recommended at small scale farms, and is a challenge for large scale farming like pastoralists who will have to reduce the number of animals.

### 2.12 Animal Health

The capital of the pastoralists is tied up in living animals which are subject to catastrophic declines through disease. An epizootic can eliminate an entire herd for instance rinderpest, anthrax, contagious bovine pleuro pneumonia, east coast fever etc. which pastoralists had no effective remedies against.



As a consequence of this, pastoralists have generally adopted modern veterinary medicine with enthusiasm. The result has been an increase in the size of the herds precipitated by forage availability and water. Veterinary services have reduced pastoralists' flexibility to move their herds.

The ability of the Kenyan government to fully exploit its potential in livestock production is seriously hampered and undermined by diseases brought about by ticks and tsetse flies. Diseases seriously limit livestock production, movement, trade and overall returns to investment in the livestock industry.

Tick control strategies are mainly by hand spraying and dressing at the individual farm level in most pastoralists areas in Kenya. Communal dips are non-functional in these areas where the main constraints include high cost of the acaricide, lack of water and poor management. Tse-tse fly control initiatives by government entails community participation in owning projects where tse-tse traps are used.

In Kenya remote areas have been reached with veterinary services with the use of trained 'paravets' programmes, who can treat minor ailments, recognize epizootic conditions and alert veterinary authorities. Road access is a challenge in most of these areas, and the use of motor bikes facilitates transportation.

The major animal ailments experienced in Loitokitok district are tick borne related pneumonia, east coast fever, heart water, helminthiasis, trypanosomiasis (in Chyulu hills), and foot and mouth. KARI is in the process of developing an early disease system that will help the farmers. The PRSP strategy envisages developing and enforcing a new policy to control livestock diseases through enhanced surveillance, vaccination, and controlled movement of the animals.

### 2.12.1 Traditional Remedies

Pastoralists are usually highly knowledgeable about the behavior and psychology of their animals, and have developed traditional remedies for some ailments. Prior to the colonial era, the ability of livestock producers to deal with viral diseases and pathogens other than ticks or worms is believed to have been extremely limited. There are two views concerning the traditional knowledge of animal health 'ethno veterinary', that is of little value and under utilized resource,

and that it is only useful when modern remedies are not available, and have been displaced as a result of the machinations of drug companies. However local remedies remain in use by pastoralists when the cost of drugs and the supply of infrastructure remain out of reach.

## 2.13 Management and Mitigation of Vulnerability

Pastoralist lifestyles are characterized by nomadic systems and they migrate to other areas in search of forage and water.

### 2.13.1 Migration

The most obvious response to drought is to move the animals to areas where there is pasture and water. In the pre-colonial era, pastoralists were limited principally by disease and insecurity related to raiding. Both livestock and wildlife migrate seasonally. Their seasonal dispersal is evidenced by their high concentrations on swamps, pastures during dry seasons. Migrations are important to the viability of wildlife and pastoral herds.

Generally the group ranches do not correspond with the traditional migration patterns, and in most cases it does not include both the wet and dry season grazing areas customarily used by the residents. Halderman (1972) points out that the boundaries of the group ranches resulted in a very inequitable allotment of potential grazing resource.

The inconsistent rainfall is a crucial factor in determining the migratory patterns of the pastoralists. During the years of sufficient rainfall the cattle are in excellent condition and people are well fed, and there is no necessity of moving herds. In ASALS sources of perennial water are scarce which is critical to the sustainability of livestock based livelihoods particularly during the dry seasons. During wet seasons, herders disperse their livestock over wide areas of savanna landscapes, while in dry seasons and droughts they retreat to mountain slopes and to riverine and swamp areas in the lowlands where water is available perennially. Wildlife follows a similar pattern. Such well watered areas are the focus of the expansion in crop production at the expense of grazing land. The rate of expansion began in 1930<sup>s</sup> around Mt Kilimanjaro areas. Competition over access to water between and within land use systems, especially between cropping, and livestock and wildlife has continued.

### 2.13.2 Changing Herd Composition

A long term recovery strategy and insurance against the impact of future droughts is changing the species in the herd. In the 1960s the high rainfall in the Sahel encouraged the Tuareg of Mali to switch from camels to cattle, but the droughts of 1970s demonstrated that it was an unwise strategy.

A response of contextual changes which has to do with perceptions of development is on the interests of trying new methods for example, the introduction of camel rearing among Maasai in Kajiado district by ASAL Programme in the 1990<sup>s</sup> was only accepted by a few wealthy farmers who took up the experiment Therefore the development strategy on pastoralists should have supportive measures rather than alternative strategies.

### 2.14 Competition with Foragers

In Africa, rangelands are essential to the subsistence of pastoralists, foragers and farmers who are dependent on rain-fed crops. These are the most vulnerable groups in the region, because they depend on a variable climate to support a patchy resource and because tenurial regimes tend to be more ambiguous in regions that are often regarded as a common property resource. As a consequence there is competition for access to rangelands and access to perennial water.

In developed economies, rangelands are given to low-intensity grazing or protected areas. The conflicts that arise such as governments desire to increase the area of national parks are minor and easily settled.

In Sahelian Africa, competition for rangelands is intense where population pressure is tending to push arable farming into more marginal areas, this in turn places more pressure on pastoralists and foragers.

Droughts have been a catalyst of change especially where antecedent conditions have increased people's vulnerability. Past droughts have triggered some pastoralists to adopt rain-fed and irrigated cropping.



In East Africa, wildlife constitutes a significant element of national income whose greatest proportion is accrued to the state, rather than the local communities. In Kenya, wildlife in the rangelands is seen as a menace posing potential conflict between wildlife and human population. This is mainly due to over competition for resources.

### **2.15 Pastoralists and the Environment**

Pastoralists in the past have been accused of overgrazing and desertification, but in the recent past various researches carried out in pastoralist areas (FAO Corporate 2006, Barrow E. 1996), have now been seen as more responsible conservators. Pastoral groups managed their lands in an environmentally sound way.

Pastoral systems are self regulating with periodic droughts and disease outbreak acting as controls. These mechanisms are breaking down often resulting in degradation of the natural resources, particularly around settlement areas. Governments have been trying to replace pastoralism with other lifestyles, and not to improve and make the system more sustainable. Adoption of modern system in traditional systems is failing therefore a need to integrate the transformation of modern systems in traditional systems.

Pastoralists themselves understand their environment, and degradation does not occur because of ignorance, illiteracy, greed or being lazy as colonial and newly independent governments and development partners often assume. Pastoralists understand the importance of allowing forage to grow for use during the next season by practicing a migratory pattern. Although it is now generally agreed that pastoralists are not responsible for overgrazing, degradation occurs only around settlements.

### **2.16 Improving the livelihoods of pastoralist families and communities**

Droughts cause significant humanitarian problems and loss of animals. In Kenya the occurrence of drought is frequent and is considered as one of the national disasters (Appendix 3).

### 2.16.1 Disaster Management

Livestock can fall victim of climatic anomaly like droughts, and this impacts on pastoralists who move their animals rapidly in search of more favorable conditions. As a consequence animals die slowly- the weaker ones first- and are sold in advance at low prices.

A series of external changes have led to pastoralists coming under unprecedented pressure, to which they are unable to respond appropriately. A number of factors are making long-distance opportunistic movement increasingly impractical. Some of the factors include change in land tenure systems through registration, the expansion of cultivation-even in dry areas, and continuing increases in total numbers.

The consequence is that droughts cause significant humanitarian problems and localized degradation, since large numbers of animals' coverage on certain pastures, especially around wells. This in turn is responsible for long-term impoverishment among pastoralists, since they must sell animals cheaply, and cannot afford to buy them back when the drought ends. At the same time, it places extra stress on already ineffectual veterinary services, since weakened animals are more susceptible to pathogens. This however has led to the perception that drought is essentially a humanitarian problem. As a result policies that deal with the long-term consequences and try to prevent the cycle from simply repeating itself are inadequate.

The responses to droughts, and the policies of governments, agencies and NGOs, focus on restocking and sedentarization. Restocking can work on a local scale, although it is expensive in terms of management and seems to provide no evident insurance against further droughts.

A pastoral household which loses some or all of its animals, especially if it has few, faces not just the loss of that years output but exclusion from the pastoral economy until it can regain its herd. Households were protected from consequences of loss of animals by a network of transactions with animals between households. Among the Maasai, individuals would take some their animals to relatives to act as reserves incase of calamities like droughts that may wipe out an entire herd. This enabled capital to be reconstituted.

The government of Kenya as a contingency measure is carrying out livestock offtake before the onset of droughts in conjunction with other development partners like Red Cross, Agricultural Development Corporation (ADC) and Arid Land Resource Management project. For instance in early 2006, 1492 head of cattle were purchased from herders in Kajiado district and taken to Galana ranch in Malindi for fattening, (Dept. of Veterinary, 2006).

### 2.16.2 Early Warning Systems

The other hope for rangelands has been remote sensing. It was believed that the use of satellites would make it possible to detect pasture availability and abundance well before the usual land based methods could, and national governments or relief agencies would be able to put remedial strategies in place before the disaster occurred.

Early warning systems put people in a position of greater knowledge, but the procedures of governments and most agencies were far too slow and cumbersome to respond in an effective way to climatological information and deliver it to those who might need it.

Agencies are now have somewhat less hubris about their capacity to respond, but the emphasis has changed to influencing governments to build awareness of the impact of climatic anomalies into their long-term planning. The variability of climatic conditions is a reality that needs to be acknowledged and incorporated into government policy, as well as individual- or group-level contingency plans.

Pastoralism is essentially a reactive subsistence strategy, by which herds are taken to the areas of greatest productivity in a given year. Pastures depends on factors such as soil quality and water retention, pastoralists will determine their movements either by what they observe or by traditional transhumance routes. At present, weather forecast based on sea surface temperatures and satellite imagery is often too general and zonal to be of any value in a restricted field of operations. The alternative is thus to look for ground-based indicators and local knowledge. A well known system is the Turkana early warning system (Buchanan S. and Davies, 1995 as quoted in FAO Corporate, 2006).

The country experiences mild cyclical droughts every 3-5years with severe droughts on a ten year cycle, this largely affected the ASALS. The last drought (early 2006) affected 5 million



people in 25 districts, and claimed livestock worth 16.67 billion and threatened human life. Towards this end, the government established a National Drought Contingency Fund in collaboration with development partners in order to facilitate quick responses to drought emergencies.

KARI is in the process of developing an early livestock warning systems where cow-dung and vegetation is analyzed in labs, and through the computer programming systems the future can be projected. The Maasai traditionally have similar warning systems where some individuals endowed with the ability, would interpret the digested matter in the intestines of slaughtered goats. There was also the interpretation of stars and moon patterns.

Through the PRSP strategy the government intends to centralize early warning systems and market information on forage, crop and livestock projections, water resources and disease situation.

### **2.16.3 Security in Pastoral Zones**

The remoteness of pastoral zones means that they are typically in regions where borders are disputed and mobile forces can easily conduct guerilla warfare. Prior to the establishment of nation states, inter-ethnic conflict associated with access to grazing and cattle raiding were common notably in Northern Kenya. Sophisticated weapons have entered the region, where Somali raiding into northern Kenya has pushed the Turkana westwards into confrontation with the Karamojong in Uganda, who in turn are raiding into the Sudan.

Donors are inevitably reluctant to supply even emergency food aid while resources are being diverted towards transboundary military confrontation, and enthusiasm to fund long-term development is still scarcer. Such conflicts also make the sort of regional planning that is essential to a coherent rangelands strategy still more difficult to establish.

### **2.16.4 Recovery Strategies**

Structural features of pastoralism that differentiate it from other enterprises such as agriculture and fisheries and which are relevant to making long-term policies are as follows (Hogg, 1997 as quoted in FAO document, 2006):

- Stock recovery: Pastoralism is a way of life, and herd owners will invest in rebuilding herds without external intervention. As a consequence, the trend is always for livestock to exceed range resources. However, the investment costs of pastoral herds are high and the recovery rates are very slow compared with those of crops. Moreover, seeds can frequently be sourced externally at relatively low cost, stock adapted to specific climatic and range conditions are difficult to obtain.
- Pastoralists are significantly more vulnerable than cultivators to trade fluctuations. A farmer replanting after a bad year can see grain stocks and prices recover in one year. Livestock owners flooding the market with salvage sales may not see market recovery for up to a decade.
- Pastoral herds always produce surplus animals, notably immune males and barren females, which can be eaten or sold to reduce pressure on resources. Nonetheless, the culture of a pastoral society strongly affects its attitude to the disposal of such animals.
- Because pastoralists must dispose of operating capital in order to buy resources (water, fodder) when their animals are under threat, poorer herd owners must sell a greater percentage of their herds in order to survive than richer herders do. This increases wealth satisfaction and makes poorer herders more vulnerable in the next cycle of environmental stresses.
- Crisis affects pastoralists in ways that are almost directly opposite to the ways in which they affect farmers. When climatic factors reduce crop yields, market prices increase because of the scarcity value of grains. When the same factors affect the herders' ability to keep stock alive, prices plummet because of competition with other stockowners who are also attempting to sell animals and also poor conditions of animals.

Although these principles would seem to follow logically from the nature of the pastoral enterprise, aid and development agencies have often been slow to adapt policies to the specificity of livestock production, and development formulae are often applied to an undifferentiated class of poor or vulnerable people.

### 2.16.5 Pastoral Organization

Pastoralists are not prone to develop complex social institutions to defend their interests as a group, in part because their mobility and flexibility make it hard for such institutions to maintain their coherence over long periods. Traditional social organization thus focuses on the household and kin group, while more vague clan entities provide social identity but not necessarily organizational capacity.

This has seemed highly unsatisfactory to outsiders encountering pastoral societies because various types of cooperation would seem to be a precondition for development. Pastoralists moving through arable areas are frequently in conflict against with farmers, to prevent this, it would seem logical to form agreements with farmers. The purchase of drugs, access to water and pasture, would seem to be regulated by local and regional associations. Moreover, the prejudice against pastoralists in many nation states might be better combated by organizations that could effectively articulate their case to government. In the command economies, the solution to this was simple, through collectivization; cooperation and association were simply forced on people. This had both a good and a bad side. It made the delivery of inputs simple and the organization of necessarily collective operations, such as predator hunts. It also evened out the production of winter hay and ensured that the economic burden of herd loss would not fall on single households. The disadvantage was that the system was heavily subsidized from outside and subject to arbitrary pricing. As a result, there was no discrimination for competence, and unsustainable production strategies were the rule. Despite the benefits, these systems have been collapsing gradually since the fall of communism, and far more traditional social patterns are reasserting themselves.

In Africa, the main tool in the armoury of developers has been the Pastoral Association (PA). Pastoralists were encouraged to associate and to negotiate collectively with outside bodies for veterinary services, water development, etc. Since the 1970s, the World Bank and regional NGOs were involved in the Sahel.

In East Africa, the system of group ranches was developed, principally for the Maasai, in order to encourage a more comprehensive system of land ownership, and thus investment, as well as to provide centralized systems of livestock dipping. Pastoralists were hit very hard by the droughts



of the 1970s and 1980s and the rinderpest epizootic of the 1990s. As a consequence, what fragile social capital had been built up tended to dissipate as herd owners scattered. When promoted by committed individuals it can be successful for some time, but the logic of pastoralism is such that, in a period of crisis, herds scatter and, with them, the associations.

If pastoralism is to make any effective defense of itself in the new millennium, it will have to develop new structures, existing social institutions have not served it well in a new era. New technology like the use of radio to communicate useful information to pastoralists has been proposed.

#### **2.16.6 Essentials of a Group Ranch**

Group ranch policy was aimed at developing sound ranching techniques to replace nomadic pastoralism. In 1957, Konza grazing demonstration scheme was a pilot project inaugurated in Kajiado district with the aim of demonstrating the results of grazing management in improving the carrying capacity of the land and the productivity of the cattle, to demonstrate improvement of stock by breeding and selection, and to conduct experiments in pasture improvement and to examine ways in which the Maasai could be introduced to a form of stable agriculture.

In 1949, ten families were chosen among the less wealthy to manage their livestock in accordance to the directions of the officer in charge of the scheme. The project succeeded well in the next six years and livestock numbers increased beyond the carrying capacity of the grazing scheme. The infrastructure was developed, which included cattle dips, boreholes and roads.

However the Maasai were unwilling to have the disposal of surplus stock by sale, causing the scheme to lose favor with government, and some families opted to move out of the scheme (ALDEV board Report, 1946- 1962). Konza came to an end in 1961 owing to drought and stock losses. The schemes were quickly replicated in other ASAL areas of Kenya, and later some of the schemes were reverted to group ranches.

The group ranch concept did not meet the intended purpose and has therefore led to sub-division of the land to the members. However, some group ranches have engaged in commercial agriculture by forming cooperative organizations within the group ranch. An example is Keyian

GR in Trans-Mara district which was started in 1968 and which comprises of 44 families and covers an area of 840 Ha.

Initially the group started by each member contributing 4 cows and setting aside some land for the cooperative society, and the members are now enjoying benefits on an annual basis. Pastoral systems could be coordinated through loosely organized pastoral association which is flexible in quality rather than being forced into rigid group ranch project, (Anders H. 1993).

### 2.16.7 Restocking

Restocking whether initiated by herders or organized by an external agent attempts to rehabilitate herders within their environment, rather diversify and take up e.g. fish production. Simply providing pastoralists with animals to replace those lost during drought does not take account of the fact that the available land, environment and management have not sustained the level of stocking. Selling animals at appropriate points and at appropriate prices in the drought cycle maintains the possibility of autonomously rebuilding herds in better times. It is beneficial as a means of management, but is still geared towards maximizing herd numbers.

Pastoralists have their own system of insurance against drought. They lend their animals to relatives or friends in exchange for looking after some of their animals in return. Some NGOs like MPIDO located in Kajiado district is engaged in restocking herds for households whose herds were completely wiped out by drought.

### 2.16.8 Livestock Banking

Livestock banking have been proposed as a way of assisting producers to carry stock across difficult seasons. Livestock banking proposes that the expense of restocking can be spared if, during the parts of the year, animals can be traded in to a state owned 'bank' in return for a token. The animals are then tended until such time as the pastoralists decide to redeem them. This, in turn, demands a responsible, disinterested and well-established organization to function as a holding operation for the stock, and this seems politically unfeasible. A system in which animals are fed at the expense of the owners and government, and paid for by milk off takes during bumper harvest times, although, this proposal has never been put in practice.

Other alternatives might include simply turning the animals into cash and then buying them back when prices are low. Livestock insurance is yet another common proposal that, despite its apparent attractions, has never been put into practice and pastoralists feel that it's an avenue that should be explored.

### 2.16.9 Economic Diversification

Diversification of income and the engagement in temporary paid labour are indirect means of restocking. The integration of pastoralism with other sectors thus benefits the pastoralists' own restocking agenda. This should be supported because alternatives to herding that are available to pastoralists are not likely to be socially, ecologically or economically effective in the short to medium term.

Diversification in ASAL regions in Kenya will depend on the capabilities of the local communities to manage the difficult environment and diversify into opportunities the land can offer. To encourage this diversification the central government intends to promote game ranching, beekeeping, growing of tree crops, medicinal plants, crop and forage production, or conservation and development of irrigation. Goat keeping as an emerging source of milk, as well as small stock such as poultry is being encouraged. Goat species like *Togenberg* from Switzerland, *German alpine*, *Saanen* and *Anglo-nubian* have been successfully been introduced in high potential areas of Meru, Embu, Nyeri, and Muranga in Kenya. The goat milk is said to be good and of high medicinal values.

### 2.17 The Need for a Policy Framework in ASALS

Pastoralists pose a number of problems for policy makers resulting from their transnational status.

Unlike farmers, who are largely tied to boundaries of the nation state, pastoralists tend to cross borders freely in their quest for forage regardless of the wishes and policy of individual countries. The Maasai freely cross the Kenyan border to Tanzania for pastures, it is therefore logical to treat pastoralism on a regional basis and to draw up common policies in relation to health, forage and water resources, subsidies on feed etc. The primary task then is to coordinate



approaches and persuade research and development agencies not to subvert each others policies with ill-considered projects.

The National ASAL policy aims at six areas namely: reducing reliance on livestock through human capital development and diversification of sources of income; improving natural resource management and utilization, by reviewing existing land use policies and land tenure systems; improving pastoral productivity through conservation of the environment, domestic animal genetic resources and other biodiversity; improving markets and providing social services to mobile pastoralists; providing financial services to nomadic pastoralists; reducing and managing risks such as droughts and floods that often reduce assets and increase food insecurity and; investment in irrigation development.

The government has various programmes in ASAL areas for enhancing livestock production. ASAL Based Livestock & Rural Livelihoods Support Project (ALLPRO) covers 22 districts including the study area, with the aim of improving livestock productivity through four main components; sustainable livestock improvement, animal health, livestock marketing improvement, drought management and food security initiatives.

The lack of infrastructural development makes it difficult for pastoralists to meet the hygiene demands of international livestock trade, and thus to generate income other than by low-level local sales.

Rational policy process involves some element of top-down imposition and some element of consultation and participation governments have access to regional information on climate, disease, feed supplies and water resources, while pastoralists can provide a dense account of local conditions. Governments must make policy and resource decisions on information available to the users.

Policies aimed at pastoralists are in dire need of reform. Some of the policy reforms revolve around the following: The general perception that livestock production is a poor gamble in development terms compared with increased crop production; the fact that animal protein is best supplied by monogastrics because extensive production is wasteful; the idea that pastoralists as

vulnerable people in fragile environments, are better consigned to relief agencies than dealt with as a significant economic proposition.

More specifically, however, policy reorientation should tackle the following: The tendency to ignore "minor" species such as camels in favour of cattle, sheep and pigs, calculation of the economic viability of projects in terms of single trait characteristics rather than total household support characteristics, estimation of the viability of production systems over short periods of time, which is of inevitable advantage to introduced breeds, ignorance of the value and significance of livestock and rangeland biodiversity and its role in increasing productivity in uncertain environments.

The future of pastoralism will depend heavily on political decisions made by national governments by managing significant grassland zones. Enclosed pastures are unlikely to see any significant impact, making it more difficult when land is expropriated for conservation, and unsustainable for wildlife migration corridors. Technical inputs will have only a very limited impact on overall output. The key in the next millennium will be major policy re-orientation.

The following are likely to become important: Production of niche products, through either unusual species and breeds or meat and milk that are free from contaminants, crop-livestock integration through the effective use of pastoral outputs in mixed farming, particularly the extension of work animals, co-conservation through the development of interlocking strategies that link conservation of wild fauna and flora with pastoral production, the expansion of ecologically sensitive low-volume tourism, using pastoralists to provide services, particularly in the area of indigenous knowledge.

## **2.18 Interventions and Information Dissemination**

Traditionally, it is usual to conclude that developing countries need policy assistance. All interventions whether top-down or participatory are problematic in retrospect. Pastoralists over time will have a tendency to fall further into 'information-poor' societies, due to the inaccessible regions in which they live. The consequence is that pastoralists will fall further behind in their capacity to deal with the modern world, whether it be in understanding livestock markets, gaining access to effective drugs or articulating their opposition to land expropriation. The role

of multilateral agencies, governments and NGOs should therefore be oriented increasingly towards information dissemination and practical demonstration of what works to their benefits.

### 2.19 Research Case Studies

Research and development now focuses on improving rural livelihoods and the physical, social and economic well being of households and communities. In drylands, land values have always been linked to water availability. As water availability increases, and can be brought into increasingly more valuable uses ranging from forestry, grazing, rainfed agriculture and irrigated agriculture.

In 1956, there was much concern over possible negative impacts of traditional land use systems on dry lands, particularly in developing countries, and increasing production through the use of modern management techniques was preferred. Now attention is being drawn to the negative consequences of some of the modern methods (Barrow, 1998).

It should be clear that research and policy developments in pastoralism are extremely uneven and research carried out by them with the increase in tertiary education.

The promotion of pastoral production will undoubtedly remain controversial but the argument that it is an effective use of land that could not otherwise be used for agriculture suggests that government and others will continue to invest in it. If this is to be a productive enterprise, the linking of knowledge with action will have to be effective. This therefore means trying to root out entrenched attitudes which do harm. The following suggestions emerge:

The process of changing the policy and attitudes of governments towards valuing pastoralists, through education, financial and political attention, publicity studies which include paying attention to new media must continue.

Drought-response policies and mechanisms, as with other policies aimed at pastoralists, the most crucial elements being protection against epizootics and siting of water points and water harvesting.



Regional decisions should determine the quality and type of services available to livestock producers and ensure that they have some comparability. Levels of insecurity and the effect these have on the decisions of livestock producers must be recognized as relevant and the use of viable approaches. Forced sedentarization is both ethically dubious and unlikely to succeed. International agencies have a significant role in both combating misinformation and diffusing accurate information as it becomes available. In future, technology developments will improve the modeling of climatic events.

A study carried out in the Serengeti – Mara ecosystem on the impacts of land use / land cover (Serneals et al, 2001), indicated that 8 per cent of land changes on the Kenyan side have occurred over a period of 20 years as compared to the 4 per cent of land cover in Tanzania which includes 50,000 ha. of rangelands. The study indicated that much of the land has been converted to mechanized agriculture in Loita plains, and developments of settlements close to the boundaries of the Maasai Mara National reserve, while few changes are found in the buffer zones in Tanzania. The study noted a decrease of wildebeest's population by 75 per cent since 1977 which is strongly linked with changing land use in the Mara.

## 2.20 Key factors shaping the twentieth century pastoralism

Some key factors shape the pastoralist mode of life and play a role in shaping the twentieth century pastoralism as outlined on Table 2.2.

Modern transportation infrastructure	Borderless systems in which transport is a major element of production dependent on effective infrastructure
Emergency relief, restructuring and rehabilitation programmes	where input supply tends to be irregular, causing periodic crisis
Conservation policy	Keeps non-viable herds/units in pastoral areas, thereby accelerating the cycle of deficits
Encroachment on rangelands	Pressure to turn previously pastoral land over to reserved wildlife/safari regions with corresponding land ownership issues that remain
Encroachment on rangelands	Elimination of rangeland through the use of politically sensitive but often uneconomic irrigation systems

**Table 2.2: Key factors shaping the twentieth century pastoralism**

Factor	Impact
Modern veterinary medicine	Increase in productivity and greatly enlarged herds
Modern weapons	Major decline in predator threats, increasingly violent ethnic conflict and high levels of insecurity
Enclaving	Collapse of traditional safety-nets in terms of long-distance migration in periods of climatic extremes
International pressure for hygiene in slaughtering and dairying	Declining market for pastoralists' products
World market in livestock products	Governments import cheap meat, milk etc. to satisfy urban demand at the expense of the pastoral sector.
Declining prestige of dairy products	Terms of trade running constantly against pastoral livelihoods
Ideological interference by the state	Inappropriate social and management strategies adopted and maintained by a combination of subsidized inputs and implied violence
Alternative calls on pastoral labour	Pressure for children to go to school and younger people to earn cash outside the pastoral economy
Modern transportation infrastructure	Replaces systems in which transport is a major element of economic production (llamas, horses).
Introduction of high-input, high output	Makes pastoralists dependent on effective infrastructure where input supply exotic breeds is irregular, creating periodic crisis
Emergency relief, restocking and rehabilitation programmes	Keeps non-viable households in pastoral areas, thereby accelerating the cycle of deficits
Conservation lobby	Pressure to turn previously pastoral land over to reserved wildlife/biodiversity regions with corresponding had currency income from tourism
Encroachment on rangeland	Elimination of rangeland through the use of politically attractive but often uneconomic irrigation systems

Source: FAO Corporate Repository , 2006. ([www.faocorporatedoc.repository.org](http://www.faocorporatedoc.repository.org))

## 2.21 The Future of Pastoralism

Evidence as to the future of pastoralism is generally discouraging. Through out Africa and the Near East pastoralists are being driven into ever-more marginal areas through arable terrain. Transport and enclosed livestock production are being forced on the remaining pastoralists in the Americas and the Mediterranean region.

The marginal lands that were previously the province of pastoralists are increasingly coming to focus as reserves of biodiversity. Veterinary services are declining and market prices for livestock products now reflect the access problems of much of the region. The consequence has been accelerating impoverishment in any countries.

Pastoralists remain a resource, a system of producing meat and milk cheaply in land that is otherwise hard to exploit and as such that they will persist in some form. This resource can be protected and managed effectively or ignored and allowed to decline.

Government policies are very unlikely to be uniform in this respect, and pastoralists are thus likely to gravitate to regions where conditions are most favorable. The key is therefore to disseminate improved understanding of pastoral society as broadly as possible, making both policy and the effective management of natural resources as widespread as possible.

## 2.22 Concluding Remarks

Pastoralism has survived due to some features in the production systems which include; flexibility, low costs, freedom of movement, light regulatory environment, and operation in regions that are unsuitable for agriculture.

Pastoralism has long term flexibility that is able to exploit patchy resources. They are also able to survive climatic catastrophes such as droughts, and able to switch species (as Bedu of Jordan switched almost entirely from camels to sheep between 1970-1995), main saleable output (Ful<sup>o</sup> in Igbo areas of Nigeria have switched from dairying to meat production) or even entirely out of pastoralism for a period.



When pastoralism comes up against highly efficient modern-era livestock industries they face major price competition for their products, and may often be dumped. However, pastoralists may have to meet hygiene, packaging and transport costs and tariffs that are costly in order to meet national and international market standards. Moreover, the single most important cost to all intensive systems is investment in land itself, both enclosing it and maintaining its productivity, a cost that pastoralists do not bear, except on rare occasions when they de-stock to conserve forage.

The problems that pastoralists face are as much social and political as they are economic and resource based. Modern nation state holds the stereotype of nomadic peoples as backward, archaic and a political threat. The arguments advanced by researchers concerning the potential for pastoralists to contribute to national productivity and interrelate with settled farmers are overridden by concerns about their constant movement, and thus a failure to control them in both economic and political terms. One frequent consequence is neglect of infrastructure in remote areas, making the concerns become self-fulfilling prophecies because nomads then do start to oppose the state.

### **2.23 CONCEPTUAL FRAMEWORK**

Land use changes are affected by various forces and have changed overtime since the pre-colonial period as illustrated on Fig. 2.1 below. These socio-economic and environmental driving forces of the land use changes have been influenced by several factors which include government policies, economic factors, population growth and migration, land tenure systems, infrastructure and environmental conditions. Government policies are one of the drivers that have had a substantial influence on pastoralists land that stems back during the colonial period. The colonial government evicted the Maasai in 1904 and 1911 from the Rift Valley and Laikipia which resulted in serious economic loss of their best grazing grounds and led to reduction of grazing lands. The colonial government introduced the land consolidation reforms which indicated a loss of the wetter areas meant for dry season grazing areas. The creation of national parks indicated a further loss of pastoral lands. These policies and laws resulted in a change of land use patterns and resulted in a further push of the Maasai into marginal areas and this impacted negatively on their livelihoods and production systems.

Changes in land tenure are one of the driving forces contributing to land use change. Land subdivision means a transformation of communal land to individual private ownership.

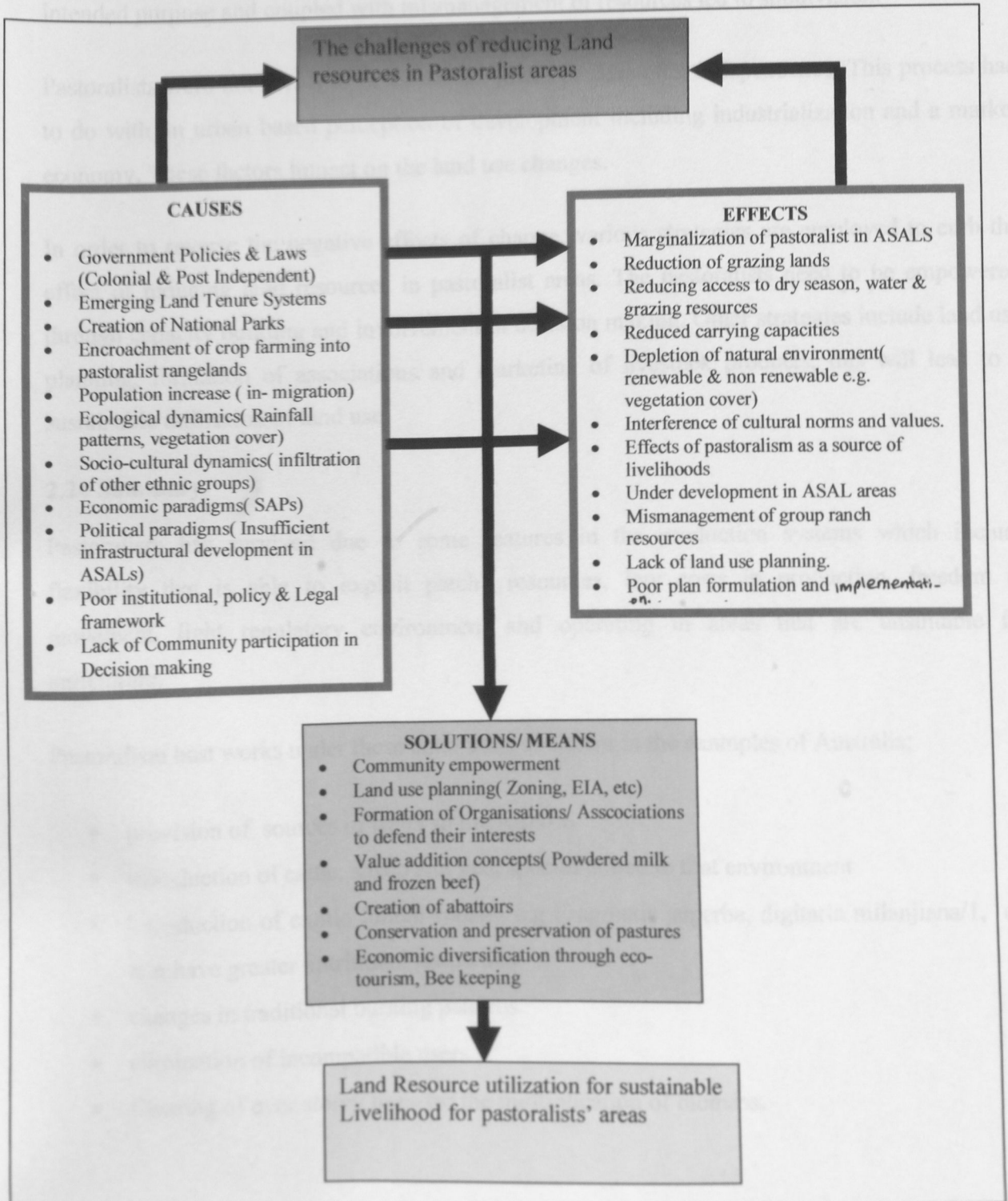
The expansion of agriculture onto pastoral land has caused a significant transformation of grazing land to crop land. The alienation of land through land consolidation and adjudication processes saw an influx of other ethnic communities into pastoralist land especially on the slopes of Mt. Kilimanjaro. The influence of other cultures impacted on the pastoralist social culture that saw a change in land use. The pastoralists have also adapted to farming. The expansion of agriculture on the wet lands meant a loss of access of dry season grazing areas for pastoralists, thus causing marginalization of pastoralists in ASAL areas. The population increase in the wet lands is attributed to in-migration of farmers from ethnic communities. The rapid rate of population growth has reduced land availability and has led to reduced carrying capacities. The population dynamics has influenced change in land use by land use intensification.

The economic forces on land have played a role in influencing land use in pastoralist areas. The colonial government and the independent nation states have a preference for agricultural production than livestock production. This is evidenced with the implementation of seasonal paper No. 10 of 1965 strategy whose policy was to address poverty intensification in agricultural areas leaving out the ASAL areas. This led to under-development in pastoral areas.

Infrastructural development in Kenya is influenced by the colonial policies. After the alienation of land, settlement patterns were such that a line was drawn to separate the areas of white settlements and the African reserves. The scheduled areas (white settlements) had infrastructural developments, while non-scheduled areas remained poorly developed. The pastoralists remained in the 'grey' areas and were functionally isolated from the competitive markets which led to their marginalization. Pastoralism is a major economic activity and due to their inability to access other markets were isolated from the economy.

## CONCEPTUAL FRAMEWORK

Figure 2.1: Conceptual Framework





The institutional policy and legal framework in Kenya are poor like the group ranch concept. The concept was designed to introduce security of land tenure to pastoralists with the approach of introducing subsistence production through sedentarization. The group ranch failed to meet their intended purpose and coupled with mismanagement of resources led to subdivision.

Pastoralists were not involved in the development process after independence. This process had to do with an urban based perception of development including industrialization and a market economy. These factors impact on the land use changes.

In order to reverse the negative effects of change, various strategies are employed to curb the effect of reducing land resources in pastoralist areas. The pastoralists need to be empowered through capacity building and involvement in decision making. Other strategies include land use planning, formation of associations and marketing of livestock products, this will lead to a sustainable utilization of land use.

#### **2.24 Summary**

Pastoralism has survived due to some features in the production systems which include flexibility that is able to exploit patchy resources, low costs in production, freedom of movement, light regulatory environment and operating in areas that are unsuitable for agriculture.

Pastoralism best works under these conditions as shown in the examples of Australia;

- provision of sources of water in the ASALS
- introduction of cattle, sheep and goat species suited to that environment
- introduction of exotic forage species e.g *Eragrostic superba*, *digitaria milanjiana*/1, etc. that have greater nutritional properties
- changes in traditional burning patterns
- elimination of incompatible users
- Clearing of over storey trees for the multiplication of biomass.

Pastoralism works unproductively under these conditions:

- Extreme climatic conditions like frequent droughts and lack of draught preparedness leading to huge losses during drought.
- Lack of infrastructural facilities for livestock production
- Poor marketing systems and lack of efficient market information network in ASALS
- Disease prevalence especially trypanosomiasis, East Coast Fever and malignant catarrh
- Inadequate extension services.

Due to the low carrying capacity in ASALS, there is a high increase of population numbers threatening the fragile ecosystem and the sustainable land use.

### 3.1 Natural Resource Base and Potentials

The physical environment provides the natural resource base, which has a direct influence on the development potential of a region. The natural resource base and their potential present opportunities that must be utilized to meet specific needs of the people. The available resources are highlighted in the location of the study area, topography, geology and soils, climate, vegetation and drainage patterns.

#### 3.1.1 Location, Area and Geographical Scope

Lushoto District is located at the Southern tip of the Rift Valley. It was one of the divisions of Kenya until April 2007 when it was elevated to district status. The district borders the Machakos district to the South, Taita Taveta district to the East, Machakos district to the North, Kilimanjaro district to the Northwest, and Kilimanjaro district to the West as shown on Map 3.1.

## CHAPTER THREE BACKGROUND TO STUDY AREA

### 3.0 Introduction

Land use in Kenya is controlled by a number of factors which include climate, soils, labour, technology and markets (Mwangi P., 1997). Of the total land surface in Kenya about 80 per cent is classified as Arid and Semi Arid Lands (ASAL), the development of these areas is therefore considered crucial since about 25 per cent of Kenya's population and over 50 per cent of the total livestock in the country are found in the ASAL areas (Kenya Gov. of; National Dev. Plan, 1997) and a major portion of the country's wildlife resources.

Owing to the low carrying capacity in ASALS, there is a high increase of population numbers threatening the fragile ecosystem and the sustainable land use.

### 3.1 Natural Resource Base and Potentials

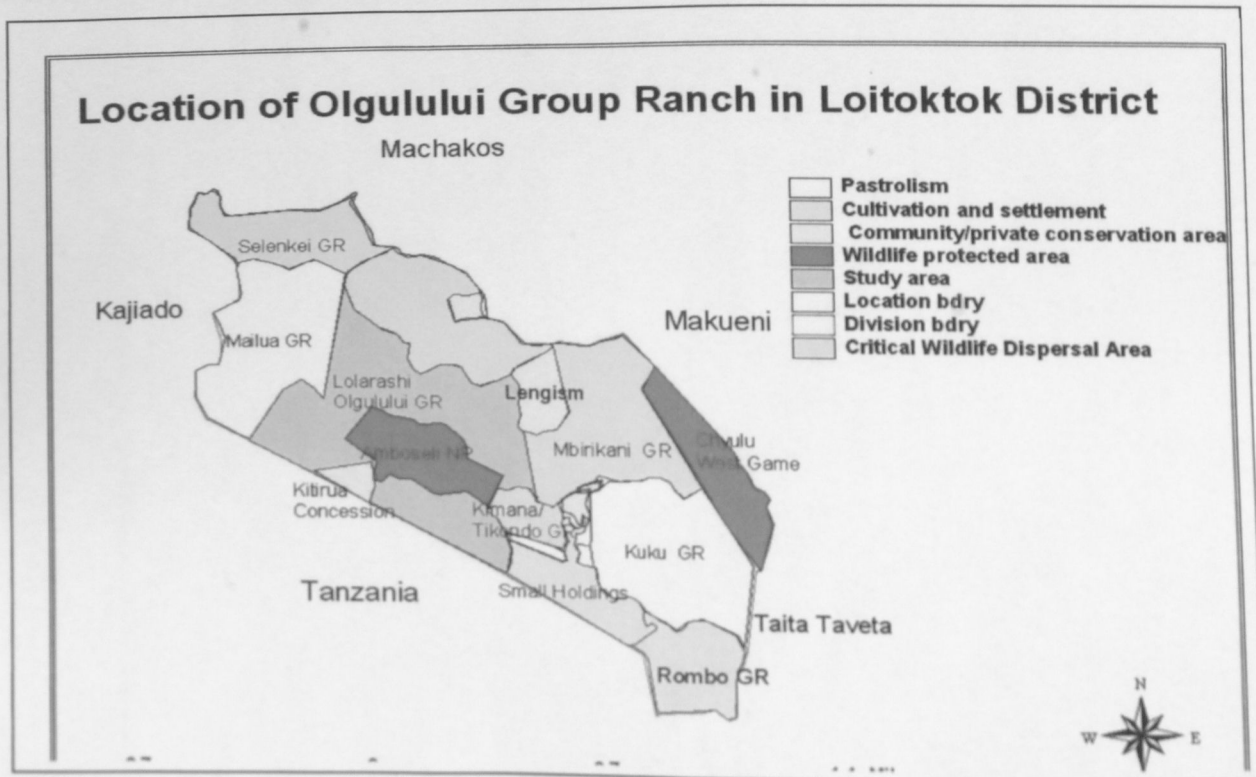
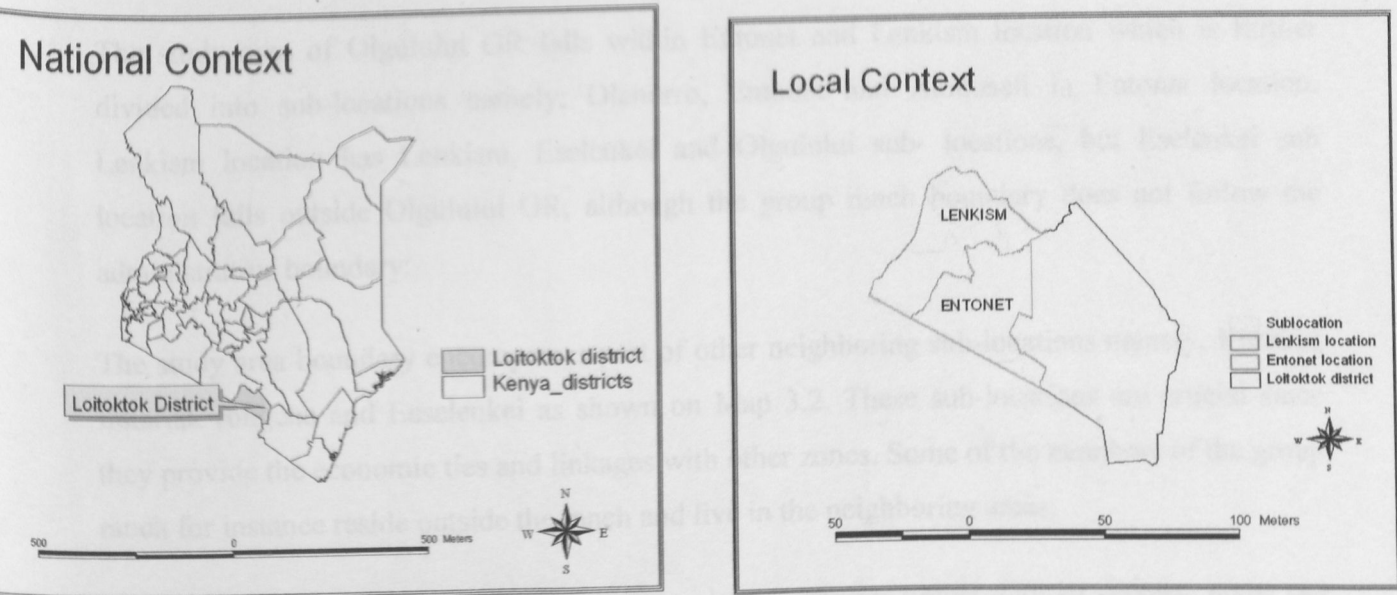
The physical environment provides the natural resource base, which has a direct influence on the development potential of a region. The natural resource base and their potential, present opportunities that must be utilized to meet specific needs of the people. The available resources are highlighted in the location of the study area, topography, geology and soils, climate, vegetation and drainage patterns.

#### 3.1.2 Location, Size and Geographical Scope

Loitokitok district is located at the Southern tip of the Rift Valley. It was one of the divisions of Kajiado district until April 2007 when it was elevated to a district status. The district borders the Republic of Tanzania to the South, Taita Taveta district to the East, Machakos district to the North, and Makueni district to the Northeast, and Kajiado district to the West as shown on Map 3.1 below.



**Map 3.1: Geographical Context of the Study Area**



Source: Compiled from Ministry of Lands, 2007.

Loitokitok district covers an area of 6,356.9 Km<sup>2</sup>, with six locations namely; Lenkism, Entonet, Birikani, Kimana, Kuku and Rombo and has 16 sub-locations.

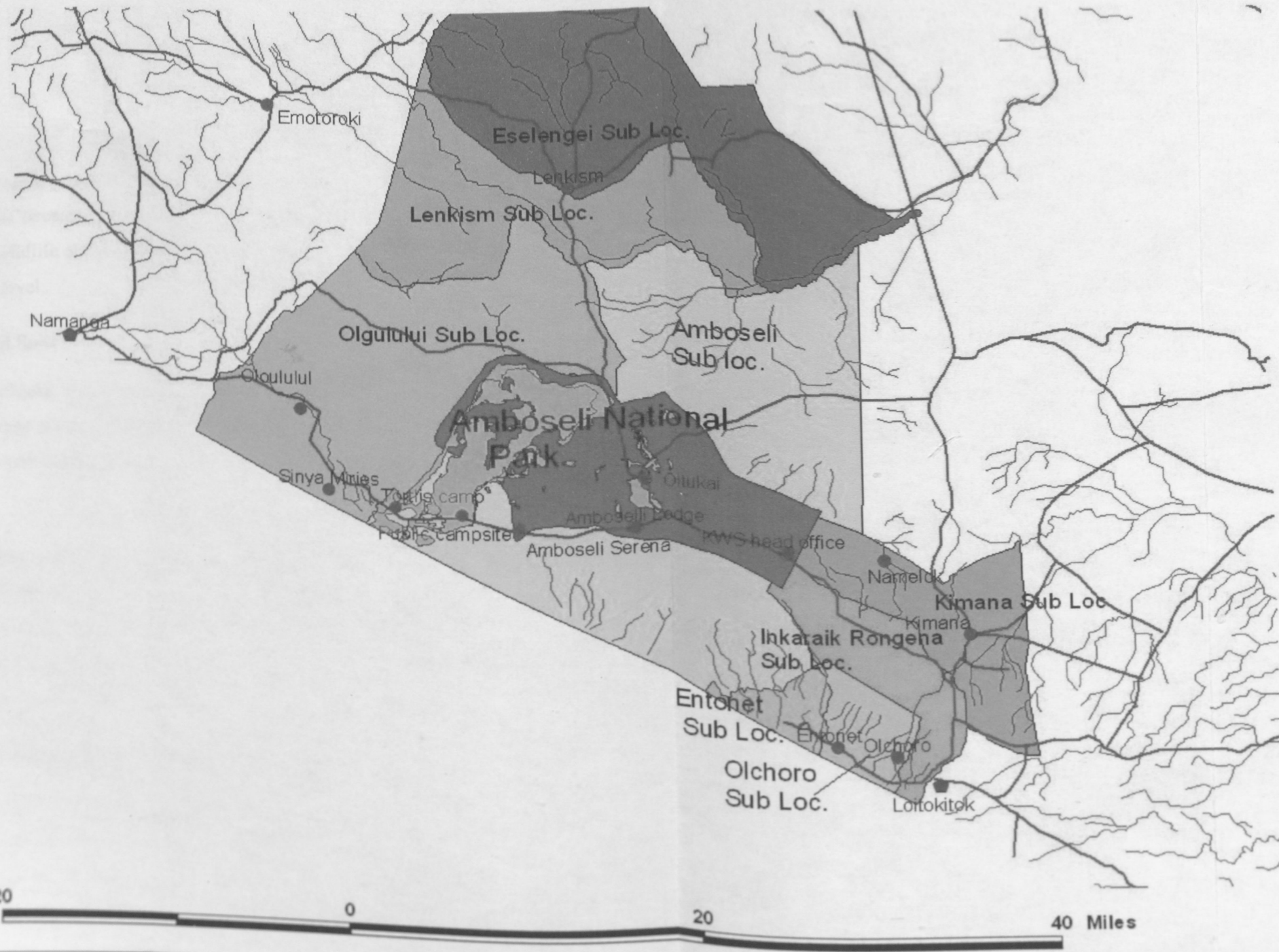
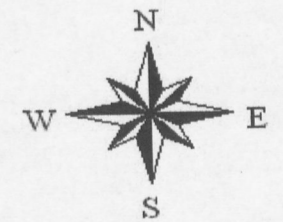
The study area of Olgulului GR falls within Entonet and Lenkism location which is further divided into sub-locations namely; Olchorro, Entonet and Amboseli in Entonet location. Lenkism location has Lenkism, Eselenkei and Olgulului sub- locations, but Eselenkei sub location falls outside Olgulului GR, although the group ranch boundary does not follow the administrative boundary.

The study area boundary encompasses part of other neighboring sub-locations namely, Kimana, Inkariak rongena and Eeselenkei as shown on Map 3.2. These sub-locations are crucial since they provide the economic ties and linkages with other zones. Some of the members of the group ranch for instance reside outside the ranch and live in the neighboring areas.

Major urban centres of Loitokitok, Namanga and Kimana are linked with all weather roads and form socio- economic ties for the people in the study area. Olgulului Group Ranch covers a total land area of 147,050 hectares.



# Physical and Natural Resource Map



- Markets
- ~ Rivers
- Towns
- ~ Roads
- Lakes.
- Protected Areas
- Neighbouring Locations
- INKARIAK RONGEI
- KIMANA
- Neighbouring. Sub Locati
- ESSELENGEI
- Locations
- ENTONET
- LENKISM



### 3.1.3 Topography

The Study area is located within Amboseli plains (basin) which is characterized by flat to gently undulating slopes within a pleistocene lake basin, formed when lava flows from erupting Kilimanjaro, blocked off the course of the Pangani River tributaries, creating a lake, which is now the Amboseli National Park. Over the course of time the lake dried up although the basin is still prone to seasonal flooding. The flat topography of the basin is broken in only a few places by a number of small extinct volcanic vents known as Lemomo, Esiteti, Kitirua, Ilmerishari, Nomator and Oldonyo Ntaua.

The hilly areas serve as dry season grazing zones for livestock and wildlife. The rainfed agriculture is concentrated on the slopes of Mt Kilimanjaro where as the irrigated zones are in areas where surface streams and springs are found. The Amboseli National Park is found in the flat zones where wildlife and other tourist activities thrive. The altitude ranges between 850m – 1340m above sea level.

### 3.1.4 Geology and Soils

The quaternary volcanic soils on the slope of Kilimanjaro are well drained, shallow to deep and fertile and encourage rain-fed agriculture. The soil types in irrigated zones are calcareous, saline and moderate to low fertility and well drained. Surface streams and springs provide water for irrigation.

The rest of the area is covered by basement rock soils making only pastoralism possible. These dark red to reddish brown sandy clay soils are low in fertility despite the rapid growth of grass on them in the early rains. The darker brown-to-black (black cotton) alluvial clays accumulate in seasonal runoff lines and low-lying areas of impeded drainage which traps nutrients and support grass growth for a while after the rains.

### 3.1.5 Climate; Rainfall and Temperature

The Amboseli region falls within arid to semi-arid zone (agro-climatic zones V and VI), with low agricultural potential and pastoralism forming the appropriate land use in the study area. The rainfall is bimodal, the short season rains start in mid November to end of December. The long rains start in mid March and end late April and mid May, with an average of 350-1045 mm

annually. The short dry season is between January and February is relatively hot (up to 35°C), and the longer dry season between June and October can be cold (down to 8°C).

The rainfall regime is erratic and unpredictable, over the past 30 years there have been four major drought periods, early 70<sup>s</sup>, mid -80<sup>s</sup>, late 90<sup>s</sup> and mid 2000.

### 3.1.6 Drainage and Water Sources

The impermeable soils form an extensive subterranean aquifer, which is fed by rainfall on the slopes of Mt Kilimanjaro. A series of springs emerge from porous volcanic rocks at the southern edge of the basin and flow northwards on the surface of the lakebed forming large expanses of the swamps. Map 3.3 shows the drainage patterns in the study area. Swamps constitute 1 per cent of the Amboseli basin and are the only permanent sources of water. Swamps are found in areas of Namelok, Kimana, Lenkati and Murtot where intensive agriculture is carried out. Kitirua swamp forms a very important source of water for the local people and livestock. In some instances the people have also made shallow pans which they use for livestock.

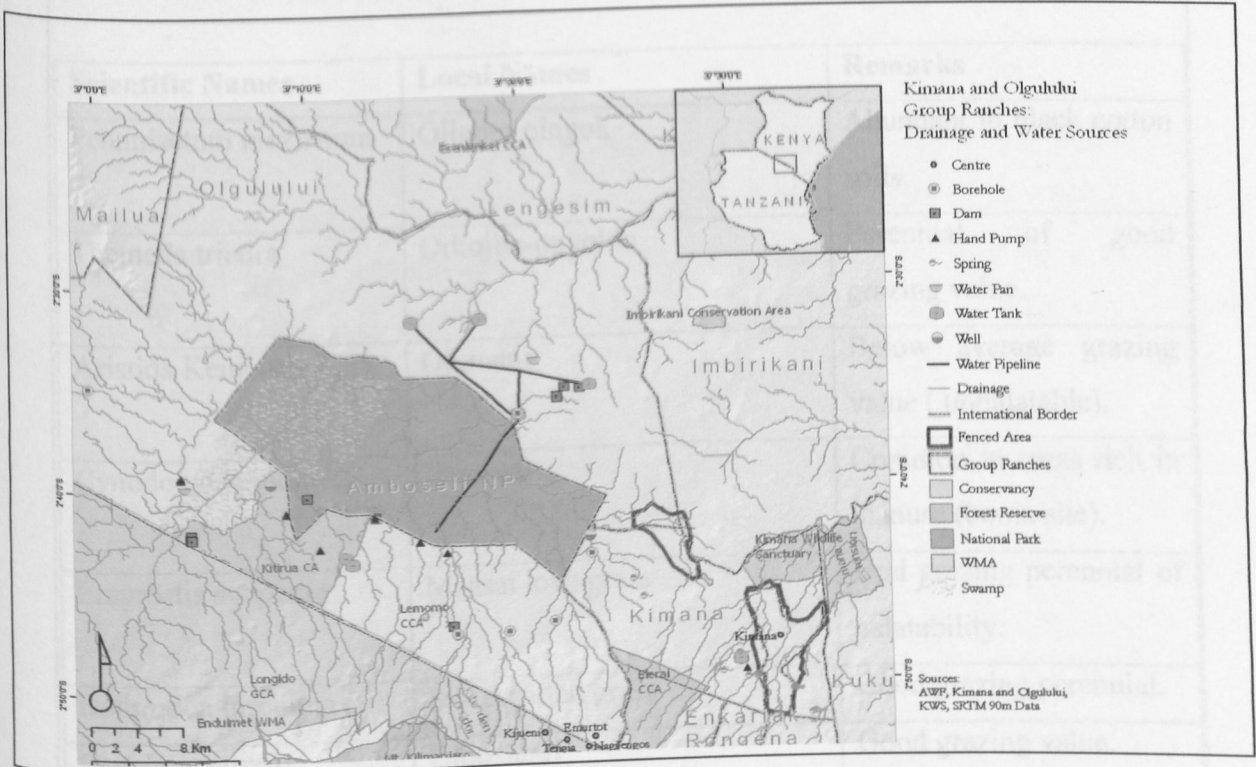
There are no adequate surface water resources for livestock and human consumption thus increasing a threat to human /wildlife conflict. There are 30 boreholes in the ranch, of these less than 30 per cent are operational ( Mutinda et al, 2004).

### 3.1.7 Vegetation

Vegetation is mainly influenced by altitude, soil type and human occupation of the land.

The vegetation is mainly classified into three broad categories: grasslands, woodland grassland and bushed grassland. Much of the grassland is savannah with scattered trees and thickets. The grassland is of poor quality dominated by annuals such as *Arundo donax*, and highly fibrous grasses such as *Pennisetum polystachion* and others as indicated in Table 3.1. The woody species include *Acacia tortilis* trees which may reach over 10m high that are scattered across the plains.

**Map 3.3: The drainage pattern in the Study area.**



Source: Mutinda et al, 2006.

### 3.1.7 Vegetation

Vegetation is mainly influenced by altitude, soil type and human occupation and utilization of the land.

The vegetation is mainly classified into three broad categories; grasslands, woodland grassland and bushed grassland. Much of the grassland is savannah with scattered trees and thickets. The grassland is of poor quality dominated by annuals such as *Aristida keniensis*, and highly fibrous grasses such as *Pennisetum mezianum* and others as indicated in Table 3.1. The woody species include *Acacia tortilis* trees which may reach over 10m high that are scattered across the plains.



**Table 3.1: Grasses commonly found in the Kimana-Olgulului area**

Scientific Names	Local Names	Remarks
<i>Pennisetum mezianum</i>	Oligoro oingok	Abundant in black cotton soils.
<i>Themeda triadra</i>	Orkojita-onyokie	Perennial of good grazing value.
<i>Aristida Keniensts</i>	Olkinani	Below average grazing value ( unpalatable).
<i>Cynodon dactylon</i>	Emurua	Common in areas rich in manure (boma site).
<i>Eragrostis swiperka</i>	Maasai love grass	Good grazing perennial of palatability.
<i>Bothrodoa insculpta</i>	Sweet pitted grass	Good grazing perennial.
<i>Cenchrus ciliaris</i>	Oloosidari	Good grazing value.
<i>Chloris xhoxburgiaria</i>	Olperesi	Good grazing perennial.

Source: Mutinda et al, 2006

The vegetation cover at the study area has been deteriorating due to clearance for agricultural activities in swampy areas of Murtot area. There has been a change in acacia *Xanthophloea* and *A. tortilis* woodland along the swamps.

### 3.2 Wildlife Diversity

The area of study lies within the Amboseli National Park, with an array of large and small mammals, birdlife and vegetative diversity. Human /wildlife conflict has led to competition of forage with wildlife and livestock and has led to human encroachment into the Amboseli National Park. Tourism is a great opportunity and a resource that need to be promoted by government and community by conserving the natural and cultural resources which are

attractions to tourists. The engagement in tourism by the Maasai is one of the means of economic diversification, and has significantly contributed to changes in land use.

### 3.3 Land Tenure System

In the study area, the land falls under the customary land tenure. This is land holding according to the traditional property rights, the Maasai were registered as group ranch where members own land and its resources in undivided shares. The group ranch comprises of three parcels of land where each parcel is registered with the following sizes; 4185.5 ha, 155.5 ha. and 147, 050 ha. (Min. of Lands, 2007).

The total number of registered parcels for Olgulului/ Lolarashi is 237. Out of these parcels, 3 are for the group ranch, 36 plots are registered under the local authority and the rest of the 198 are privately owned by individuals who were allocated land during the adjudication process that was finalized in 1975. The individual parcels vary in size between 10.0 ha. and 3,923 ha.

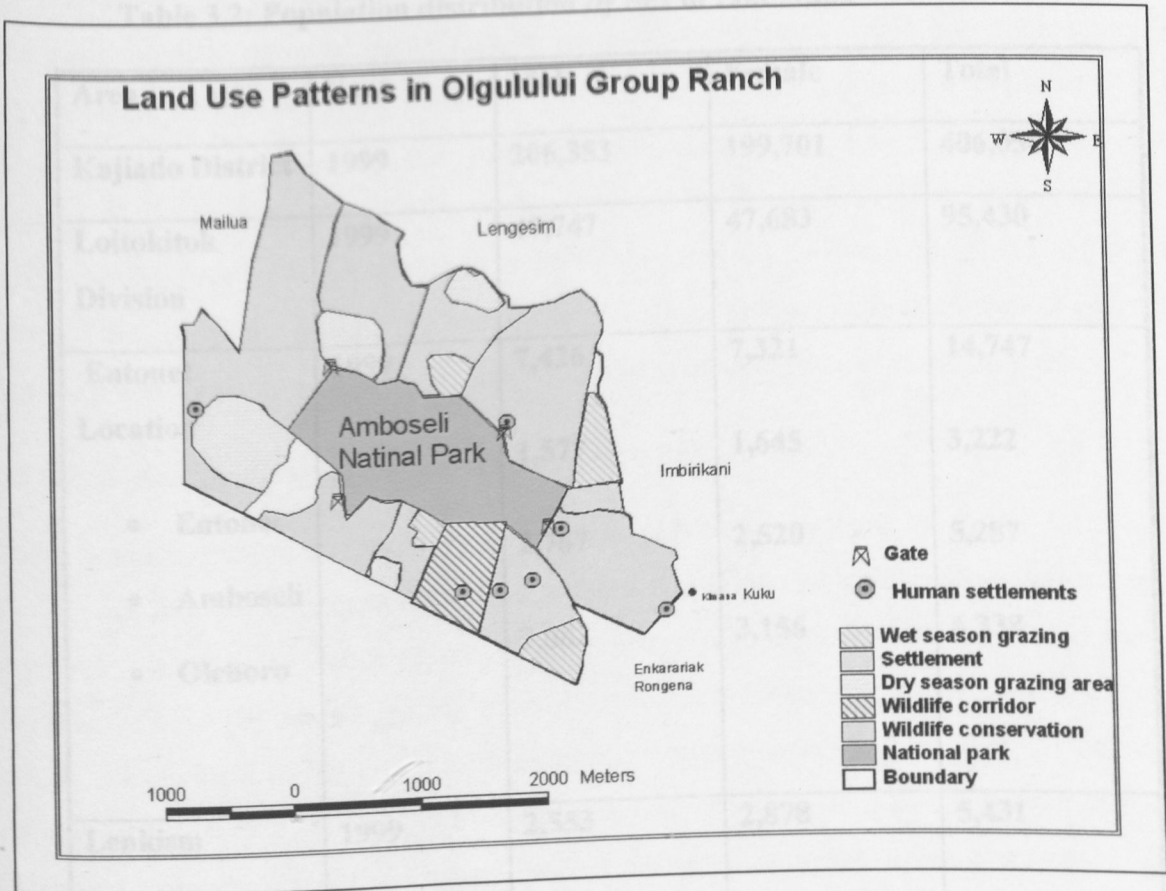
#### 3.3.1 Land Resource Systems

Land is the bases upon which people earn their livelihoods. There are basically four broad zones based on the land use patterns: Pastoral grazing areas, cultivated areas, Wildlife (national Park and Conservation) areas and settlements as indicated in Map 3.4 below.

Pastoral grazing areas are low-lying zones and usually receive low rainfall, where herding is the dominant activity. Wildlife share in the grazing resource with the livestock, and the group land forms the dispersal area for the wild animals.

The area under cultivation is mainly located in the swampy zones of Namelok. Cultivation of horticultural crops like onions and tomatoes for outside markets thrive most. The areas on the slopes of Kilimanjaro mainly Murtot, farmers rely on perennial rain for crop cultivation. One of the most significant land changes in these areas under cultivation is sub-division of plots to members. The 5 - 10 acre plots for each member are intended to be utilized for cultivation, where the rest of the land is shared for grazing. These areas under cultivation also form critical dry season grazing areas for livestock and wildlife.

Map 3.4: Land Use patterns in Olgulului group ranch.



Source: Field Survey, 2007.

The National Park forms the area under protection for wildlife. The community with the help of government and other development agents has formed conservation areas for wildlife where tourist income forms an economic benefit to the community.

### 3.4 Population Structure and Composition

Loitokitok district has a population of 95,430 people as per the 1999 census, with an average density of 18.6, (CBS, 1999). There is an increase in population size which is attributed to an influx of in-migrants who are non- Maasai from other regions and who are predominantly farmers.



Table 3.2: Population distribution by Sex in Loitokitok

Area	Year	Male	Female	Total
Kajiado District	1999	206,353	199,701	406,054
Loitokitok Division	1999	47,747	47,683	95,430
Entonet Location	1999	7,426	7,321	14,747
• Entonet		1,577	1,645	3,222
• Amboseli		2,767	2,520	5,287
• Olchoro		3,082	3,156	6,238
Lenkism Location	1999	2,553	2,878	5,431
• Lenkism		629	692	1,321
• Eselenkei		1,199	1,393	2,592
• Olgulului		725	793	1,518

Source: Kajiado District Development Plan, 2002.

Olgulului GR has a total of 11,495 registered members according to the group ranch management committee. The increase in population in the high potential areas on the slopes of Mt Kilimanjaro has impacted on land use where agriculture is intensively practiced. Table 3.2 illustrates the distribution of population by sex in the study area, where Entonet location has a total population of 14,747 while Lenkism has 5,431, from which Entonet, Olgulului and Lenkism sub-locations are less populated owing to the hilly outcrops found in the region and lack of water sources. The Amboseli sub-location is characterized by the location of the National Park and tourist hotels, hence the population is mainly derived from the hotel personnel and relatives. Most of the population resides in Olchoro sub-location, with the highest number of people. The Maasai practice transhumance lifestyle and migrate to other regions in search of pasture.

### 3.5 Socio- Economic Development and Livestock Population

Semi- nomadic pastoralism has been the traditional Maasai mode of life. About 92 per cent of the district is used as rangeland, it also supports the countries wildlife population. Livestock production is the main source of subsistence. Livestock production was centered on movement between wet and dry season grazing areas. However this lifestyle is slowly undergoing changes due to sub-division of the group ranches to individual ownership. The table 3.3 indicates the number of livestock population in Loitokitok district according to a census carried out in 2004, (Min. of Livestock, 2007). The emphasis put on such areas is on the carrying capacity of the land resource systems. The recommended grazing pressure is 6 ha per stock unit.

**Table 3.3 Livestock Population in Loitokitok District according to census of 2003-2004**

	Estimate of Total Numbers
Cattle	72019
Sheep	86786
Goats	72178
Donkeys	5627
Camel	0
Pigs	0
Poultry	13024

Source: Min. of Livestock, 2007.

### 3.6 Welfare Indicators

The Maasai view livestock numbers as wealth indicators, according to a study carried out by African Wildlife Foundation (AWF) in 2001, the categories are summarized into four as indicated in table 3.4, where the wealthy people own over 100 cattle and the poor with less than 20 cows.

**Table 3.4 Livestock ownership and wealth**

Category	No. of cattle	Status
1	Over 100	Wealthy
2	>60 <100	Average
3	>20 <60	Poor
4	<20	Very poor

**Source: Mutinda, 2006.**

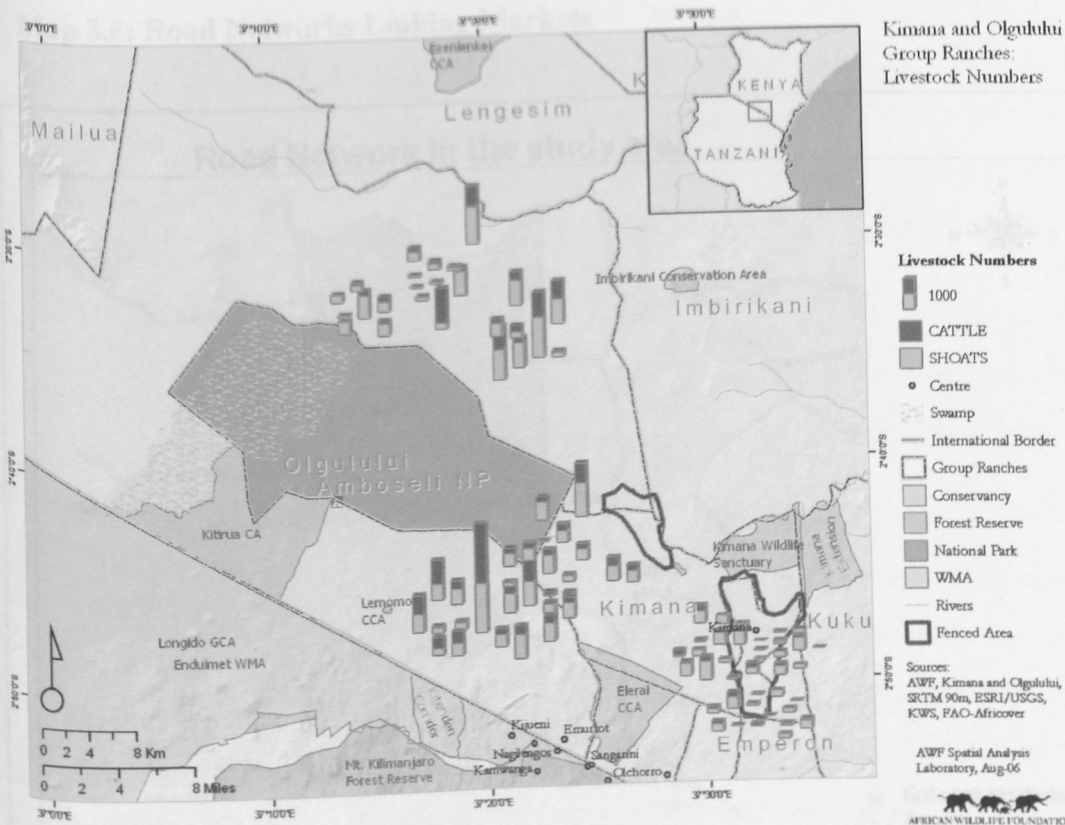
The distribution of livestock is mainly to the north and south-eastern parts of the group ranch as shown on Map 3.5. The central part is the location of the National park, while private owned farms are located to the west part of the ranch. The Western part of the ranch is characterized by hilly outcrops where settlements tend to avoid.

### 3.7 Market Access and Infrastructure Development

Infrastructure supports the economy of a region, it facilitates efficient and effective resource utilization and distribution of goods and services within and outside a region. Government policy has influenced the spatial structure of markets in Kenya, through investment in transportation infrastructure, land alienation and allocation and economic policies.



Map 3.5: Livestock population in Olgulului and Kimana group ranches.



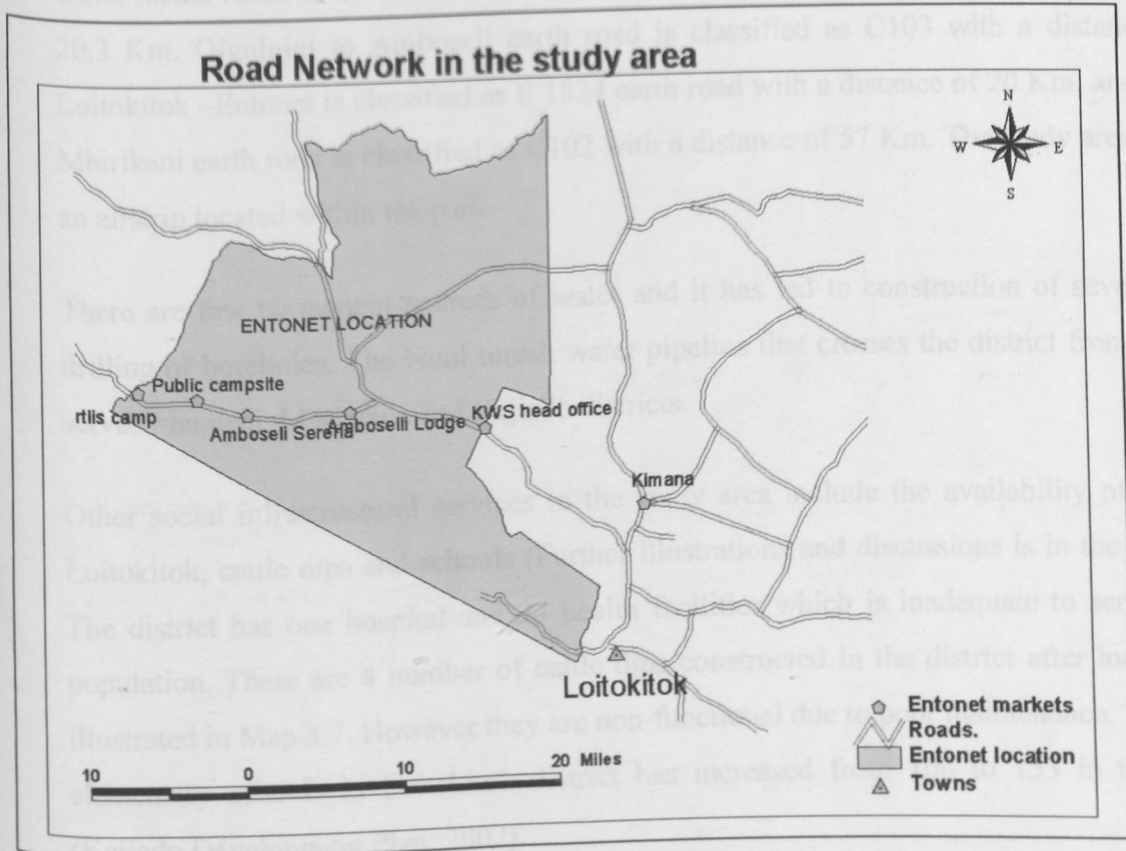
Source: Mutinda et al, 2006.

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In Loitokitok district economic driving forces have had a significant impact upon land use from colonial times to present. Their location relative to markets is determined by accessibility, and their competitiveness in supplying products relative to other sources.

**Map 3.6: Road Networks Linking Markets**



Source: Kajiado Livelihood Information & Mapping: ILRI, 2004.

In the early colonial period some pre-existing markets were isolated from the economy and declined in importance while others grew as they became more central to colonial economic activity, settlement and administration and related infrastructural investments in roads and railways. Loitokitok district is served by an all weather road classified as C102 and runs 115 km from Email to Loitokitok. The district has an agricultural potential of being the second highest

cereal producing district after Kitale in the country. The roads are poor and accessibility to market opportunities has been a challenge to the pastoralists.

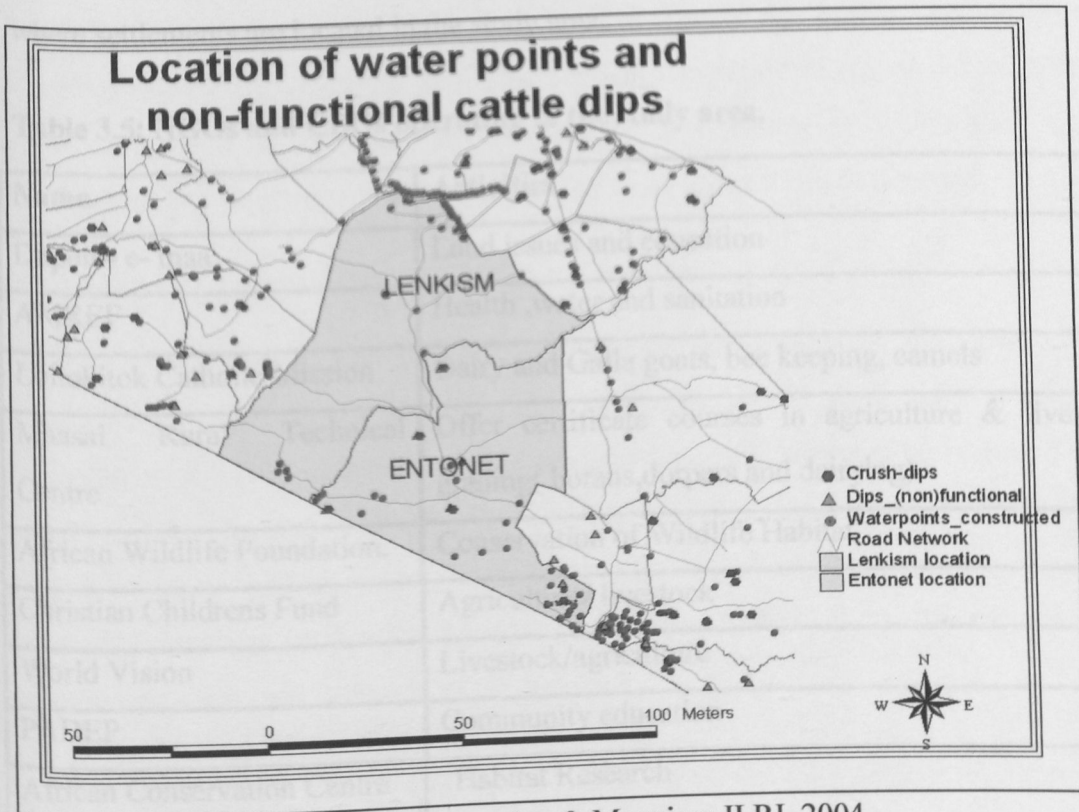
The study area is traversed by a graveled road, classified as C 103 (as shown on map 3.6) that connects Namanga through the Amboseli National park to Chyulu gate with a length of 168 Km. Other feeder roads is Amboseli to Eselenkei earth road, classified as E 396 and runs a distance of 20.3 Km. Olgulului to Amboseli earth road is classified as C103 with a distance of 18Km. Loitokitok –Entonet is classified as E 1824 earth road with a distance of 20 Km, and Amboseli – Mbirikani earth road is classified as C102 with a distance of 57 Km. The study area is served by an airstrip located within the park.

There are few permanent sources of water and it has led to construction of several dams and drilling of boreholes. The Nool turesh water pipeline that crosses the district from Kilimanjaro, serves Makueni, Machakos and Kajiado districts.

Other social infrastructural services in the study area include the availability of a hospital in Loitokitok, cattle dips and schools (Further illustrations and discussions is in the next chapter). The district has one hospital and 24 health facilities which is inadequate to serve the district population. There are a number of cattle dips constructed in the district after independence as illustrated in Map 3.7. However they are non-functional due to poor maintenance. The number of elementary schools in Loitokitok district has increased from 106 to 153 in the year 2000, (Kajiado Development Plan, 2002).



Map 3.7: Water points and non-functional cattle dips in Loitokitok



Source: kajiado Livelihood Information & Mapping: ILRI, 2004

### 3.8 Institutional Framework

Institutions play a crucial role as agents of regional development. There are various institutions represented in the district. These include central government departments representing their respective sectoral ministries and departments, local authorities and the public corporations. The line ministries and departments embark on immediate implementation of sectoral policies in accordance to governments' short and long term programmes and financed by the government expenditure.

Local authorities play an important role in the provision of appropriate infrastructure and social services. They are also entrusted with the custody and sustainable utilization of local resources and by managing these resources and regulating access to them through licensing, they play an important role in local resource mobilization. Local authorities plan for the location of market

centres and industrial projects, there is therefore a need to plan for market centres especially where settlements are located in the study area.

**Table 3.5: NGOs and CBOs operating in the study area.**

Name	Activities
Dupoto- e- maa	Land issues and education
AMREF	Health ,water and sanitation
Loitokitok Catholic Mission	Dairy and Galla goats, bee keeping, camels
Maasai Rural Technical Centre	Offer certificate courses in agriculture & livestock up grading( borans,dorpers and dairying)
African Wildlife Foundation.	Conservation of Wildlife Habitat
Christian Childrens Fund	Agriculture/ livestock
World Vision	Livestock/agriculture
PADEP	Community education
African Conservation Centre (ACC)	Habitat Research
Amboseli Elephant Research Programme (AERP)	Elephant Research
Kenya Wildlife Service (KWS)	Provides legislation and regulatory framework on wildlife.
Amboseli Tsavo Game Scouts Association	Community involvement in anti-poaching outside the park.
Amboseli Tsavo Group Ranches Conservation Association. (ATGRCA)	Negotiating body for land use.
Baboon Research	Research
Hyena Research	Research

Source: Kajiado District Development Plan, 2002.

Apart from the main stream government institutions, there are some active NGOs and CBOs operating in the district as shown in Table 3.5. The NGOs play an active role in economic development by providing the infrastructure and capacity building at the local level. There is need to provide an enabling environment by government in which they can effectively implement their policies and also the necessity to integrate the activities with the line ministries.

### 3.10 Land Use and Socio-economic Characteristics

The major land use in Loitokitok district is pastoralism, agriculture and tourism. The district is classified as arid to semi-arid zone. The arid drier zones form the lee-ward side of Mt. Kilimanjaro which is characterized by open grasslands and scattered bushlands. This arid area is dominated by herders and wildlife. The settlements are sparsely distributed with a low population density in the study area, but are nucleated and mainly concentrated near water sources. Livestock production is very important in these areas for supplying subsistence requirements and cash from sale of the livestock.

Agriculture in the district is practiced on the wetlands of the slopes of Mt Kilimanjaro and around swamps and springs. The rainfed agriculture is practiced on the slopes of Mt Kilimanjaro which has a high productive potential in food crops. The productivity is influenced by high rainfall and good soils that supports the growth of good vegetation and agricultural crops and other land uses. These zones also forms the bulk of the high potential dry season grazing where the *ilkisongo* Maasai fell into during times of drought. There is a high concentration of human settlements in the high potential areas and is dominated by other tribes mainly Kikuyu who were allocated land during land adjudication in 1960s. About 75 per cent of the area in Mt Kilimanjaro is cultivated, and maize dominates the crop acreage.

Irrigated agriculture is practiced in swampy areas and also in the springs. The area is dominated by horticultural crop production for commercial purposes. The current crops produced include onions, tomatoes, maize, beans and Asian vegetables which get to the markets of Mombasa and Nairobi. Mixed farming is practiced by Maasai pastoralists in these areas, which implies that pastoral people are adapting to agriculture.



Tourism is one of the most popular land uses in the study area. The area is endowed with wildlife species and the communities are involved in tourist activities. The group ranch has set aside 40,040 acres of land as wildlife concession areas of which they manage.

### 3.11 Land Use Changes and Pastoralism

One of the most significant land use change in the study area is conversion of pastoral lands into cultivation on the most humid areas. This was as a result of government policy on land reforms of alienating land for economic production. In Loitokitok district, land was alienated to individuals through consolidation and adjudication processes on the slopes of Mt Kilimanjaro and other high potential areas like Ngariak- Rongena, Kimana, and Rombo and this resulted to an influx of in-migration of farmers. The change in land tenure, with the migratory push factors, and lack of political power at the national level led to a transformation from pastoralism to one of mixed- farming and they lost their control of the land meant for grazing during the dry season.

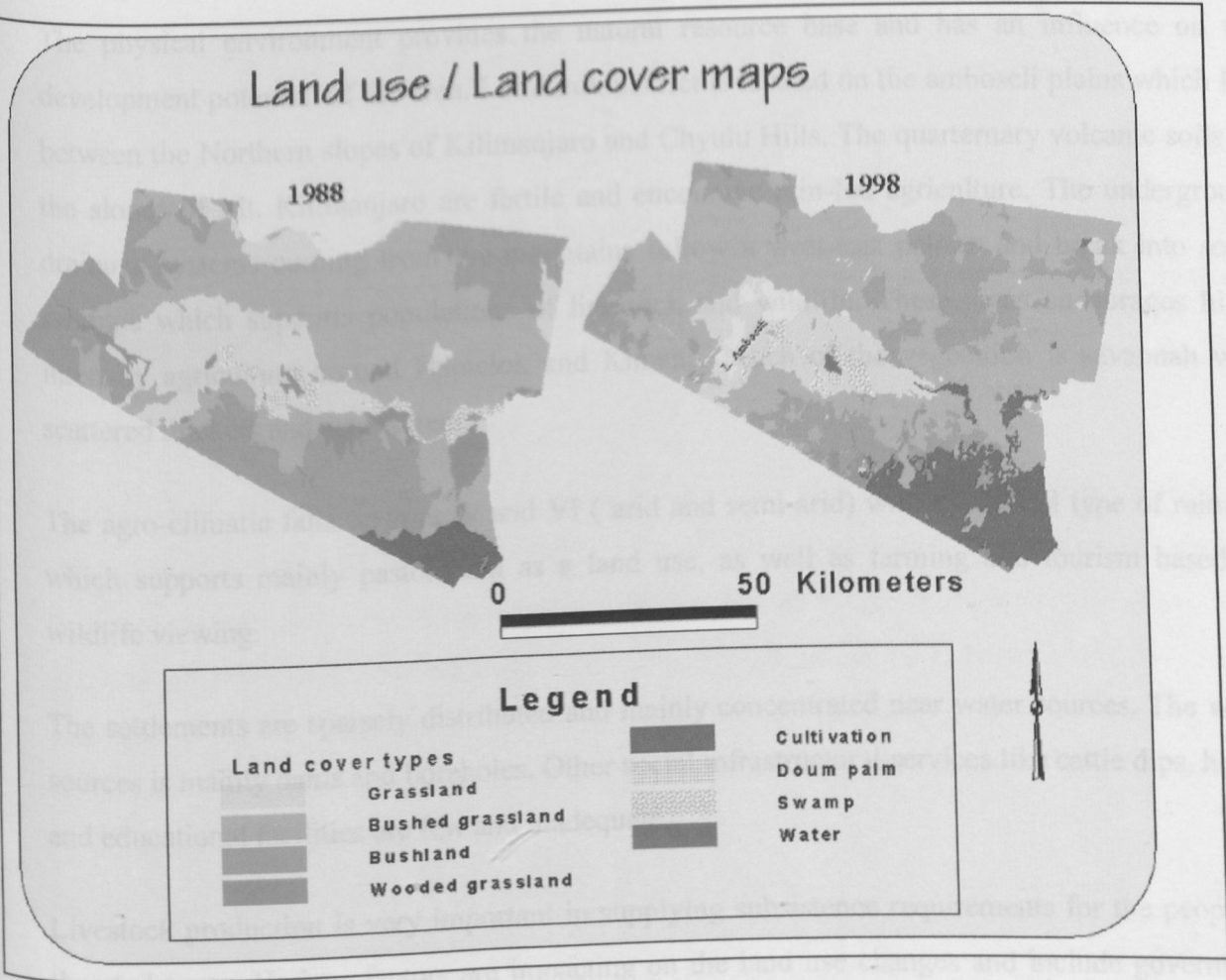
The alienation of land by the colonial government for creation of National Parks and Forest Conservation areas further impacted on change on land use in pastoral areas. The gazettelement of Amboseli National Park and Chyulu hills led to the reduction of the total land area and loss of key dry season grazing areas.

Land sub-division to members within the group ranch is causing further alienation of wet lands for cultivation. The wetter more productive land and water sources are increasingly less available to livestock and wildlife during the dry season. The land sub-divisions to members implies that pastoralists are going to be more sedentarized into more permanent settlements.

These processes potentially are impacting landscape patterns and pose a threat to pastoral livelihood in the area. Map 3.8 and table 3.6 both indicate the land use and land cover change in South East Kajiado which is currently Loitokitok district, where cultivation has significantly increased on the slopes of Mt Kilimanjaro.

	1984	1994	2000
Forest	546	596	417
Original agriculture	245	3513	4043
Non-forest agriculture	7213	17762	22034
			24911

**Map 3.8: Land use changes between 1988 and 1998 in Loitokitok.**



Source: Atieno as quoted by Mutinda et al, 2006.

**Table 3.6: Land use and land cover change in South East Kajiado**

Land use / cover type	Area (ha)			
	1973	1984	1994	2000
Forest	646	596	417	417
Irrigated agriculture	245	3513	4045	4768
Rain-fed agriculture	7213	17762	22034	24911

Source: Campbell et al. (2003) as quoted by Mutinda et al., 2006.

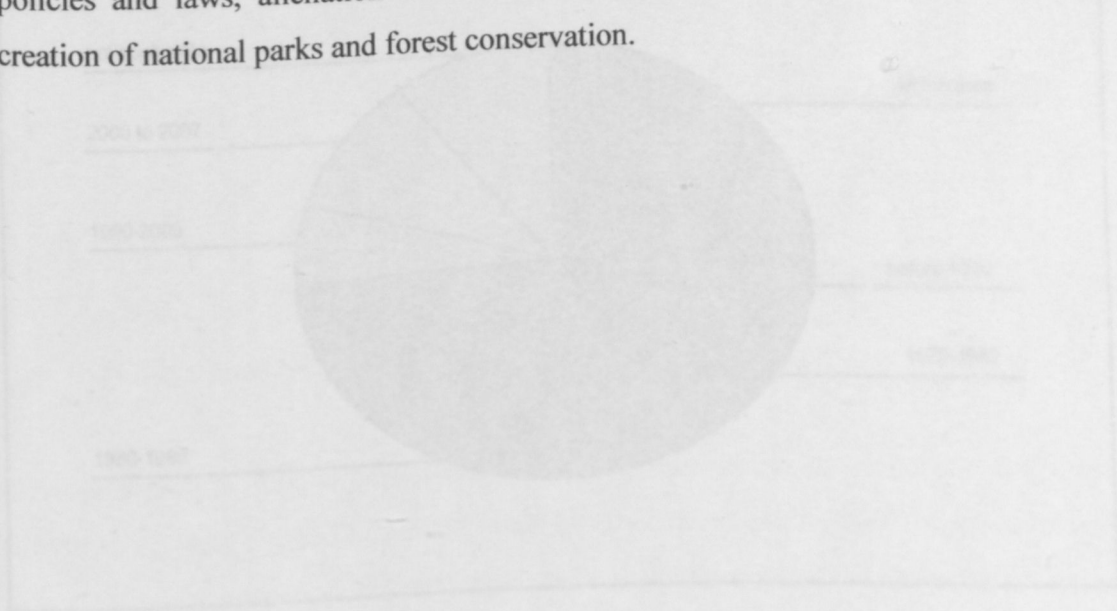
### 3.12 Summary

The physical environment provides the natural resource base and has an influence on the development potential of the area. Loitokitok district is located on the amboseli plains which lies between the Northern slopes of Kilimanjaro and Chyulu Hills. The quarternary volcanic soils on the slopes of Mt. Kilimanjaro are fertile and encourage rain-fed agriculture. The underground drainage systems coming from the mountains follow a west-east pattern and break into some swamps which supports populations of livestock and wildlife. These areas encourages high-intensity agriculture around Namelok and Kimana. Much of the vegetation is savannah with scattered thickets and acacia trees.

The agro-climatic falls on zone V and VI ( arid and semi-arid) with a bimodal type of rainfall, which supports mainly pastoralism as a land use, as well as farming and tourism based on wildlife viewing.

The settlements are sparsely distributed and mainly concentrated near water sources. The water sources is mainly dams and boreholes. Other social infrastructural services like cattle dips, health and educational facilities are few and inadequate.

Livestock production is very important in supplying subsistence requirements for the people in the study area. Various factors are impacting on the land use changes and include government policies and laws, alienation of land for agricultural production and land subdivisions and creation of national parks and forest conservation.





## CHAPTER FOUR

### ANALYSIS OF PASTORALISM AND LAND USE CHARACTERISTICS

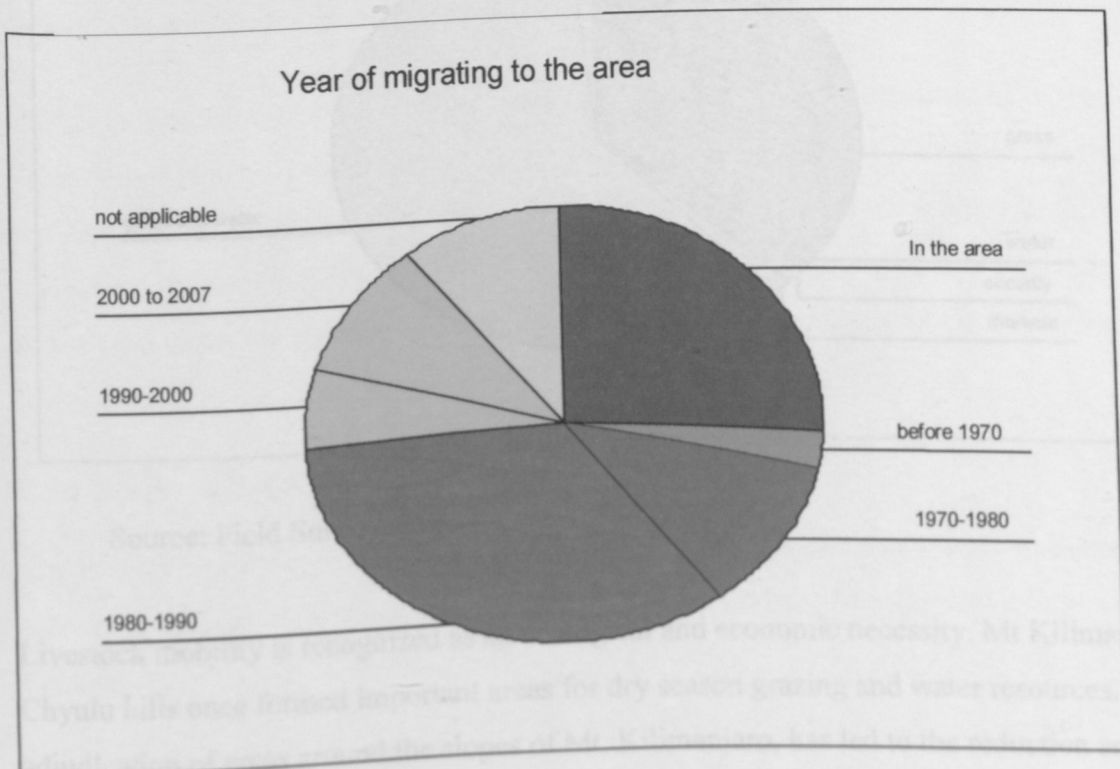
#### 4.0 Introduction

The analysis in this chapter focuses on socio-cultural, economic and environmental factors influencing land use patterns in Olgulului GR. It is based on field work carried out in the study area.

#### 4.1 Migration Trends and Resource Use

In this study, 72 per cent of the respondents were not born in the study area, showing an indication of the nomadic lifestyle practiced by pastoralists who move from one area to another. In one of the sampled areas of Namelok, a small number of 2.9 per cent of the respondents lived in the area before 1970, and there was a substantial influx of people as between 1980 – 1990 as indicated in Fig 4.1. This trend could be related to sedentarization of Maasai and the beginning of cultivation of crops in the swampy area of Namelok and high altitude area of Murtot-Entonet.

**Figure 4.1: Migration Trends**

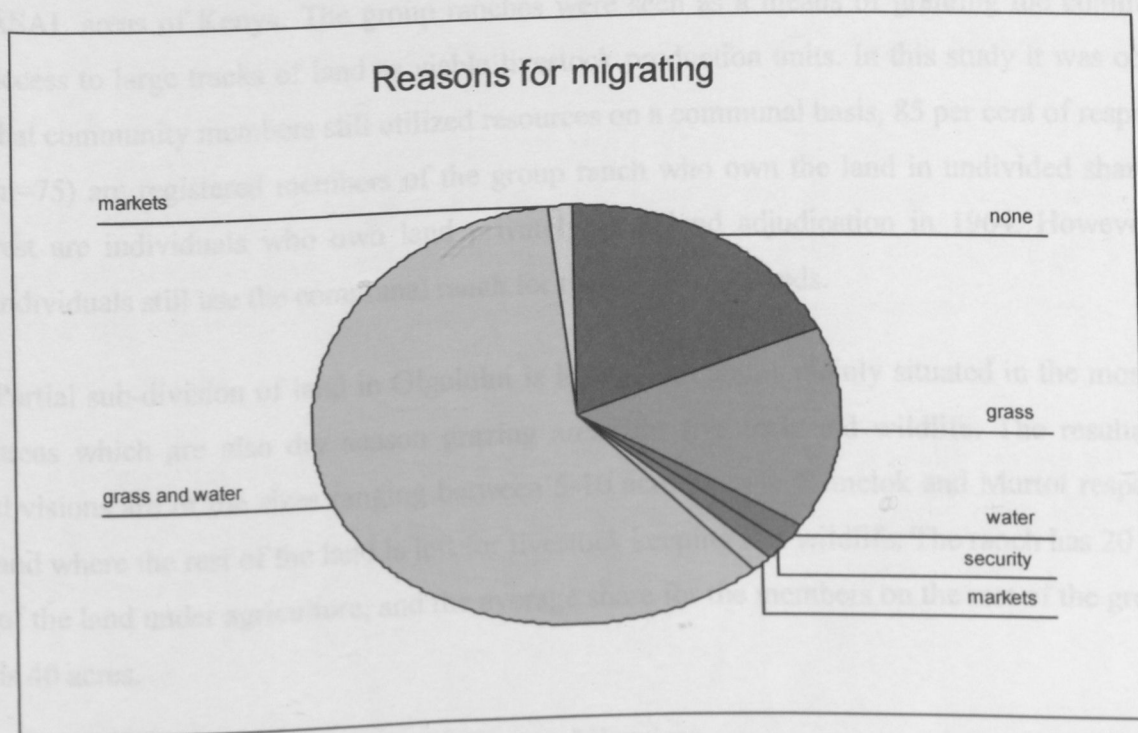


Source: Field Survey, 2007.

Pastoral natural resource management strategy entails mobility between wet –and dry season grazing areas which are meant to mitigate risk of losing herds.

The Maasai pastoralists in the study area were observed to still continue to migrate with livestock mainly in search of forage and water as indicated in Fig.4.2. These accounted for 88.6 per cent of the respondents who migrate to dry season zones outside the study area of Chyulu hills and Risa (located within the study area) and under extreme circumstances they resort to migrating into the National park which amounts to trespass. This gives an indication of the importance of setting aside areas for dry season grazing areas.

**Figure 4.2: Purpose of Migration**



Source: Field Survey, 2007.

Livestock mobility is recognized as an ecological and economic necessity. Mt Kilimanjaro and Chyulu hills once formed important areas for dry season grazing and water resources. With the adjudication of areas around the slopes of Mt. Kilimanjaro, has led to the reduction and access to

the dry- season water and grazing resources. Chyulu hills form the water catchment area reserved under forest area. The Maasai are compelled to move to take advantage of the fluctuating forage availability in different areas and at different times. Pastoralists will continue to migrate as long as the ecological conditions of semi arid regions remain the same.

Livestock too follow a similar seasonal migratory pattern. The grasses in an area are quickly deleted when the livestock and wildlife converge on an area, thus providing no chance for the grass to become fully established. However with better rangeland management, including rotational grazing, suitable stocking rates and the situation could be improved.

#### 4.2 Land Tenure Systems

The post colonial era marked the formation of group ranches in 1978 located mainly in the ASAL areas of Kenya. The group ranches were seen as a means of granting the communities access to large tracks of land as viable livestock production units. In this study it was observed that community members still utilized resources on a communal basis, 85 per cent of respondents (n=75) are registered members of the group ranch who own the land in undivided shares. The rest are individuals who own land privately after land adjudication in 1964. However these individuals still use the communal ranch for their livestock needs.

Partial sub-division of land in Olgulului is in progress and is mainly situated in the most arable areas which are also dry season grazing areas for livestock and wildlife. The resultant sub-divisions are of the sizes ranging between 5-10 acre plots in Namelok and Murtot respectively, and where the rest of the land is left for livestock keeping and wildlife. The ranch has 20 per cent of the land under agriculture, and the average share for the members on the rest of the group land is 40 acres.

#### 4.3 Changes in Socio –Cultural Values and Services

The Maasai traditions are still being upheld as revealed from the focused group discussions. Two factors in support of this fact were wealth indicators and the housing patterns according to the field survey.



### 4.3.1 Welfare Indicators and Traditions

According to a focused group discussion in the study area, the following views were expressed :

The practice of livestock keeping was passed down as a culture from their ancestors. A myth has it that God passed down cattle from heaven to the first Maasai man through a long rope. Cattle became then a source of life – ‘*enkishui*’ to man, thus the name of cattle – ‘*inkishu*’ is a synonym for the word life. Constant rivalry over control and possession of large herds were experienced through cattle raiding with distant communities and clans.

The Maasai traditionally reared large numbers of herds, and they believed that the more cattle one had the better the chances of at least some surviving after droughts. The Maasai view the number of livestock as an indicator of wealth, a rich person is considered to own 100 and above heads of cattle while a poorer person owns less than 20 heads. Most producers are unwilling to sell their herds as a means of wealth production and use their breeding herds to multiply the livestock herd.

A large herd of cattle is seen as an investment, a security and an indicator of wealth status. The cattle is a source of basic needs like food, it is used for payment of dowry, as a gift to family, friends and relatives, for trade and also large bulls were ‘praised’ - ‘*aimany*’ by owners through song and proverbs.

Long droughts wipe out herds and a household could recover the herds by lending out cattle to friends and relatives, as a drought coping mechanism. There is a special relationship between stock-friends and are obligated to one another when rains fail.

### 4.3.2 Housing

Housing is a basic necessity for human beings and is a measure of the standard of living as well as the welfare of each household. The Maasai in the study area live in traditional kraals and the main type of construction material used is sticks and mud mixed with cow dung and occasionally roofed with iron sheets. The Maasai traditionally moved from one area to another in search of forage, and therefore have no permanent dwellings and some could own more than one dwelling home, 45.7 per cent of the respondents in the study area indicated that they do not incur expenses

in building materials as indicated in (Table 4.1). The housing patterns reflect their migratory patterns as evidenced by the type of material used for housing. The social concept of housing has not significantly changed over time, and they were observed to live in large kraals and within it are several households.

**Table 4.1: The Cost of buying building materials**

Cost	Frequency	Percentage %	Cumulative %
none	32	45.7	45.7
Below 1500	13	18.6	64.3
1500-3000	6	8.6	72.9
3000-4500	9	12.9	85.7
Over 4500	10	14.3	100
Total	70	100	

Source: Field Survey, 2007.

### 4.3.3 Human Population Dynamics

The human settlements patterns in the group ranch were observed to be concentrated in various pockets. The areas that are highly concentrated with human settlements are Olgulului, Esiteti and Laimutia areas, and are located to the West of the ranch, where as Nkongu-Narok, Ilmarba, Murtot areas are to the South and Southeast of the study area. The Northern part of the ranch with high human concentration are Risa, Nkiito, Remito and Nauyankare, where as Osoit and Namelok areas are situated to the West of the ranch. The Central part of the ranch is the protected area of the National Park and Lake Amboseli where there is a low human concentration.

Certain areas in the study area were observed to have high concentrations of human population, owing to an influx of in-migrants who are attracted to certain activities. For instance, Nkongu – Narok is a cultural boma located near a tourist hotel and forms an agglomeration of human

Plate 4.1: Livestock at a Borehole Source  
 population around a cultural activity. The main entrances (gates) to the Park have market activities developing like sell of cultural ornaments to visitors, and it also forms a major transit route to other destinations.

Some human settlements are located along wildlife migration corridors which cause conflicts and result in losses and damages to people and properties. The researcher during the field research encountered such a conflict where a tragedy occurred when a human being was killed by an elephant, and this resulted in a retaliation exercise by *morans* killing other elephants.

#### 4.4 Infrastructure and Social Services

Infrastructure plays a role in facilitating the efficient and effective resource utilization and distribution of goods and services. When a minimum complement of services, such as transport and communication, electricity and water supply among others are provided economic growth is greatly enhanced. In the study area, settlements are concentrated in areas with availability of infrastructural services like water sources, schools and roads.

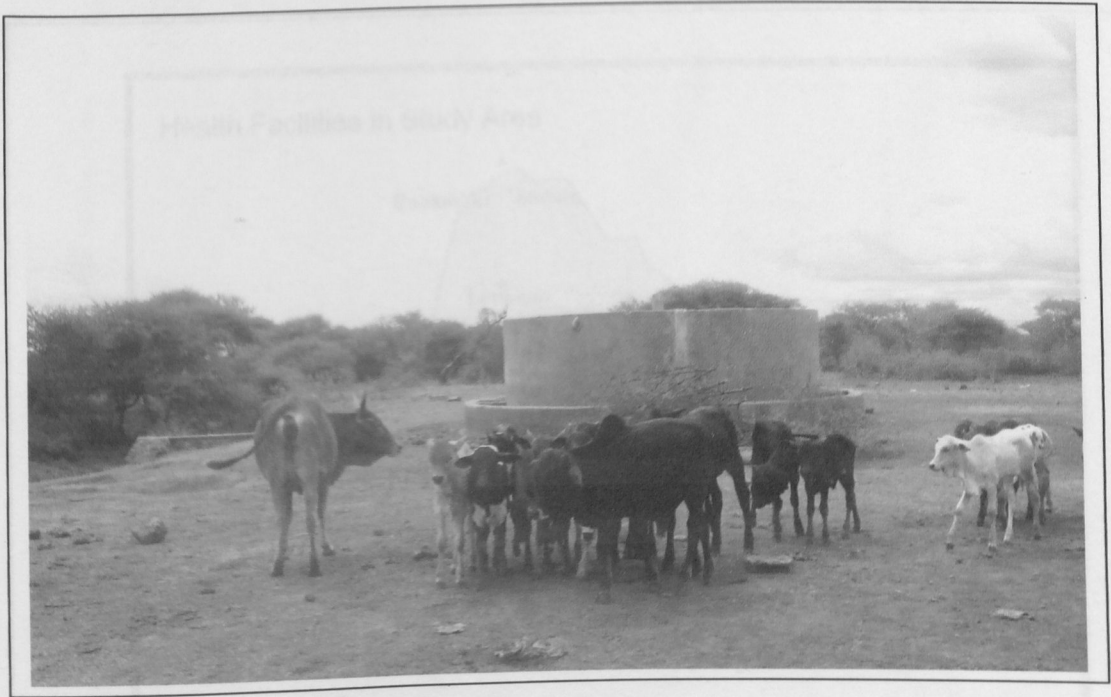
##### 4.4.1 Access to Water

There are few permanent sources of water in the study area and 41.4 per cent have access to water within a radius of 1 Km. The main sources are boreholes and springs. The group ranch in collaboration with AMREF and other NGOs have embarked on rehabilitating the collapsed boreholes. Plate 4.1 indicated below shows one of the boreholes in the study area. Water sources are insufficient owing to the high number of population for human, livestock and wildlife.

The distribution of health facilities is depicted on Map 4.1, where the location of the health facilities is mainly on the Central and Southern part of the study area. Other specialized health services are found in Lomokit and Lankiam. The use of modern medicine is preferred than the traditional methods according to the research findings.



### Plate 4.1: Livestock at a Borehole Source



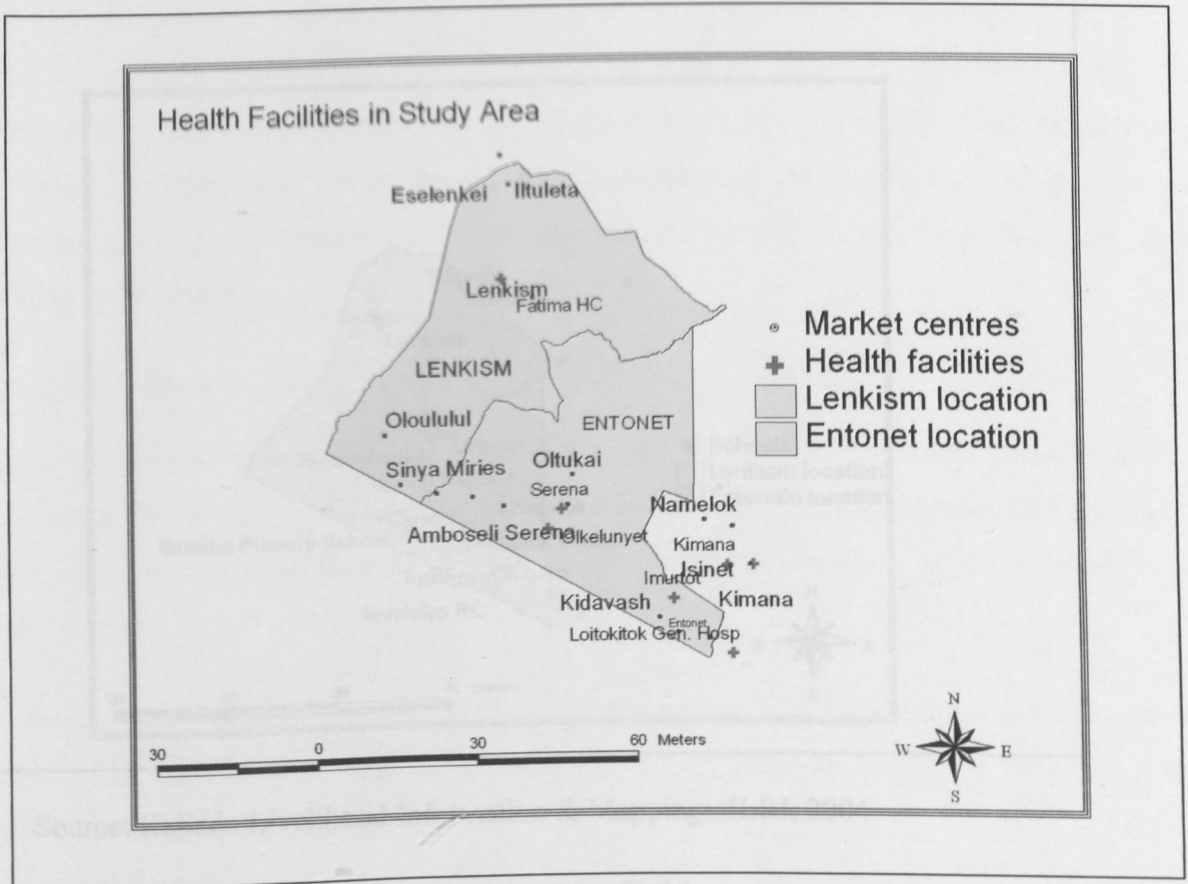
Source: Field Survey, 2007

#### 4.4.2 Health

The health dispensaries are within a radius of less than 5 Km according to 67.1 per cent of the respondents in the study area. A hospital is available in Loitokitok town and the health facilities are provided by private institutions like the tourist hotels (Serena, Oltukai and Imurtot). The distribution of health facilities is depicted on Map 4.1, where the location of the health facilities is mainly on the Central and Southern part of the study area. Other specialized health services are found in Loitokitok and Lenkism. The use of modern medicine is preferred than the traditional methods according to the research findings

The distance to the primary and secondary facility was less than 20km and 30km respectively as shown in figure 4.3. This indicates the availability of health facilities within the settlements. Secondary schools were found outside the study area in Kiunga, Loitokitok and Narungu. There are no tertiary or polytechnic facilities available within the study area. The distribution of schools is as shown in Map 4.2 below where the locations of the schools are mainly to the south and along the main transport route.

**Map 4.1: Distribution of Health Facilities in the Study area**



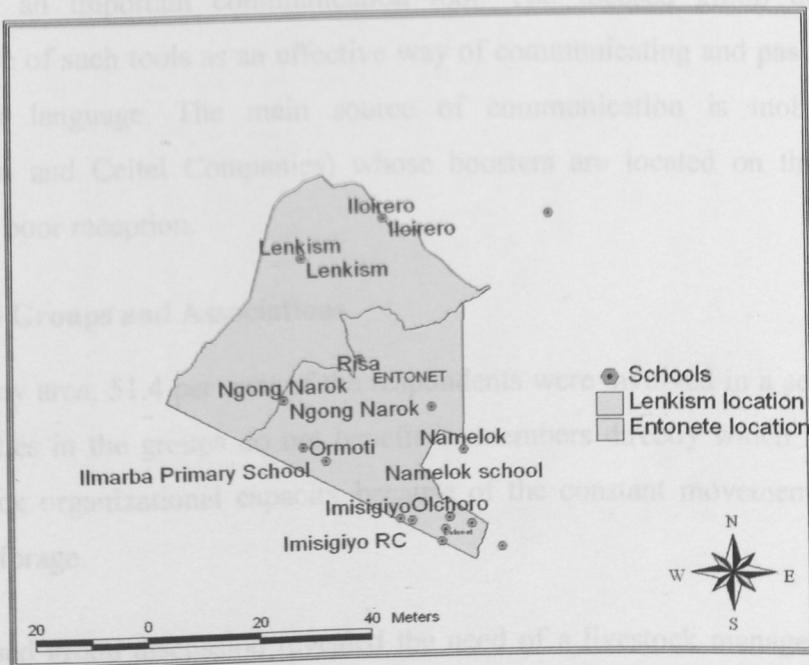
Source: Kajiado Livelihood Information & Mapping: ILRI, 2004.

#### 4.4.2 Education

Education is an important indicator of the welfare of a community. The study revealed that literacy levels are low with the older generations not attaining any formal education, while the youthful generation have attained at least up to secondary education.

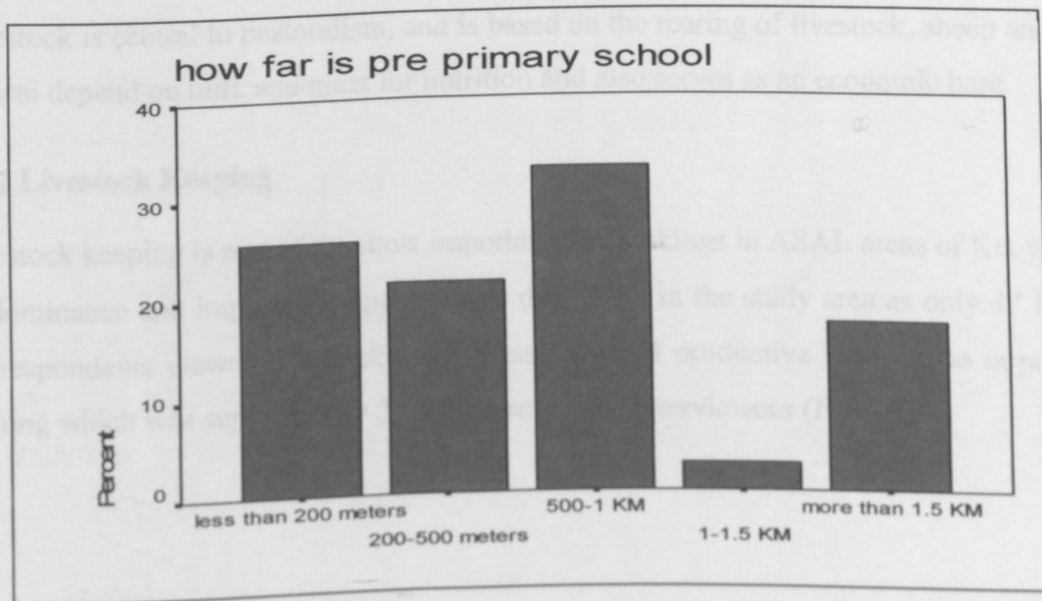
The distance to pre-primary and primary facility was less than 200m and 500m respectively as shown in figure 4.3. This indicates the availability of educational facilities within the settlements. Secondary schools were found outside the study area in Kimana, Loitokitok and Namanga. There are no tertiary or polytechnic facilities available within the district. The distribution of schools is as shown in Map 4.2 below where the locations of the Schools are mainly to the South and along the main transport route.

Map 4.2: Distribution of Schools in the Study Area



Source: Kajiado Livelihood Information & Mapping: ILRI, 2004

Fig. 4.3: Distance Traveled to School by Children



Source: Field Survey, 2007



#### 4.4.4 Radio Communication

There is poor network of communication particularly the radio-waves in the study area, which serves as an important communication tool. The focused group discussion revealed the importance of such tools as an effective way of communicating and passage of information in a vernacular language. The main source of communication is mobile telephone services (Safaricom and Celtel Companies) whose boosters are located on the Tanzanian side, thus providing poor reception.

#### 4.5 Social Groups and Associations

In the study area, 51.4 per cent of the respondents were involved in a self-help group. However the activities in the groups do not benefit its members directly which indicates that the social groups lack organizational capacity because of the constant movements of the pastoralists in search of forage.

The focused group discussion revealed the need of a livestock management association where members will contribute the resources required to run such an enterprise. The need for sensitization on the same was highlighted.

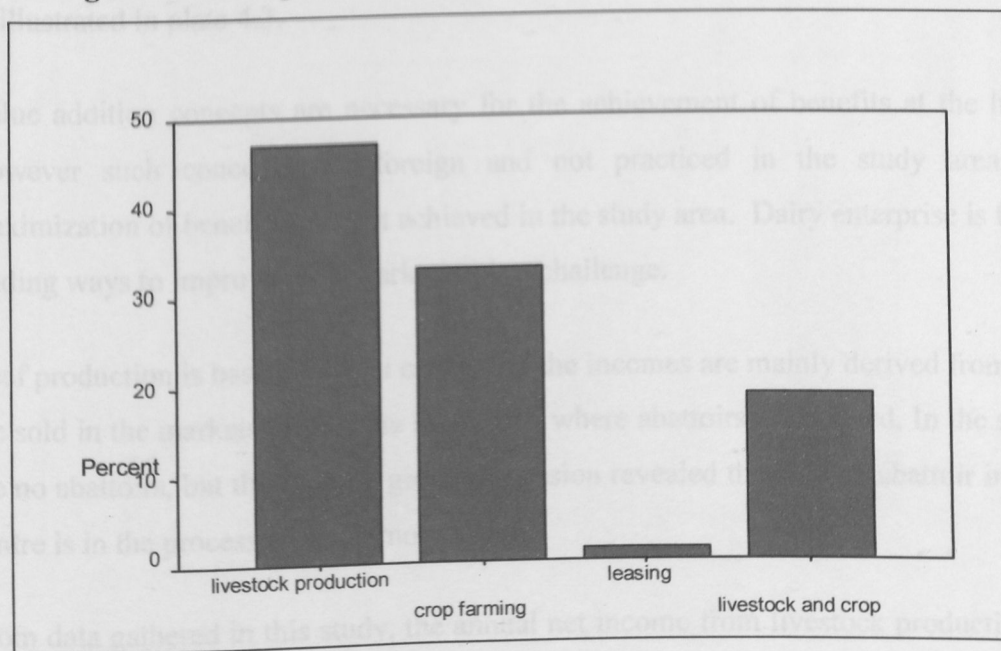
#### 4.6 Pastoralist Economy

Livestock is central to pastoralism, and is based on the rearing of livestock, sheep and goats. The Maasai depend on milk and meat for nutrition and also serves as an economic base.

##### 4.6.1 Livestock Keeping

Livestock keeping is one of the most important undertakings in ASAL areas of Kenya. However, its dominance and importance appear to be dwindling in the study area as only 47.1 per cent of the respondents viewed livestock keeping as the most productive land use as opposed to crop farming which was supported by 32.9 per cent of the interviewees (Fig 4.4).

**Figure 4.4 Most productive land use**



Source: Field Survey, 2007

#### 4.6.2 Livestock Production Systems and Benefits.

Pastoralism is the major economic activity in the study area, and the main livestock reared are cattle, shoats and donkeys. Production system is characterized by rotational grazing patterns, regular livestock movements, breed selection to increase chances of survival, and intensive range utilization through selective browsing and grazing.

There is a substantial improvement of breeds in the study area, the Europeans during the colonial period introduced new cattle breeds which were crossed with the traditional ones. Exotic breeds like the galla goats are derived from North Eastern province of Kenya. The common breeds in the study area are the Boran and zebu, and are drought resistant and have high yields in milk and beef production as compared to the local breed.

Milk is one of the products popularly consumed by pastoralists and other by-products processed are ghee, and cuddled milk (yoghurt). Milk is consumed at household level and not marketed due

to lack of markets during goat periods. The milk yields for a traditional zebu cow in the study area is 2-5 litres of daily from several cows. Milk from goats is also an important source of milk as illustrated in plate 4.3.

Value addition concepts are necessary for the achievement of benefits at the household level. However such concepts are foreign and not practiced in the study area and therefore maximization of benefits was not achieved in the study area. Dairy enterprise is lacking and thus finding ways to improve milk marketing is a challenge.

Beef production is based on zebu cattle, and the incomes are mainly derived from beef cattle that are sold in the markets of Kimana and Emali where abattoirs are located. In the study area, there are no abattoirs, but the focused group discussion revealed that a local abattoir in Olgulului rural centre is in the process of being mooted.

From data gathered in this study, the annual net income from livestock production was found to average Kshs 50,000<sup>1</sup> among 44.3 per cent of the respondents. However, 35.7 per cent of the respondents earn above Kshs. 200,000 as depicted in Fig. 4.5. The study revealed that only 3 people in the group ranch practice commercial beef production which indicates that Maasai people in the study area are still rigid in disposing cows for commercial purposes and destocking is viewed negatively. Selling of livestock is done to meet house hold needs and to offset education and medical bills.

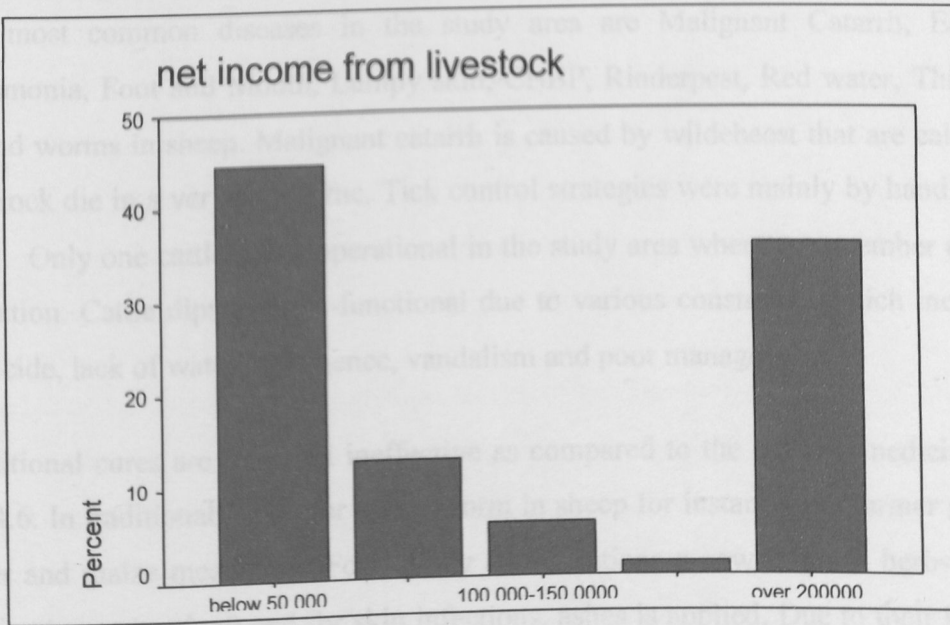
Livestock inputs are obtained from Namelok and Kimana markets, with an average of Ksh 2000 spent on animal medicine and acaricides per every six months.

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<sup>1</sup> One US dollar is equivalent to Kshs. 64.



**Figure 4.5 Household Incomes from Livestock**



Source: Field Survey, 2007

**Plate 4.3: Milking of goats in study area.**



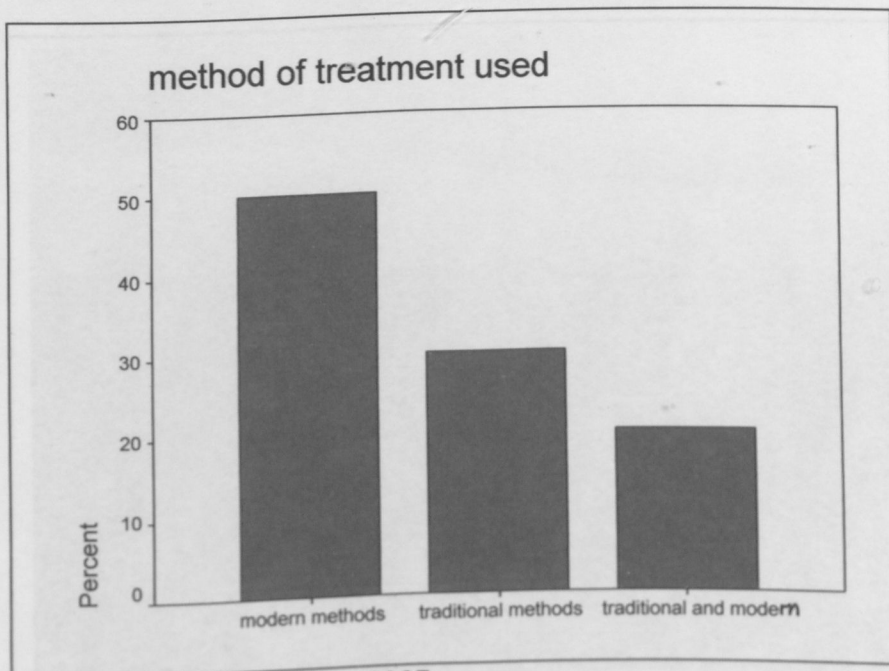
Source: Field Survey, 2007

### 4.6.3 Animal Health

The most common diseases in the study area are Malignant Catarrh, East Coast Fever, Pneumonia, Foot and Mouth, Lumpy skin, CBBP, Rinderpest, Red water, Three day fever and Round worms in sheep. Malignant catarrh is caused by wildebeest that are calving and infected livestock die in a very short time. Tick control strategies were mainly by hand spray at the farm level. Only one cattle dip is operational in the study area where one member meets the costs of operation. Cattle dips are non-functional due to various constraints which include high cost of acaricide, lack of water, negligence, vandalism and poor management.

Traditional cures are rendered ineffective as compared to the modern medicine as indicated in Fig.4.6. In traditional cures, for round worm in sheep for instance, the farmer gives a mixture of water and maize meal flour. For calving complications a cow is given herbs from certain tree species (*eremit- oluai*) and for skin infections, ashes is applied. Due to their ineffectiveness the pastoralists have adopted the modern veterinary medicine.

Figure 4.6: Modes of Treatment



Source: Field Survey, 2007

#### 4.6.4 Livestock Nutrition and Forage

Natural pasture constitutes the main feed resources for livestock. The condition of natural pasture in the study area was grossly inadequate and there were signs of range deterioration including soil erosion, bush encroachment and species diversity as illustrated in plate 4.4. The Maasai regularly moved to other localities in search of pasture for the livestock during the dry seasons. There is need for the stock owners to cut and conserve grasses as hay, although there is lack of knowledge in forage production and storage in the study area.

There is need to introduce improved pastures and legumes in the study area. The group ranch has set aside dry season grazing areas for livestock as grazing banks in the areas of Risa, Ilaingarrunyi hills and angata –oonkishu. A management committee headed by village elders is in place to foresee the management, the months of August to the next rainy season have been decided as the critical months for grazing. The elders convene meetings in order to consent for the utilization of the pastures.

**Plate 4.4: The degraded vegetation in study area**



Source: Field Survey, 2007 —



#### 4.8.2 Bee Keeping

The study area is well endowed with acacia trees and there is a great potential in honey. 22.9 per cent of the respondents showed an interest in beekeeping as an economic activity. Crop farming was also a preference by the pastoralists.

#### 4.7 Disaster Management

The worst droughts recurred after every ten years according to the focused group discussions. The worst droughts according to the focused group discussions happened in 1964, 1974, 1984, 1994 and 2004, that threatened human life.

The Maasai traditionally restocked livestock by lending to friends and relatives, this is a means of coping with disaster in a household.

Traditional weather indicators involved the reading of stars by the seers, and interpretation of signs in the intestines of slaughtered goats. These traditional systems should probably be explored further.

#### 4.8 Economic Diversification

Diversification of income is essential in pastoralist areas which will economically affect them in the long run. The Maasai in the study area are engaged in tourism and are interested in other activities like bee-keeping and tourism.

##### 4.8.1 Tourism Development

Tourism activities were viewed as the most lucrative enterprise. The study revealed that the group ranch has set aside areas for wildlife conservancy with the help of Kenya Wildlife Services and other development agencies.

In Olgulului GR the incomes accrued from tourist related activities in 2006 amounts to Kshs. 21 million, there is also revenue received from Kenya Wildlife Services amounting to Ksh.1.2 million which is channeled in form of educational bursaries. However, the trickle down effect of benefits is yet to be felt at the household level.

### 4.8.2 Bee Keeping

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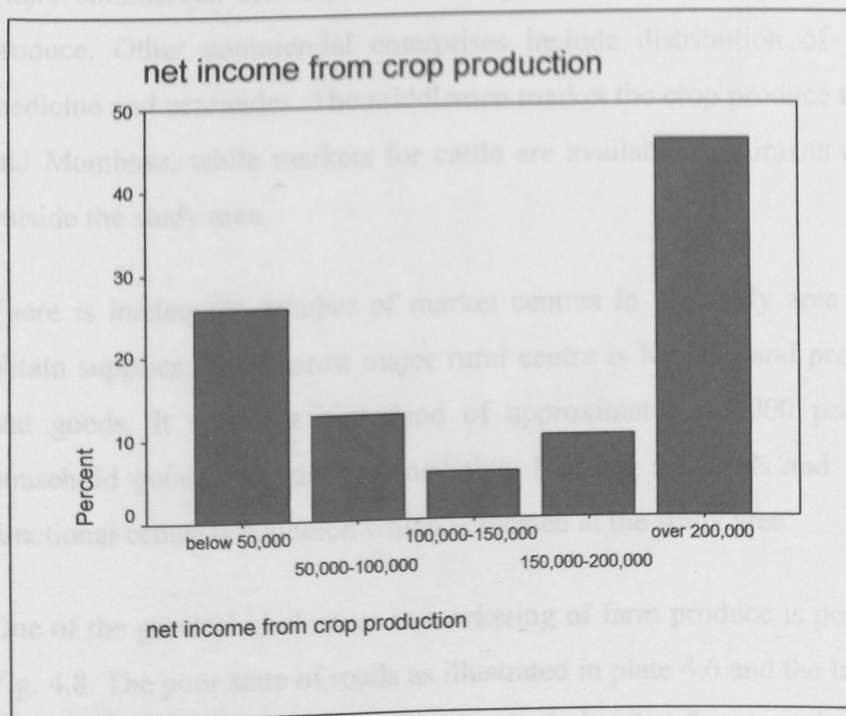
## 4.9 Agro- pastoralism

The largest conversion of land use in the study area is the expansion of irrigated agriculture at the expense of grazing land. The study revealed that about 20 per cent of the ranch has been cultivated and more land is being converted into agricultural use. In the study area, 75.7 per cent of the respondents interviewed practiced mixed farming (both livestock and crop farming) which indicates that the adoption of crop growing has enabled them diversify their income.

### 4.9.1 Crop Production

The farmers in the study area utilized an area of 5-10 acres in Namelok and Murtot areas respectively. The major crops grown are maize and beans, indicating that the cereals are grown for subsistence. The horticultural crops grown in these areas include tomatoes and onions which are sold to city markets of Nairobi and Mombasa. Plate 4.5 illustrates some tomatoes produced in Namelok area.

The net annual income from 47.5 per cent of the respondents in the study area earned an average of over Ksh.200, 000 per person which is an indicator of capitalizing on the cash market. The respondents viewed the cost of fertilizers and pesticides as fairly high where the farmers spent on average Ksh. 2000 per season, and are obtained from the markets of Kimana and Namelok. The distance involved in accessing the farm inputs in Kimana is 17 Kms from Namelok. Fig 4.7 indicates the incomes from crop farming in the study area.

**Figure 4.7: Income from Crop Production**

Source: Field Survey, 2007

**Plate 4.5: Farm produce from irrigated areas in study area.**

Source: Field Survey, 2007



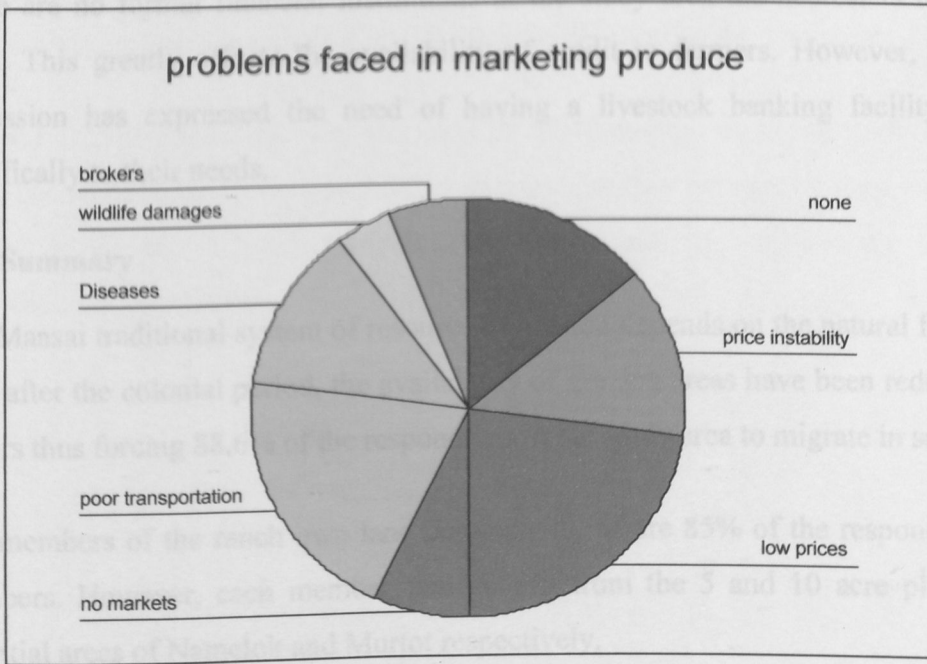
#### 4.10 Trade and Marketing Facilities

Major commercial activities in the study area includes sale of beef livestock, and horticultural produce. Other commercial enterprises include distribution of fertilizers pesticides, animal medicine and acaricides. The middlemen market the crop produce to distant localities of Nairobi and Mombasa, while markets for cattle are available in Kimana and Emali which are located outside the study area.

There is inadequate number of market centres in the study area where the community could obtain supplies. The nearest major rural centre is Kimana and provides a low level of services and goods. It serves a hinterland of approximately 40,000 people and provides the basic household goods like clothes, medicine, building materials and farm inputs. Other low level functional centre is Namelok which is located at the study area.

One of the greatest hindrances to marketing of farm produce is poor transportation as shown on Fig. 4.8. The poor state of roads as illustrated in plate 4.6 and the lack of public transport curtails the flow of goods and services particularly the farm produce. There is lack of public transportation in the study area, and the mode of transportation observed was the use of motorbikes and bicycles and walking for long distances is also common. The Northern and Southern part of the study area is inadequately served by road networks, thus curtailing the movement of goods and services. The communities cover long distances to access the markets, and owing to lack of public transport and non- motorized transportation facilities.

**Figure 4. 8: Problems faced in marketing Agricultural produce.**



Source: Field Survey, 2007

**Plate 4.6: Minor Roads in the Study Area.**



Source: Field Survey, 2007

#### 4.12 Banking and financial services

There are no formal financial institutions in the study area the nearest is found in Loitokitok town. This greatly affects the availability of credit to farmers. However, the focused group discussion has expressed the need of having a livestock banking facility which addresses specifically to their needs.

#### 4.13 Summary

The Maasai traditional system of resource utilization depends on the natural forage. In the recent past, after the colonial period, the availability of grazing areas have been reduced due to various factors thus forcing 88.6% of the respondents in the study area to migrate in search of forage.

The members of the ranch own land communally where 85% of the respondents are registered members. However, each member will benefit from the 5 and 10 acre plots located in high potential areas of Namelok and Murtot respectively.

The group ranch has pockets of high concentrations of human settlements and are mainly to the north, south-east and South. The central part of the ranch is protected area of the national park. However, some settlements are located along wildlife migration corridors and causes conflicts which result in losses and damages to people and properties.

Human settlements are concentrated in areas with availability of infrastructural services like water and schools. The infrastructural facilities like water, schools, health and roads are insufficient owing to the high population.

Livestock keeping is one of the most undertakings in ASAL areas of Kenya. In the study area 47.1% of the respondents (N=75) viewed livestock keeping as the most productive land use as opposed to crop farming which accounted for 32.9% of the interviewees. However, 75.5% of the respondents practiced agro-pastoralism which indicates a diversification of their source of income.



The common livestock breeds are boran and zebu, and milk is one of the popular products consumed by pastoralists. However, dairy enterprises are lacking in the study area. Income from beef production averaged about Ksh. 50,000 annually among 44.3 per cent of the respondents.

Tourism activities are viewed as the most lucrative enterprises in the study area, and the group ranch has set aside wildlife conservation areas which they manage on their own. The pastoralists showed an interest in bee keeping as an economic activity owing to the fact that the area is endowed with acacia trees.

### 5.1 Land Resource Systems and Pastoralism

Government policies and laws is one of the drivers that influence land use change, where policy is a means of promoting desired future conditions. The history of land issues in Maasai land from colonial era has an influence to the current processes of change in land use. The expropriation of the best agricultural lands by the European settlers in 1900<sup>7</sup> (chapter 2) relegated the Maasai to smaller, waterless and inferior quality areas of Kenya. The legislations resulted in the loss of their best grazing grounds on which they had relied and reared their flocks disregarding the pastoralist livelihood.

Subsequent appropriations in the created National Parks and Game Reserves for wildlife conservation indicated a further loss of part of their land increasing their vulnerability in dry lands. The enactment of land policies introduced by the colonial government and further perpetuated by the independent nation governments shaped the land tenure systems which have implications on the utilization of land.

The land consolidation and adjudication procedures indicated a loss of the wetter areas meant for dry season grazing areas. The wetlands represented secure sources of water and pasture for grazing for both livestock and wildlife before the colonial period. The amount of land under cultivation has been increasing, from the study findings Nambelok had a small number of 2.9 per cent of people residing in the area before 1970 and who practiced pastoralism. There was a substantial influx of people between 1980- 1990 to Nambelok who adopted to agro-pastoralism.

## CHAPTER FIVE

### RELATIONSHIPS BETWEEN PASTORALISM AND CHANGES IN LAND USE

#### 5.0 Introduction

This study focused on the changes in land use patterns in regards to pastoralism. It examined the social, political and economic factors that have an influence on land use among the Maasai. Change in land use is evident in the study area and to better understand and explain the changes, this chapter highlights the factors that press the pastoralists towards change and it relates these findings to the implications on land use.

#### 5.1 Land Resource Systems and Pastoralism

Government policies and laws is one of the drivers that influence land use change, where policy is a means of promoting desired future conditions. The history of land issues in Maasai land from colonial era has an indication to the current processes of change in land use. The expropriation of the best agricultural lands by the European settlers in 1900<sup>s</sup> (chapter 2) relegated the Maasai to smaller, waterless and inferior quality areas of Kenya. The legislations resulted in the loss of their best grazing grounds on which they had relied and reared their flocks disregarding the pastoralist livelihood.

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The land consolidation and adjudication procedures indicated a loss of the wetter areas meant for dry season grazing areas. The wetlands represented secure sources of water and pasture for grazing for both livestock and wildlife before the colonial period. The amount of land under cultivation has been increasing, from the study findings Namelok had a small number of 2.9 per cent of people residing in the area before 1970 and who practiced pastoralism. There was a substantial influx of people between 1980- 1990 to Namelok who adapted to agro-pastoralism.

The land use pattern in the high productive areas is one of herding by livestock and wildlife and of later intensification of cultivation.

These land use changes have resulted in a further push of the Maasai into marginal areas and this impacted negatively on their livelihoods and production systems. The Maasai had to cope with the current harsh environmental situations and make a livelihood through their nomadic lifestyle.

Land tenure as one of the driving forces of land use changes has seen a transition from communal based to private ownership. Olgulului is a group ranch communally owned but is in the process of sub-dividing part of the arable lands to its members for farming, and the process has targeted the swampy and wetter regions which are dry season grazing areas. The study revealed that the sub-division of small holdings (5- 10 acres) in the arable areas of Murtot and Namelok will affect their incomes from livestock production. On average the total shares a member is expected to own in the expansive group ranch is 40 acres which is far below the expected viable land size in ASALS which should on average be not less than 50 acres for 23 heads of cattle (Min. of Livestock, 2001).

The privatization and individualization of land rights implies a transformation of the social system to more of economic system, from one based on communal management of resources to private management. This will also lead to a rise in land markets since people will buy and sell, and where parcellation of lands has occurred, individuals tend to fence off causing problems to wildlife migration corridors. The land sub divisions imply a further marginalization of the pastoralists who will occupy the drier sections of the ranch.

Proper Land Use planning is recommended for the ranch through the application of the Physical Planning Act (Cap 286) which will ensure that proper assessment of the environment and social impacts of the proposed development activities at the local and regional level are done before the implementations. There is need to zone areas in accordance to resource utilization, for instance areas for dry season grazing areas should be set aside and conserved .The Environmental Impact Assessment should be carried out to ensure environmental conservation of the critical ecological habitats.



## 5.2 Agro-pastoralism and Land Use Changes

The study revealed that in Loitokitok district there is a substantial increase in population which is attributed to in-migration. The population pressure as one of the factors contributing to land use change has seen the conversion of more land to irrigated agriculture at the expense of grazing land especially on the slopes of Mt Kilimanjaro. The study revealed that pastoralists in the study area are involved in mixed farming (both livestock and crop farming) which indicates a diversification of income and also for subsistence at the household level. The pastoralists are finding that incomes from crops are faster earned after a season than livestock keeping that takes a longer time for the animals to mature and traded. The expensive inputs for livestock keeping is also encouraging more people to practice crop farming. The study however revealed that 32.9 per cent of respondents supported farming as the most productive land use, which indicates that it is gaining popularity among pastoralists as compared to pre-colonial era. Livestock keeping was still viewed as the most productive land use where 47.1 per cent of the respondents interviewed practiced it.

Horticultural production through irrigation is a great potential in generating incomes in the wetter area of Namelok. Pastoralists should therefore be supported by government through the National Irrigation Board to provide for irrigation infrastructure and extension services to farmers.

## 5.3 Livestock Production Systems and Incomes

The demand for livestock products in Kenya remains high as the population increases. The economic forces on land use in Kenya have led to a general pattern of change in pastoralist areas. The major change is attributed to the Kenyan governments' preference of intensifying agricultural production and disregarding the ASAL regions where pastoralism thrived. This is evidenced from the implementations of the Swynnerton plan of 1954 and further enhanced by the independent state through Sessional Paper No. 10 of 1965 whose production policy was market-oriented, faster producing and cost effective, and agriculture was more targeted. This resulted in marginalization of pastoralists who are located on the grey areas who were seen as functionally operating outside the scheduled area.

Beef production is found to be the most productive source of income to the pastoralists in the study area. Incomes are mainly derived from beef cattle where on average Kshs. 50,000 is earned annually among 44.3 per cent of the respondents in the study area. However, the poor state of infrastructure curtails access to distant local markets. The nearest abattoir is Kimana centre and the larger market is in Emali town (approximately 180 km from the study area). The Kimana abattoir should be upgraded to be a major beef commercial centre. There are no abattoirs in the study area but there is a proposal by the community to establish one at Olgulului rural centre. The government should encourage private sector investments in slaughter houses. The spatial distribution of livestock in the study area is the concentration of cattle, sheep and goats to the North and Southern areas of the group ranch.

The pastoralists' community in the study area should be sensitized on proper livestock management, de-stocking and re-stocking processes. A livestock management and demonstration project should be established at Risa where there is a high concentration of herds. The purpose of the institution is to demonstrate on proper livestock production systems of feeding, fattening, and marketing processes.

Dairy enterprise is lacking in the study area as well as ignorance on value addition concepts among the Maasai is a challenge. The study revealed that during gloat periods a household's zebu cows could produce on average 2-5 liters of milk daily, and is all consumed due to lack of markets. There is a high potential in milk production which need to be tapped and exploited by government and private sector. The investments in dairy processing entail the introduction of value addition concepts like milk powder and frozen beef in order to take advantage of external markets.

#### **5.4 Traditional and Commercial Pastoralism**

The pastoralists in the study area still value the cultural beliefs of rearing large herds of cattle being an indicator of wealth. From the focused group discussions the interviewees expressed that livestock as a culture was passed down from their ancestors and they still uphold these values. Although other land use patterns have been adopted by the Maasai like crop production, the profits accrued from crops is re-invested in livestock production at the household level, thus their culture does not disappear with the growing of crops.

Prolonged droughts that affect the availability of forages and water occasionally wipe out the whole herds leaving a household destitute. Thus the Maasai will continue to keep as many cattle as possible as a coping strategy in a harsh environment.

The colonial and independent state planners failed to understand the pastoralist needs and concerned more with market oriented agricultural production. There are those Maasai in the study area who uphold traditions and will not regard cattle for commercial purposes as such. The study revealed that only three individuals out of more than 11,000 members of the group ranch practiced annual off-takes, and economically these three individuals are well-off as compared to the other people. This is an indication of the rigidity of the members in engaging in livestock commercial activities thus hampering income generation. Cows, sheep and goats are mainly sold to meet expenses for household upkeep, educational expenses etc. Thus large herds will cause environmental degradation, thus forcing them to migrate in search of pasture.

The pastoralists need to be empowered through specific measures of strengthening the social institutions and capacity building, and establishment of various training institutions within the group ranch. A training school for wildlife management and conservation is recommended in one of the community owned conservancy areas, and this will provide an on-site management training practices on wildlife. The school will provide managerial skills on eco-tourist activities and will enhance practical knowledge and skills for the community and others. The pastoralists should also be involved in the development process of national building.

### **5.5 Economic Diversification**

Bee keeping is viewed as one of the most preferred income generating activity at the household level in the study area. This is supported by the fact that the area is well endowed with acacia trees and therefore need to promote non-conventional livestock activities like bee-keeping. There is need to introduce bee-keeping technology and by increasing modern equipment to the farmers as well as offer training skills on bee management techniques.

Wildlife is a major resource in the study area with a wide diversity of species. Tourism related activities is practiced in the study area where the communities are directly involved in the enterprise, and they have set apart some land for wildlife conservation. The study revealed that



income from tourism is not felt at the household level, most of it is channeled in form of educational bursaries through KWS. There is need to develop a sustainable revenue sharing programme with other stake holders.

The wildlife/ human conflicts over resources are common in the study area. The government should apply interventions and strategies of protecting people and property from injury caused by wildlife and also share handsomely the benefits accrued from tourism, so as to benefit the local people for economic development.

### **5.6 Resource Use and Pasture Management**

Environmental condition is one of the factors influencing land use change, where the arid areas are characterized by low erratic rainfalls and drought conditions that affect biodiversity. The climatic conditions influence land management, such that the Maasai migrate with livestock mainly in search of forage and water. The study revealed that 88.6 per cent of the respondents still migrate in search of pasture and water during the dry season. The availability of forage for livestock directly affects the migratory patterns of the pastoralists in the study area. The erratic rainfall pattern affects their migratory trends this implies that the weather dictates on their livelihood.

The migration of large herds into certain areas during the dry season exerts pressure on the existing vegetation cover. From the study findings, there is need to establish more dry season grazing areas in addition to the already existing zones. The conserved grazing areas are socially managed and they lack capacity for control in terms of human resources to fully undertake the management.

The future of pastoralism will depend heavily on political decisions by managing grassland zones. There is need to establish a legal and institutional framework to enhance and regulate these grazing zones, and this will further enhance sustainable management of the resources.

Supplementary feeding in traditional pastoralism is hardly practiced. There is need to sensitize and introduce the stock owners on forage production and storage by cutting and conserving grasses as hay. This will also imply that the pastoralists will have to reduce the number of animals to comply with the carrying capacity.

### **5.7 Pastoralism and Drought Coping Mechanisms**

The study established that one of the drought coping mechanisms in the study area is through the traditional system of lending out cattle to friends and relatives and recoup them after the difficult times. Restocking could be an expensive venture, and the government with other partners attempted to carry out livestock off take before the onset of droughts. The government should extend the practice by covering more areas and targeting the most vulnerable households.

A livestock organization which operates like a bank could be established with the support of the state, where livestock is traded with a token and redeemed during favorable conditions. Although the pastoralists in the study area viewed this new proposal as a good idea, there is need to explore further into the possibilities of forming such an organization and further community sensitization is essential.

### **5.8 Pastoralist Organization and Associations**

In order for pastoralism to survive in the future, there is need to develop new structures of social organization. The study revealed that the number of members registered in the group ranch is more than 11,000 and owing to the ever increasing population there is need to form smaller groups for management purposes.

A system of a livestock- based association should be formed where a manageable number of members could come together to form a cooperation where they could contribute the required resources and have a commercial livestock enterprise. This practice has worked elsewhere in Trans Mara district where a smaller manageable group of people formed a Cooperative society and are engaged in commercial livestock production.

### **5.9 Infrastructure for Human Settlements and Market Access**

Marketing support is one of the weakest links in pastoralist areas due to poor infrastructural development. Economic forces have had a contributing factor on land use change since colonial period. The location of markets relative to the production areas in ASALS is one characterized by isolation from the competitive markets. Accessibility in ASAL areas is a challenge, and therefore has hampered the pastoralist ability of supplying products to other sources. During the colonial period, some markets were isolated and therefore have led to their current status of

stagnation. The spatial location of Loitokitok town with poor road connectivity is characterized by one of isolation and yet it's one of the highest cereal producing areas in Kenya after Kitale. There is need to improve transportation to take advantage of economic activities.

Pastoralism is the major economic activity in the study area, where meat and milk are the main by-products. Milk is consumed at household level and not marketed due to lack of markets during gloat periods.

There is need to support and develop a dairy enterprise by government and private sector through provision of infrastructure including weather roads and electricity for refrigeration. This will support the development of facilities like milk cooling centres. Other strategies is the establishment of value adding processes like milk powder in order to conserve the higher milk off-take and stock during lean periods.

The pastoralist products can take advantage of external markets particularly end products like milk powder and frozen milk. This enterprise can further be explored.

### **5.10 Planning for Human Settlements**

Human settlements were observed to have quickly developed in the study area given the high population growth rate, and is evidenced by the quick growth of market centres particularly at the entrances (gates) to the Amboseli National Park. The market activities taking place on the gate entrances include the sell of traditional artifacts and ornaments to visitors and being a major transport route people seek transport to other destinations.

Areas of human concentration are Enkongu- narok, Namelok, Risa and Ilmarba. Population has significantly increased at Enkongu –narok which serves as Maasai cultural centre and is located near a tourist hotel. There is need to control in-migration of people to Enkongu –narok. Some settlements are located along wildlife corridors and people suffer losses including human life. There is need to re-locate settlements along Kitenden wildlife corridor. For the settlements in Risa, Ilmarba and Namelok, there is need for planning and provision of infrastructure like roads, schools, and water and health facilities. There is need to provide for infrastructure for the settlements who are mainly located to the Southern and Northern parts of the district of the



through the provision of road networks that connects the settlements and other services. There is need to introduce motorized and non- motorized modes of transportation to ease difficulties in transportation.

### **5.11 Natural Resource Management and Infrastructural Resource Strategy**

Lack of effective planning for proper land utilization in the study area, and especially in the development of rural settlements, combined with poor infrastructure and services and environmental management are the most challenging factors to development.

In the study area, various plans have been proposed by NGOs operating in the study area, the natural resource map on land use by African Wildlife Foundation ( Mutinda et al, 2006) was utilized by the researcher for the preparation of an integrated strategy to be employed in the study area as shown on Map 5.1, and a matrix to indicate the interventions as indicated on Fig. 5.1.

# Strategy for Infrastructure & Natural Resource Management

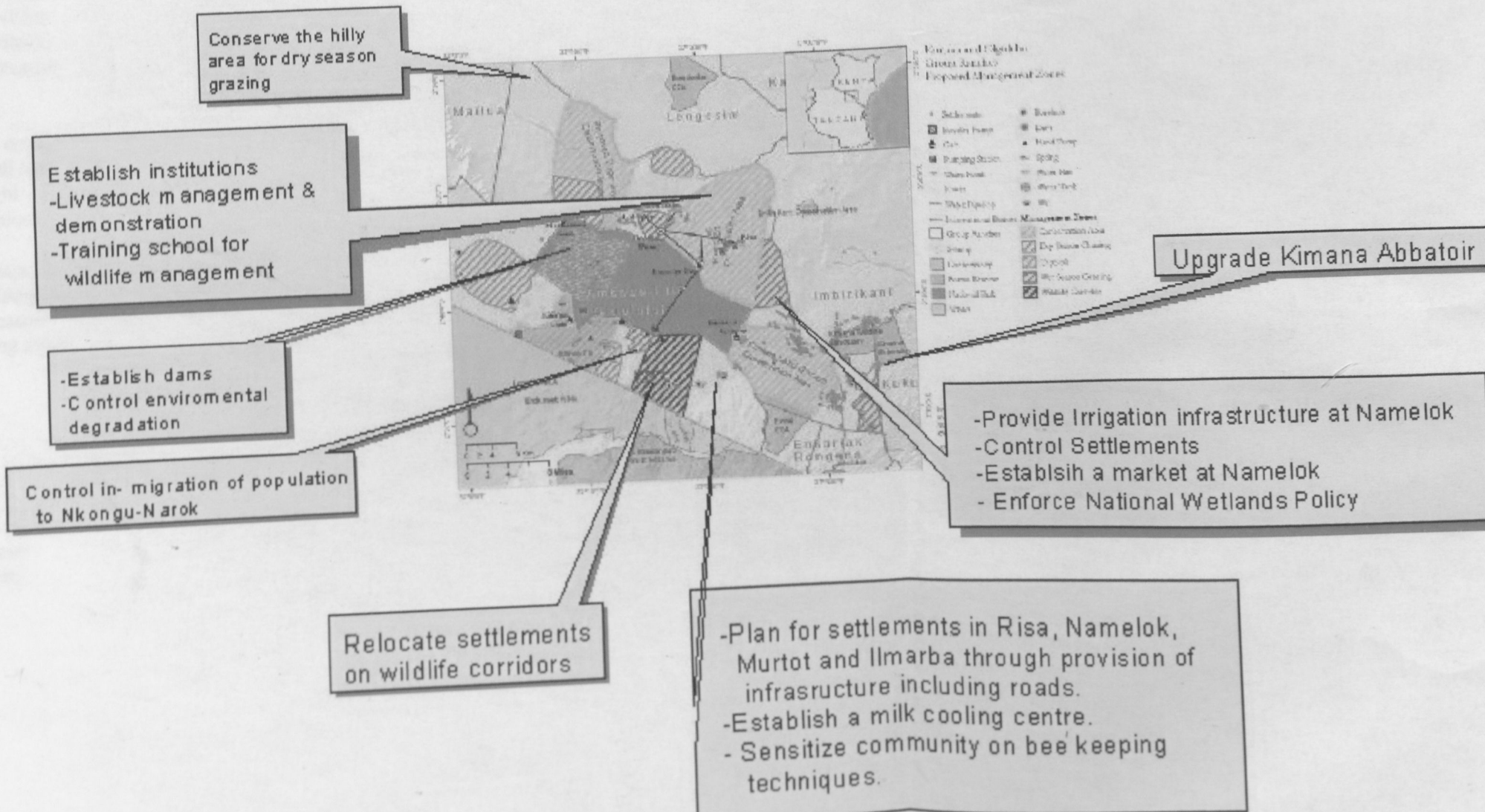
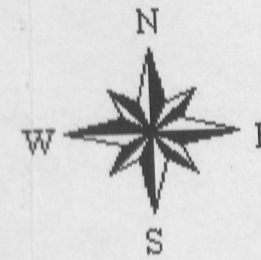




Figure 5.1 Land Use Management Strategy

Problem	Causes	Objective	Area	Strategies	Programmes	Actors	Time Frame
Reduced access to dry season grazing resources	<ul style="list-style-type: none"> <li>-Land alienation through adjudication, subdivision, and wildlife conservation areas.</li> <li>-Low erratic rainfall and drought conditions.</li> <li>-Increase in population in dry season grazing areas.</li> </ul>	<ul style="list-style-type: none"> <li>-Improved natural resource management.</li> <li>-Rehabilitate natural resources to reduce migrations.</li> </ul>	Whole group ranch.	<ul style="list-style-type: none"> <li>-Establish grazing zones.</li> <li>-De-populate some areas for purposes of creating conservation areas.</li> <li>-Establish regulatory and institutional framework for managing grassland zones.</li> <li>- Build capacity for effective management of natural resources.</li> </ul>	<ul style="list-style-type: none"> <li>-Prepare land use plan.</li> <li>-Plant exotic grass species.</li> <li>-Introduce forage storage through cutting and conserving grass.</li> </ul>	<ul style="list-style-type: none"> <li>-Local communities.</li> <li>-Min. of Livestock &amp; Fisheries.</li> <li>-NGOs.</li> <li>-Private Sector.</li> </ul>	Short Term
Lack of markets for livestock products and horticultural produce.	Limited financial capacity.	<ul style="list-style-type: none"> <li>Encourage and support the processing of livestock products.</li> <li>- Engage in commercial livestock enterprise.</li> </ul>	Kimana Ogulului Risa Namelok	<ul style="list-style-type: none"> <li>-Provide an enabling environment for industrial growth through investments.</li> <li>-Encourage ownership of local industries.</li> <li>-Form Cooperative society.</li> </ul>	<ul style="list-style-type: none"> <li>-Upgrade Kimana abattoir.</li> <li>-Establish Ogulului abattoir.</li> <li>-Establish a dairy collection centres.</li> <li>-Government.</li> </ul>	<ul style="list-style-type: none"> <li>-Min. of Livestock &amp; fisheries.</li> <li>-Government</li> <li>-Min. of Agriculture.</li> <li>-NGOs</li> <li>-Private Sector.</li> <li>-Local communities.</li> <li>- Local authorities.</li> </ul>	Short term



Low livestock productivity	<ul style="list-style-type: none"> <li>-Poor livestock breeds.</li> <li>-Lack of sound management principles.</li> <li>-Ignorance on value addition concepts.</li> <li>-Lack of diversification.</li> <li>-Ignorance in supplementary feeding.</li> </ul>	<ul style="list-style-type: none"> <li>-Increase livestock productivity.</li> <li>-Increase household income through economic diversification.</li> </ul>	Whole group ranch	<ul style="list-style-type: none"> <li>-Encourage economic diversification.</li> <li>-Establish training institutions.</li> </ul>	<ul style="list-style-type: none"> <li>-Establish a livestock management and demonstration institution to train farmers on management skills.</li> <li>-Introduction of value addition concepts on livestock products.</li> <li>-Encourage bee keeping technology.</li> <li>-Establish a training school for wildlife management.</li> </ul>	<ul style="list-style-type: none"> <li>-Min. of Livestock.</li> <li>-NGOs</li> <li>-Local communities.</li> <li>-Private sector.</li> </ul>	Long term
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Source: Field Survey, 2007.

## CHAPTER SIX

### SUMMARY AND CONCLUSIONS

#### 6.0 Introduction

As the land use changes impacts on the pastoralist mode of production in the ASALS, there is need to re-think on strategies and policies that would empower them to utilize the available resources for their benefit.

This chapter presents a summary of findings that arose from data analysis and observations made during the fieldwork. This forms the basis upon which a summary and conclusions are drawn, and recommendations.

#### 6.1 Summary of Findings

The study examined pastoralism as a means of livelihood and the challenges of the reducing land resources in pastoralist areas. There are a number of processes driving this change which includes; government policies which encompasses the influence of colonial policy and post-independent governments' policy frameworks, the economic factors, changes in land tenure, the expansion of agriculture into grazing areas and population growth, all these factors have influenced the changes of land use in pastoralist areas.

The impact of these forces has resulted in critical issue of livelihoods, land degradation and biodiversity.

The study sought to analyze the land use changes in the study area characterized by social, economic and political changes, and attempted to find solutions to the socio-economic issues for sustainable land resource management.

The first objective was to assess land use changes over time from a social cultural, economic and environmental perspective.

The study assessed the changes from a historical point of view and drew reference from the pre-colonial era (before 1900), the colonial (1904), and the post- independent era (1963).The Maasai before 1900 traditionally shared the land and its resources communally and occupied an

expansive region of the Rift valley. They practiced transhumance lifestyle and moved between designated dry and wet season grazing areas.

The colonial period marked the eviction of Maasai from the Rift Valley and Laikipia through two agreements of 1904 and 1911. These two agreements resulted in the serious economic loss of their best grazing grounds and it impacted negatively on their livelihood pattern since it meant a reduction in spatial space. The colonial government also introduced new land reforms and laws that further reduced the land resource and hence the change in land use. The post-independent nation states adopted the same colonial principles that further contributed to land use changes in pastoralist areas.

The second objective was to assess the causes and effects of land use changes on pastoralism in the study area. The study assessed the various forces that contributed to land use changes where various factors were highlighted which includes government policies laws and regulations, economic factors, population growth and migration, land tenure systems, markets access and infrastructural services, and environmental conditions. These factors operate to effect land use changes in pastoral areas.

The third objective assessed the existing land uses in the study area. Change in land use is evident in the study area and this shows an indication of the influence of the drivers on land use. The findings indicated that significant changes have taken place in terms of land use changes, where 75.5 per cent of respondents out of the sampled size ( $n = 75$ ) practiced mixed farming. At least 20 per cent of the land is under crop cultivation which gained popularity between the years 1980 – 1990.

The study revealed that 47.1 per cent of the respondents viewed livestock keeping as the most productive land use, while crop farming was supported by 32.9 per cent. This indicates that crop farming is gaining popularity although livestock keeping is still being practiced. It draws an indication that livestock production is widely practiced and needs to be enhanced.

Some pastoralists have taken up agriculture due to the loss of key dry season grazing areas, and thus making pastoralism insecure for extensive livestock production. However, they have



diversified their economic base through farming to reduce their vulnerability to droughts and this has contributed to economic sustainability.

Traditional pastoralism is widely practiced in the study area and is based on the rotational grazing patterns and livestock movements. The Maasai still move in search of forage and water and this accounted for 88.6 per cent of the respondents, and this indicates that pastoralism as their livelihood base need support through maintaining rangeland biodiversity through conservation measures.

The changing patterns in land use have pressurized them to diversify towards a mixed farming (livestock and crops) which has been a critical source of household income.

## **6.2 Recommendation**

The third objective sought to suggest recommendations to be employed for sustainable land resource utilization in the study area.

### **6.2.1 Recommendation for Land Use Planning**

The largest conversion of land use in the study area was the expansion of agriculture, and this has precipitated sub division of land to enable pastoralists to farm. Land use planning and environmental conservation measures within the group ranch will then have to be taken into consideration. There is therefore need for land use planning by zoning through the preparation of a regional physical development plan of the area by the Department of Physical planning in liaison with the local Authority.

With the physical development plan it ensures that appropriate use of land including land management such as change of user, extension of user and lease, subdivision and amalgamation of land are followed. No development should be allowed to take place on any land unless it is in conformity with the plan. The land use plan should promote sustainable natural resource management which will secure water and pastures for both livestock and wildlife, at the same time enhance the livelihoods of the inhabitants.

### 6.2.2 Recommendation on Environmental Conservation

A high diversity of breeds in ASAL areas is crucial to overall livelihood strategies. There is therefore a need to conserve rangeland biodiversity through conservation of grazing areas and wildlife for sustainable management which will involve the cooperation of other stakeholders.

The trends in land use practice in the study area have negative implications to environmental sustainability. An Environmental Impact Assessment should be carried out in the area. The specific area to be addressed is on the fragile ecosystems like wetlands, where subdivision of land and intensive agriculture is practiced with the use of agro-chemicals. The concern of the people in the wet lands is to incorporate agro forestry practices in their farming systems.

### 6.2.3 Recommendations for Drought Coping Mechanisms

The availability of forage directly affects the migratory patterns of the pastoralists. The setting apart and conservation of dry season grazing areas is essential for the survival of pastoralism to curtail the long distance migratory patterns. The already established community based resource management organization need to be supported by an establishment of a regulatory framework to enhance the management of the conservation areas for sustainable development. Forage production technology is not common among pastoralists and therefore need to introduce forage storage through cutting and conserving grasses as hay.

### 6.2.4 Recommendations for Pastoralist Economy

Beef production is found to be the most productive source of income for pastoralists. There is need to upgrade the abattoir at Kimana in order to facilitate markets for livestock, and also a need to support the establishment of Olgulului abattoir to meet the market demand of the area.

Dairy enterprise is an enterprise that should be tapped. The government should encourage private sector investments in dairy products and explore the introduction of value addition concepts like milk powder and frozen beef in order to take advantage of external markets.

Marketing support in the study area is a great challenge and in order to enhance livestock productivity, the government should provide infrastructure like access roads, water and electricity in these areas.

There is need to establish new socio-economic structures in form of organizations like cooperatives, where a manageable number of members could engage in commercial livestock enterprise.

### **6.2.5 Recommendation for Economic Diversification**

Tourism is one of the most popular activities in the study area, and this should be enhanced for sustainable economic development of the nation as well as for the benefit of people located in wildlife areas. There is need to formulate policies that protect people from injury or damage caused by wildlife.

There is need to promote non- conventional livestock activities like bee-keeping at the household level, and other activities like forage production and tree -crop farming should be introduced.

### **6.3 Areas for further Research**

Further studies should focus on the following:

1. The most appropriate ways of managing agriculture and livestock production in ASAL areas.
2. The ways of involving the community in zoning, planning and management of natural resource.
3. Developing the most appropriate technology in forage production in rangelands.
4. Explore the Maasai traditional weather indicators.
5. The impacts of land subdivision on pastoralism and wildlife.

### **6.4 Conclusion**

Pastoralists are located in ASAL areas of Kenya and their economy is based on livestock production which accounts for 10 per cent of GDP in Kenya.

The largest conversion of land use in the study area is the expansion of agriculture and has been prompted by group members to sub-divide the land for farming. Land use planning and environmental conservation measures need to be taken into consideration to ensure appropriate



use of land. The setting apart and conservation of dry season grazing areas is essential for the survival of pastoralism as a livelihood.

Beef production is an important source of income for pastoralists, and therefore a need to upgrade the abattoir at Kimana, and establish another at Olgulului. Dairy enterprise need to be encouraged and established, as well as value addition concepts on livestock products. There is therefore need to develop the infrastructural services in these areas in order to support the marketing of products so as to improve the economy of pastoralists.

Tourist activities need to be enhanced further in order to achieve the national goals of the vision 2030 and therefore a need to invest in the cultural and eco-tourist activities.

The government and development agents should formulate strategies meant for pastoralists living in ASAL areas through empowerment to attain sustainable livelihoods.

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#### Livestock bio-diversity

1. What local breeds are available? How do animals feeding systems conserve fauna and flora diversity?
2. Has there been competition over forage with wildlife and livestock? How do they traditionally cope?
3. What are their ideas of about hay production?

## APPENDICES

### Appendix 1: Questions for the Focused Group Discussion.

#### Historical evolution

1. A narrative of how the pastoralists kept livestock as an economy.
2. How did they start owning large herds?
3. Has there been changes in their economy/what forces contributes to these changes?
4. Where do they get breeds from (neighboring tribes-taita, kamba, Gov Programmes, etc)?
5. Do they hope to improve the breeds?

#### Pastoralist economy

1. Why do pastoralists manage livestock for milk products for nutrition rather than for meat?
2. Would they hope to enhance marketing of milk products?
3. Are there strategies the government/ NGOs put in place to:
  - Enhance market economy?
  - Open up markets for their products?
4. Are they aware of value adding processes, which can be utilized during drought periods?(e.g milk powder)
5. What is the advantage of a large herd over a small herd?
6. Due to variations in rainfall, fodder availability is scarce thus mobility is necessary. Would pastoralists consider production of forage for animal feeds?

#### Livestock bio-diversity

1. What local breeds are available? How do animals feeding systems conserve fauna and flora diversity?
2. Has there been competition over forage with wildlife and livestock? How do they traditionally cope?
3. What are their ideas of about hay production?



#### 4. **Animal Health**

1. What are the major animal diseases found in the area of study?
2. Do they have traditional cure? How do you treat animal disease?
3. In difficult circumstances, has there been any change in herd composition? E.g. switching from cattle to camels?

#### **Disaster management**

1. Which years were the worst affected by drought since 1900?
2. What was the effect on people and animals?
3. What are the traditional drought warning signs?
4. How did they cope with such drought situations and the coping systems over time. In case the animals are wiped out how does a household restock?
5. What strategy can be put in place by Gov. / development agencies to replenish stock?
6. Is there a possibility of selling animals in appropriate seasons at good prices before drought periods?

#### **Pastoral Organization, communication, banking.**

1. In the group ranch, is there a possibility of forming organizations/ associations?(Where animals will be managed by representative for the group, E.g No of animals translated into shares and each receiving returns on the basis of numbers of animals brought into the pool-common resources)?
2. Livestock banking has been proposed to assist producers carry livestock across difficult situations. Livestock can be traded in return for a token. During the good season it can be redeemed. What in their opinion is the best banking system?
3. Who /what organization would be best suited for this?
4. What role would they play in the management of such a banking system?
5. What would be the response to establishment of system of livestock management systems within the group for ensuring that each family would have part of their herds preserved even during the dry seasons?
6. The use of media to communicate important information in a local language is essential in the new era of technology. What is their opinion, and do they think radio is an essential tool?

**Appendix 2: Economic diversification**

1. What other mode of diversification of income apart from livestock can they engage in? (Supplementary to herding).
2. What has been their experience in each alternative mode?
3. What are the various land uses in the group ranch? Which is the most viable?
4. What is the major problem experienced in the group ranch (Social/ cultural, economic, or political) and what is the recommendation?

Declaration: This **Socio-Cultural systems** and will be used purely for academic purposes only.

1. How do elders manage access to;
  - Land (quotas)
  - Water
  - Saltlicks-in times of wet and dry seasons for livestock feeds within the group ranch?
2. How did the system of passing animals to friends, relatives, groups helped to reduce loses in event of epidemic, drought?

1. Name of respondent (Optional) \_\_\_\_\_
2. Details \_\_\_\_\_

Name of village	age	sex	Level of education	Marital status

**Migration Trends**

3. Were you born here? 1. Yes 2. No
4. If not born here, when did you come here? \_\_\_\_\_
5. Do you migrate with livestock? \_\_\_\_\_
6. If you do where do you move to? \_\_\_\_\_

**Appendix 2: Household Questionnaire**

**UNIVERSITY OF NAIROBI**

Reasons for selection From study area to---  
**Department of Urban and Regional Planning**  
 MA in Planning 2006/07 Field Research.  
 Minerals (soft Licks)  
**CHANGE IN LAND USE PATTERNS IN OLGULULUI GROUP RANCH**  
 Declaration: This information is confidential and will be used purely for academic purposes only.  
 Other

Name of Interviewer:-----

Date of interview:-----

Locality:-----  
 7.a. Do you own land? 1. Yes 2.No  
 b. If yes what is the nature of land ownership?

**A: RESPONDENT'S HOUSEHOLD DETAILS**

1. Name of respondent (Optional)-----
2. Details

Name of village	age	sex	Level of education	Marital status

**Migration Trends**

3. Were you born here? 1.Yes 2. No  
 4. If not born here, when did you come here?-----  
 5. Do you migrate with livestock?-----  
 6. If you, do where do you move to? -----

9. How do you determine if a person is rich or poor in your community? (indicate the indices of poverty)



10. Which is the most productive land use in terms of income in this area?

Reasons for migration	From study area to-----
Grass	
Water	
Minerals (salt Licks)	
markets	
Disease	
Other	

### Land Use and economic issues

7 a. Do you own land? 1. Yes 2.No

b. If yes what is the nature of land ownership?

- i. Group ranch member ✓
- ii. Individual
- iii. Others (Specify) \_\_\_\_\_

c. If member of a group ranch, how much land do you hope to be allocated after subdivision? ---

8. How do you utilize land?

Land utilization	Size of land utilized
Animal husbandry	
Crop farming	
Both livestock & crop farming	
Commercial trading	
Other(specify)	

9. How do you determine if a person is rich or poor in your community? (Indicate the indices of poverty)

---

12. What is your monthly income in total? .....

10. Which is the most productive land use in terms of income in this area?

- a. Livestock production
- b. Crop farming
- c. Tourism
- d. Other(specify)

10. How much do you get from animal husbandry?

Products	Yields per day( Lt)	Price per Lt	Inputs	Net
Milk				
Beef				
Manure				
Sheep				
Goats				
Hides and skins				
Other-(Specify)				

11. How much do you get from crop output?

Type	Yield per bag	Income	Where sold	Inputs	Net
Maize					
Beans					
Onions					
Tomatoes					
Bananas					
Other(Specify)					

12. What is your monthly income in total? -----

13. Where do you get these farm inputs from and at what cost?

### B. SOCIAL ACTIVITIES AND COMMUNITY FACILITIES

Inputs	ksh	Where bought
Farm fertilizer		
Crop pesticide		
Animal medicine		
Cattle dip		
Others (Specify)		

13. Where do you get this house hold items?

Household items	Ksh.	Where bought
Food stuff		
medicine		
clothing		
Building materials		

14. a. How much of your produce do you sell to outside markets)-----

b. What are the major constraints you encounter in marketing (Livestock / Crops)?-----

-----

15. What other economic activities could be of interest to you and hope to engage in?

- Beekeeping
- forage(Grass) production for animal feeds
- Poultry
- Growing of tree crops
- Crop farming
- Growing medicinal plants
- Other(specify)-----



## B. SOCIAL AMENITIES AND COMMUNITY FACILITIES

### Transport Facilities

14. What mode of transportation do you use?

Mode of travel	Trip purpose	Time taken (hrs)
Walking		
Bicycle		
Private vehicles		
Taxi		
Matatu		

### Health Services

15. What methods of treatment do you use when you are sick?

- a. Modern methods(Hospital)
- b. Traditional method
- c. Other(specify)-----

16. How far are health facilities from your home?

- a. Less than 5km
- b. 10 -20 km
- c. 20-40 km
- d. more than 40km

### Education Facilities

17. How far is school from your home?

SERVICE	Distance in (KM)
Pre-primary	
Primary	
secondary	
tertiary	
Other (Specify)	

### Water Facilities

18. How far is your nearest water point?-----

### Institutional Systems

19. Do you belong to any social organization/ group? 1. Yes 2. No

20. What help are the organizations to you?-----

21. Which CBOs, NGOs are you aware of?-----

22. What activities do they do?-----

22. How have you benefited from its activities?-----

## APPENDIX 3: NATIONAL DISASTERS IN KENYA

Date	Disaster	Region (Kenya)	Casualties	Response	Remarks
1896 - 1900	Famine Locust Rinderpest	Central and Eastern	25 - 75 % of pop. in some areas	-	Uganda Railway construction
1913 - 1919	- Famine	Coast and Eastern	-	-	WW1 Giriama rebellion
1933 - 1934	Great famine	Coast and Central	50 % loss of livestock	Forced destocking Soil conservation	Demo sites set up in Machakos and Baringo
1942 - 1944	Famine	Countywide	Approx. 200 people	-	WW2 Military demand for food
1952 - 1955	-Drought - Famine	Central	Over 50% of the pop.	Concentration camps	Mau Mau rebellion State of emergency declared
1960 - 1961	Heavy Floods	Rift Valley, Eastern, Nyanza	70 - 80 % loss of Maasai cattle - Widespread crop failure	10m pounds spent on food relief rescue operations by air	Political campaigns
1965	Famine	Countrywide	600,000 people affected	US, WFP donation (yellow maize) - Policy reform in agric. sector	Establishment of Kenya Freedom From Hunger Council
1973 - 1974	Drought	Countrywide	150,000 people affected	Food aid Livestock restocking	M/East war led to sharp rise in oil prices
1975	Floods	Countrywide L. Victoria basin most affected	-	-	Damage of roads and property
1975	Terrorism - bomb blast	Nairobi - OTC bus	27	Government investigation	Political instability
1977	Floods Landslides	Rift Valley	Damage to Maize and wheat crop	-	-
1981	Terrorism - bomb blast	Nairobi - Norfolk hotel	5	International investigation	Linked to M/East crisis
1983 - 1984	Drought	Countrywide	Over 600,000 people affected Over 50% loss of livestock	-International appeal for food relief - setting up of strategic food reserve	President promotes Soil con-servation and tree planting
1992 - 1993	Drought	Countrywide	2.7 M people affected 70% of livestock lost	food importation Int. appeal for food aid Setting up of the Dept. of Relief and Rehabilitation	Collapse of agricultural institutions blamed for food insecurity
1994	Ferry accident	Mombasa	270 dead	Rescue operations by the Navy and Ports authority	Overloading and faulty engine blamed
1997 - 1998	Floods - El Nino	Country-wide L. Victoria basin most affected	- 1.5 million people affected - Damage to infrastructure and property - Damage to crops	- relief supplies / air drops by GOK, UN, NGOs - Setting up El Nino Emergency Project and Disaster Coordination Office at OP	Outbreak of water borne diseases
1998	Terrorist attack - bomb blast	Nairobi - US embassy	214 dead 5,600 injured	Army involved in rescue operations -International support	Restrictions on border entry points
1999 - 2000	Drought	Country-wide	4.4 million people affected livestock deaths and crop failure	Relief supplies Setting up of emergency diesel power generators	-economy affected by power rationing - Diversification of power generation National food security policy revisited
2001	HIV/Aids	Country-wide	-Over 2 million affected (600 dying daily) - - Hospital bed occupancy about 50 %	-Donor support -Setting up National Aids Control Council -Research	HIV/Aids declared a national disaster by the President -Labour force severely affected



004	Landslides	Nyeri district	5 dead	Rescue by local communities	Landslides in Kenya not yet fully studied
004	Food Poisoning (Alfatoxin)	Makueni, Machakos Kitui districts	82 dead hundreds hospitalized	-Medical supplies -Food inspection -Public awareness campaigns	-Food traders blamed for the poisoning -WFP denies that it donated the food
005	Alcohol poisoning	Machakos	Over 50 dead scores blinded	Medication Crackdown on illicit brew	Indication of poverty level

Source : CBS, WFP, CETRAD, National Disaster Management Agency, Kisoyan P.K