

**AN ASSESSMENT OF EFFECTS OF DROUGHT ON HOUSEHOLD LIVELIHOOD
SUSTAINABILITY AMONG MAASAI PASTORALISTS IN MASHURU DIVISION
OF KAJIADO COUNTY, KENYA**

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of Nairobi.**

Department of Geography and Environmental Studies

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DECLARATION

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This project work is my own original work and has not been presented for an award at any other university or institution.

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ABSTRACT

In the dry lands of Africa, range pastoralism is often the main source of livelihood and a way of life. However, frequent droughts often adversely affect dry land livestock economies and livelihoods in ways that can be far reaching and even devastating. This study sought to establish adverse effects of perennial drought on livelihoods of Maasai households. Specifically, the study sought to: 1) identify factors that determine vulnerability of livestock production to drought; 2) analyze strategies adopted by the Maasai households to cope with drought; 3) identify opportunities that can be used to promote drought-resilient Maasai pastoralism; 4) recommend ways to promote livelihood security among Maasai households in the face of recurrent drought. Using a cross-sectional study design, data were collected by use of questionnaires, key informant interviews and observation techniques.

The results showed that dry conditions, increased land sub-division, over dependency on livestock for a living, low formal educational levels and human activities such as mining, sand harvesting, deforestation are the main factors that increase vulnerability of Maasai households to drought. Maasai households adopts various strategies in order to cope with effects of drought including livelihood diversification (such as crop farming), seeking paid employment opportunities, going into retail business ventures (dukas); bead making and selling, charcoal burning and sand harvesting. Other strategies included: livestock mobility in search of forage and water, diversification of herd composition (to increase herd resilience and reduce losses), getting formal schooling for children as a long term coping strategy to increase household employment income and boost chances of drought recovery through restocking. The study rejected the hypothesis that frequent and increasingly severe droughts haven't affected the ability of pastoral household in generating and maintaining a sustainable livelihood through rangeland livestock production, leading to the conclusion that the droughts

have affected the pastoral household ability in generating and maintaining a sustainable livelihood through rangeland livestock production.

The study concluded that factors including but not limited to increased land sub-division, over dependency on livestock for a living, and low formal educational levels adversely influence vulnerability of Maasai pastoralists in Mashuru to drought. In order to cope with drought episodes, range pastoralists of Mashuru have employed coping strategies including livelihood diversification, livestock mobility, diversification of herd composition, getting formal schooling and multi-locational households. Younger households increasingly consider livelihood opportunities outside range pastoralism, which is a departure from the norm. The study recommended policy and institutional frameworks at county and national levels that promote sustainable livelihoods among Maasai households through a holistic understanding of the nexus between land-water-pasture-conservation, and sustainable herding in the light of contemporary challenges such as climate change.

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LIST OF ABBREVIATIONS AND ACRONYMS

AHA	Animal Health Assistant
ASAL	Arid and Semi-Arid Lands
ASL	Above Sea Level
CBO	Community Based Organizations
CVO	County Veterinary Officer
FAO	Food Agriculture Organization
FBO	Faith-Based Organizations
FMD	Foot and Mouth Disease
GDP	Gross Domestic Product
G.O.K	Government of Kenya
CBPP	Contagious Bovine Pleuro-Pneumonia
KII	Key Informant Interviews
KNBS	Kenya National Bureau of Statistics
KWS	Kenya Wildlife Service
RVF	Rift Valley Fever
NGO	Non-Governmental Organization
OFSG	Oxford Food Study Group
PRA	Participatory Rural Appraisal
TDCPU	Turkana Drought Contingency Planning Unit
UNDP	United Nations Development Program

CHAPTER ONE: INTRODUCTION

1.1 Background to Study

Pastoralism as livelihood strategy has its name derived from the term '*pastoral*' which refers to pastures: - an essential ingredient to pastoralists' subsistence. Pastoralists are livestock producers' who raises their livestock on "natural" pastures such as on uncultivated land deriving at least 50% of their household revenue from livestock or livestock-related activities (Salzman, 2004). Thus, they are different from other livestock keepers such as farmers and ranchers, who may have large herds, but use natural pastures only seasonally or not at all and derive their upkeep from other sources.

Pastoralist could be classified using different ways, though, classifying them according to how they keep their livestock and their dependency on livestock in terms of products, status and economy in a great extent defines what pastoralism is (Smith, 1992). Widstrand (1975) classified pastoralism into: nomadic, agro-pastoralism and transhumant depending on the spatial-temporal variability in pastures and water availability. However, such classifications of pastoralist are difficult to identify in practical life because pastoralists often shift between different forms of nomadic activity in their constant adaptation to environmental, political, cultural and economic conditions (Salzman, 1980).

Pastoralism is a global phenomenon practiced all over the world and occupies over a quarter of the world's land mass; from the Asian steppes to the Andean regions on South America and from mountainous regions of Western Europe to the African savannah (Salzman, 2004). In Africa, it's practiced mainly in savannas, arid deserts and lowlands areas that are characteristically hot, dry, with low erratic rainfall, periodic grass and water scarcity and rain fed crop risk (Kari, 2010). Nonetheless pastoralists are well known to adapt to these harsh climate and poor living conditions (Fratkin& Roth, 2005).

It's estimated there are over 200 million pastoralists world over, with more than 50 million in sub-Saharan Africa. In East-Africa, rangelands constitute about 95 per cent of the total land area in Somalia and Djibouti, more than 80 per cent in Kenya, 60 per cent in Uganda, and between 30–60 per cent in Tanzania (Oxfam, 2008). These areas are home to millions of animals and pastoralists and according to 1982 estimates; they had more than 50% of cattle and more than 60% of sheep and goats of the entire region (Sheik-Mohamed and Velema, 1999). However, in East Africa and other parts of Africa, livestock numbers are on decline because of increased human population, cultivated land in pastoral areas and increased number of pastoralists who have been pushed out of pastoralism by drought in the past forty years (Homewood, 2008).

Pastoralists are known for their strong specialization in animal breeding with livestock species kept varying according to; climatic environment, geographical location, water and other natural resources of a region (Salzman, 2004), but mainly they are domesticated herbivores. For instance, in East Africa cattle, sheep, donkeys and camel are preferred by different groups of pastoralists (Huhó et al, 2010). Although most pastoral societies are associated with two or more animals, often one key animal defines the pastoral group culturally and which they want to be associated with (Barfield 1993). Among the Maasai, cattle are the key animals forming an integral part of their life, so much so that cattle were treated with the same respect accorded to family members. To Maasai cattle were important as sign of wealth, source of food: milk, cheese, meat, and on occasion, blood which was mixed with the milk to supplement their diet and cultural prestige, could pay fines and bride prices with cattle due to their life-sustaining importance (Kantai, 1995).

However, Salzman (2004) argues that livestock importance characterizations among pastoralists are over-simplified and misleading, since most pastoral societies raise more than

one animal species. Additionally, Salzman (2004) argues such characterization imply that pastoral activities are the only, or the most important, income generating activities, which may not be the case in all pastoral societies. These arguments point the case with Maasai and many other pastoralists in Africa, who not only keep several species of livestock but also more often part of pastoral households or societies engage in other kinds of production to the same extent as pastoral activities to strengthen their livelihoods

The East Africa region is becoming drier and droughts are increasing in frequency and temporal-spatiality (Homewood, 2008). These droughts are severely limiting pastoralism, since both plant growth and surface water collection are crucial for livestock subsistence. Pastoralism believed to be 9000yrs old in Africa, is thought to have flourished well when Sahara region entered a period of prolonged desiccation with no reliable supplies of permanent water (Blench, 1998). It enabled people to adapt to the increasingly arid and unpredictable environment by moving livestock according to the shifting availability of water and pasture. That opportunistic management system has enabled it to continue to this day and remain as the most effective and efficient land use and production systems for marginal areas (Nyariki and Ngugi, 2002).

However, despite pastoralism being the most viable economic activity, environmental and anthropogenic factors are limiting it. Natural changes include; climatic variability, drought, emerging and re-emerging diseases, pest and environmental degradation. Anthropogenic changes include; population growth, urbanization, land subdivision, shifts in land use, declining land carrying capacity, opening up of pasture land and forest areas for human settlements and agro-farming (UNEP, 2007). Additionally, ASAL environments are continuously becoming harsh, unreliable, unpredictable and hostile with limited migration and restricted access to key resources. Thereby pastoralism is increasingly becoming

vulnerable to drought and weakened with huge economic losses, increased poverty and weakened livelihoods (UNEP, 2007).

Traditionally pastoralist had very effective traditional mechanisms to counter hazards such as herd migration, herd splitting, stocking mixed species, maintenance of a high proportion of females, settlement selection, as well as strong social-cultural network (Homewood and Rogers, 1991). However, according to Oxfam (2008), pressures from socio-ecological changes have severely threatened pastoralism resulting in increased vulnerability. Subsequently, there are increased incidences of poverty and food insecurity. Incidentally, many pastoralists are forced to diversify to other strategies beyond pastoralism in order to minimize risks and vulnerability (Brooks, 2006). However, more often these strategies render inhabitants totally dependent on environment, further aggravating the situation (Berger, 1993).

1.2 Statement of Problem

Range pastoralism is the dominant source of livelihood in Kenya's dry lands, which constitute more than 80% per cent of the county's landmass, supports about 25% of the national population, accounts for over 50% of all livestock, 65% of all wildlife, 30% of crop agriculture, and 7% of commerce (Oxfam, 2008; Huho, *et al*, 2010). Although this illustrates the importance of drylands to the Kenyan economy, frequent and severe droughts are a major threat to people and their livelihood systems in these areas and have caused huge losses in past years (Zamani *et al*. 2006; Le Houerou, 1996; Oba and Lusigi, 1987; Huho, *et al*, 2010). Beyond Kenya, an example of the adverse effects of drought on livestock wealth in some other African countries is illustrated in Table 1.1. This situation re-occurs in the entire Horn of Africa region where episodes of recurring droughts have pushed herders out of pastoralism

into a vicious cycle of poverty and food aid dependency (Fratkin, 2001; Campbell, 1999; Spencer, 1974; FAO, 2003).

Table 1.1 Effects of recent major droughts on livestock in selected African countries

Drought	Country	Livestock lost
2010 (May)	Somalia	70-80% livestock lost
2010	Niger	75% livestock threatened
2002	Ethiopia(Afar and Somalia)	40% loss of cattle;10-15% shoats
2002	Eritrea	10-20 % loss of livestock in some areas
1998-99	Ethiopian (Borana plateau)	62% loss of cattle
1995-97	Greater horn of Africa	29% loss of cattle; 25% loss of shoats
1995-97	Southern Ethiopia	78% loss of cattle; 83% loss of shoats
1993	Namibia	22% loss of cattle; 41% loss of shoats
1991-93	Ethiopian(Borana plateau)	42% loss of cattle
1983-85	Ethiopia(Borana plateau)	37% loss of cattle
1982-84	Niger	62% loss of national cattle herd
1981-84	Botswana	20% reduction in national herd

Sources: Morton, 2006; Tearfund, 2010; [Akila and Wekesa, 2002](#); FAO, 2003; HPG, 2006; Somaliland press, 2010 and [Huhó et al, 2011](#)

In Kenya, several examples can illustrate the adverse effects of drought: In 1975, widespread drought affected 16,000 people, which rose to 20,000 people in 1977, 40,000 people in 1980, 200,000 people in 1983/84, 1.5 million people in 1991/92, 1.4 million people in 1995/96, 4.4 million people in 1999/2000, and 10 million people in 2010 (FAO, 2003; OXFAM, 2010). In the ASAL regions of North Eastern, Rift Valley, Eastern and Coast, about 70% of all livestock were lost in the 1991/92 drought alone while pastoralists lost between 30% and 90% of all livestock in the droughts of 1995/96,1999/2000, 2006, and 2009/2010.

The effects of drought on humans and associated losses of livestock and crops illustrate the importance of understanding resilience to drought. For example, understanding how different communities of pastoralists live through frequent droughts and recover during years of better

rainfall (Fratkin & Roth, 2005; Nkedianye *et al.*, 2011) could help inform policies and programmes on drought management. Some questions that need answers include: How do traditional practices such as preference for larger herds influence effects of drought on herders? How have frequent droughts weakened pastoral economies and how have pastoralist communities responded?

Additionally, despite the fact that pastoral resilience and survival over decades have had some success as result of several traditional coping strategies [(Nkedianye *et al.* (2011); McPeak (2005)], they have been under strain from social, economic and environmental factors (Homewood *et al.* 2009; Behnke, 2008; Brockington, 2005; Lamprey and Reid, 2004; McCabe, 2003; Sindiga, 1984) thus severely disrupting, inhibiting and incapacitating coping strategies [(Borjeson *et al.* (2008); Hughes (2006); Hodgson (2001); Rutten (1992)]. It's therefore important to: identify Maasai coping strategies, detrimental factors prevalent in Mashuru, their effects and possible solutions.

Though Maasai pastoral people were once called the wealthiest tribe in East Africa, courtesy of the land and stock they were able to sustain (KLC, 1934), they have had their livelihood severely challenged in the recent times as the drought has led to an impact on livestock economy and social effects, food security and famine, biodiversity, water, migration, conflicts, and their economy at large. It's therefore important to ask: are they able to overcome all the aforementioned issues, return to their full pastoral way of life, rebuild herds and what's the future of their pastoralism.

Although numerous studies have been done on Maasai pastoralism thus far, it's imperative to study the current situation since pastoral areas and livelihood in there are continuously transformed by the several challenges encountered. The study will therefore attempt to answer the knowledge gap by answering the question; what are the effects of drought on

household livelihood sustainability among Massai pastoralists in Mashuru division of Kajiado County, Kenya?

1.3 Research Questions

The study aimed at addressing the following;

- 1) What factors have contributed to vulnerability of pastoral production to drought?
- 2) What are the strategies adopted by the Maasai household to cope with drought?
- 3) What opportunities are there to promote drought resilient Maasai pastoralism?
- 4) What are the ways to promote livelihood security among Maasai households?

1.4 Research Objectives

The broad objective of this study was to find out droughts effects on pastoralism and Maasai household livelihood sustenance.

The specific objectives were, to;

- 1) Identify factors that determine vulnerability of pastoral production to drought.
- 2) Analyze strategies adopted by the Maasai household to cope with drought.
- 3) Identify opportunities that can be used to promote drought resilient Maasai pastoralism.
- 4) Recommend ways to promote livelihood security among Maasai households.

1.5 Hypothesis

The following hypothesis was tested by the study;

H₀: The frequent and increasingly severe droughts have not affected the ability of pastoral household in generating and maintaining a sustainable livelihood through rangeland livestock production.

1.6 Justification of the study

Pastoral communities, with pastoralists in Mashuru sub-county being no exception, are differentiated in certain aspects, for example, by their geographical location and ethnic backgrounds. Internal differentiation is also explicit in pastoral settings. Coppock (1994) argued that 'African pastoral communities are diverse and therefore the concept of average household is less significant in understanding the dynamics of pastoralist system or in stipulating blanket intervention approaches'. The concept of differentiation emphasizes that although pastoral communities may experience similar socioeconomic impacts of drought and apply common coping and adaptive strategies, different impacts may be experienced and different strategies may be applied. This study explored such distinctions within the pastoral group under investigation to enable the government to intervene based on the specific needs of different pastoral communities.

Additionally, pastoralists are forced to migrate far and wide, further exposing them to conflicts, stress, diseases sometimes increasing livestock mortality (Nkedianye et al., 2011). Pastoralists are becoming more food insecure often with hunger and famine situations occurring during drought season, as pastoralism is weakened undermining household resilience capacity based on endowment hence infringing on the household entitlement (Leach and Means, 1991). As such, the study necessitated the recognizable proof of key adapting and versatile methodologies which may be bolstered, changed or upgraded to grow long haul dry season administration frameworks. At long last, in the wake of setting up people groups' observations, thoughts and suppositions; audit of existing writing and strategy

archives on government reaction, this examination measured the suitability and sufficiency of government mediation measures, henceforth, suggests important approach activities.

1.7 Assumptions of the Study.

The following assumptions were taken into consideration, that:

- Mashuru residents in rural areas were Maasai pastoralist.
- All respondents gave accurate and honest responses to the items in the questionnaire and interview schedule.

1.8 Scope, Limitations and Delimitations of the Study

The study was done in Mashuru area of Kajiado County, involving pastoralists, residents, administrators and non-government official as respondents. Data collection in pastoral areas can be challenging and difficult due to vastness and remoteness of the areas as well as demographic data on pastoralist societies often lacks in national statistics (Homewood, 2008). Although there were several challenges, through perseverance, persistence and concerted efforts, it was possible to reach an adequate number of Maasai households for the purpose of this study.

These challenges included; Language barriers especially in the interior rural areas: where many people couldn't understand Swahili, hence personal interview with them took a lot of time. There were non-cooperative respondents especially women whose husbands were not present and also those who couldn't understand the purpose of research. However, the research assistants who were well known in the area helped a lot in assuring the respondents, explaining the purpose of the study and interviewing them. Although, the researcher intended to interview targeted household heads, there were instances where they were absent and their

representative sometimes weren't able or didn't had all the information intended to be obtained. A re-visit back to the household at a later date was repeated, hence prolonging research work and with financial implications.

The harsh weather conditions such as very cold morning, windy, dusty and hot sun during daytime interrupted movement and research work, however proper clothing enabled researcher to proceed. Transport was a challenge due to lack of reliable public transport and passable roads, however by using motorcycle and working even at odd hour's such as very early and late evenings made it possible to cover the vast distances.

1.9 Operational Definitions

The following terms and words in this study have their meaning as follows;

Pastoralism	Agricultural practice involving keeping of livestock (Abule et al., 2005).
Livestock	Refers to cattle, sheep, goats, camels, poultry, pigs and donkeys.
Vulnerability	The potential to be adversely affected by an event or change
Drought	Naturally-occurring wonder that exists when precipitation has been essentially beneath typical recorded levels, causing genuine hydrological awkward nature that antagonistically influence arrive asset creation frameworks (FAO, 2002)
Meteorological drought	Deficiency of precipitation from expected or 'ordinary' sum over an expanded timeframe.
Agricultural drought	Deficiencies in water availability for specific agricultural operation such as in soil moisture.

Hydrological drought	Deficiency in surface and subsurface water supplies that prompt absence of water accessibility to meet ordinary and particular water requests.
Social-economic drought	Situations where the reductions in precipitation has impacts on the wellbeing of the affected community and effects on general public through an imbalance in supply and demand of specific goods such as food crops.
Social system vulnerability to climate change	its level of failure to adapt to antagonistic atmosphere impacts and as a component of presentation, affectability and versatile limit (McCarthy et al., 2001).
Exposure	Alludes to the character, the size and the rates of future environmental change a framework is or will confront.
Sensitivity	The degree to which a framework is influenced by atmosphere upgrades, and versatile limit alludes to the capacity or capability of a framework to react effectively to atmosphere boosts (McCarthy et al., 2001).
Adaptation	Adjustments in human ecological frameworks because of watched or expected changes in climatic boosts (Smit et al., 2001).
Livelihood	Refers to the capacities, resources (counting both material and social assets) and exercises required for a methods for living.
Sustainable livelihood	Refers to that business that can adapt to and recoup from pressure and stuns and keep up or improve its abilities and resources both now and later on, while not undermining the characteristic asset base'(Carney, et al, 1998)
Household	Involves a man, or a gathering of people, for the most part bound by ties of family relationship, who might possibly live respectively under a solitary rooftop or inside a solitary

compound, yet who share a network of life, in that they are responsible to a similar head and offer a typical wellspring of wage and occupation.

Household head

A man or woman or their representative (woman or son/daughter over 20 years) as the respondents.

Entitlement

Refers to products, administrations and assets over which individuals have successful summon in utilizing them to profit their occupation.

Famine

Drawn out diminishing in sustenance admission of extensive quantities of individuals to levels beneath what they have to keep up sensible healthful condition

Nomads/ pure pastoralists

Refers to pastoralists who are solely dependent on livestock and are characterized by their irregular movements without fixed routes or movement patterns.

Transhumant pastoralists

Pastoralists who move from one specific place to another, with their itinerant along the same regular route occurring on specific times of the year according to seasonality.

Semi-nomads/ agro-pastoralists

Are characterized by their more or less settled livelihood, with their livestock herded in natural pastures and often associated with agricultural activity or small-scale trade in addition to their dependency on livestock

Natural capital

Refers to common asset stocks, for example, arrive, water, trees, field, and untamed life, and natural administrations, for example, hydrological cycle from which asset streams and administrations valuable for vocations are determined (Ellis, 2000; Scoones, 1998).

Physical capital

Refers to capital made by the financial generation forms. It incorporates foundation, for example, streets, power and water

supply and in addition delivered products, for example, instruments and hardware.

Financial capital

Comprises of cash or different investment funds in fluid shape and also access to credit and effectively arranged resources, for example, domesticated animals.

Human capital

Is made out of amount (number of gainful people) and quality (what these people know and how hard they can function) work accessible, for example, at the family unit level; consequently it's dictated by family estimate, training, aptitudes, and strength of family individuals.

Social capital

Refers to social assets, for example, contact systems, social cases, social relations, affiliations, affiliations, and common trust, whereupon individuals draw while seeking after various occupation methodologies requiring composed activities (Scoones, 1998; Ellis, 2000; DFID, 2001).

CHAPTER TWO: STUDY AREA

2.1 Introduction

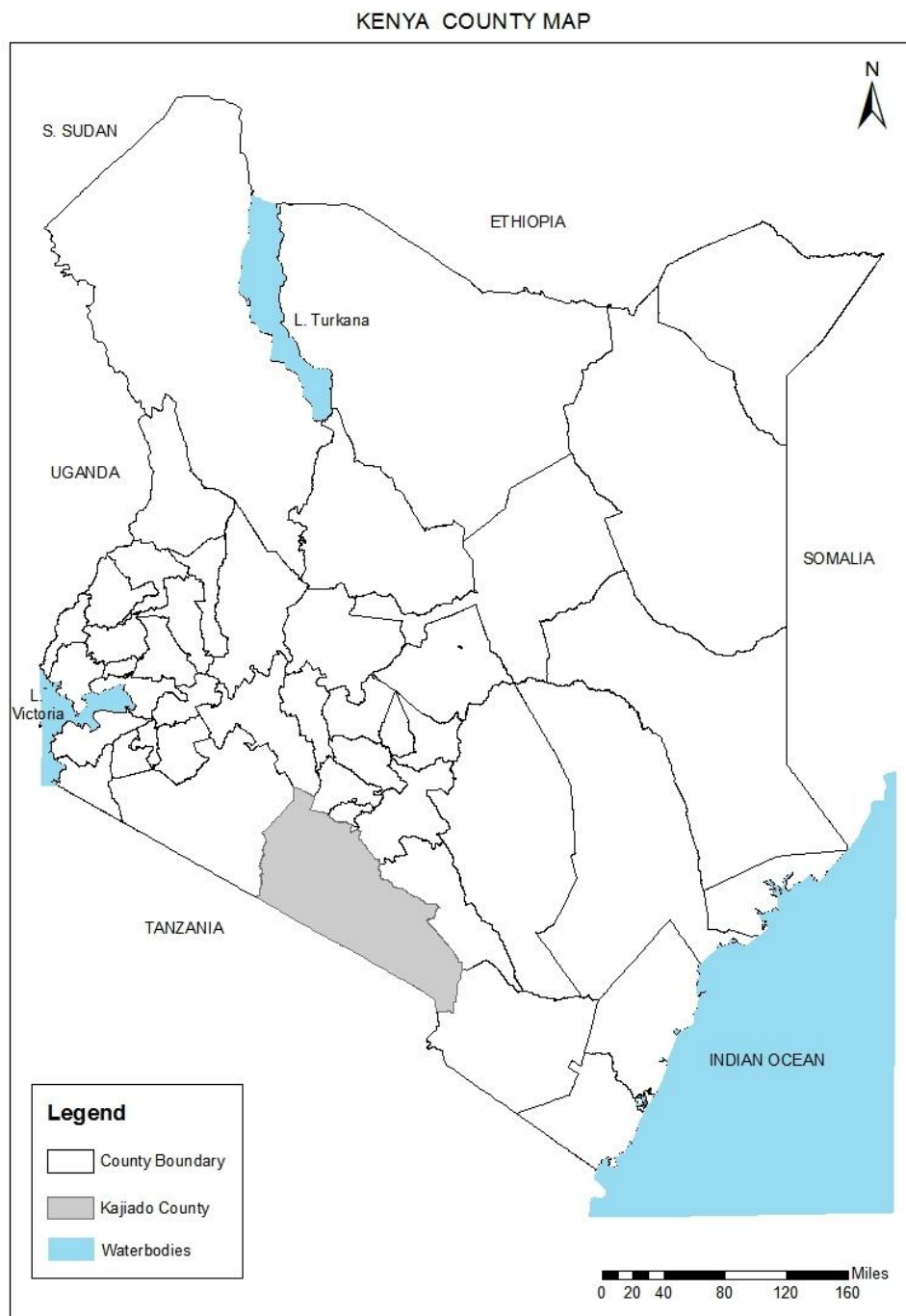
This chapter presents description of the location, physiographic, agro-ecological and socio-economic characteristics of the study area, with emphasis being placed on aspects that relates to pastoralism, vulnerability, drought and livelihoods strategies.

2.2 Location and Size

Kajiado County with an area of 21,902.9 km² is roughly triangular in shape bordering Nairobi County to the north and extends to the Kenya-Tanzania border further south. It also borders the Counties of Taita Taveta (to the South East), Makueni (to the East), Machakos (to the East), Kiambu (to the North) Nakuru (to the North West) and Narok (to the West). It is situated between longitudes 36° 5'0"/E and 37° 5'0"/E East of Green Winch Meridian and between latitudes 1° 0'0"/S and 3° 0'0"/South of Equator.

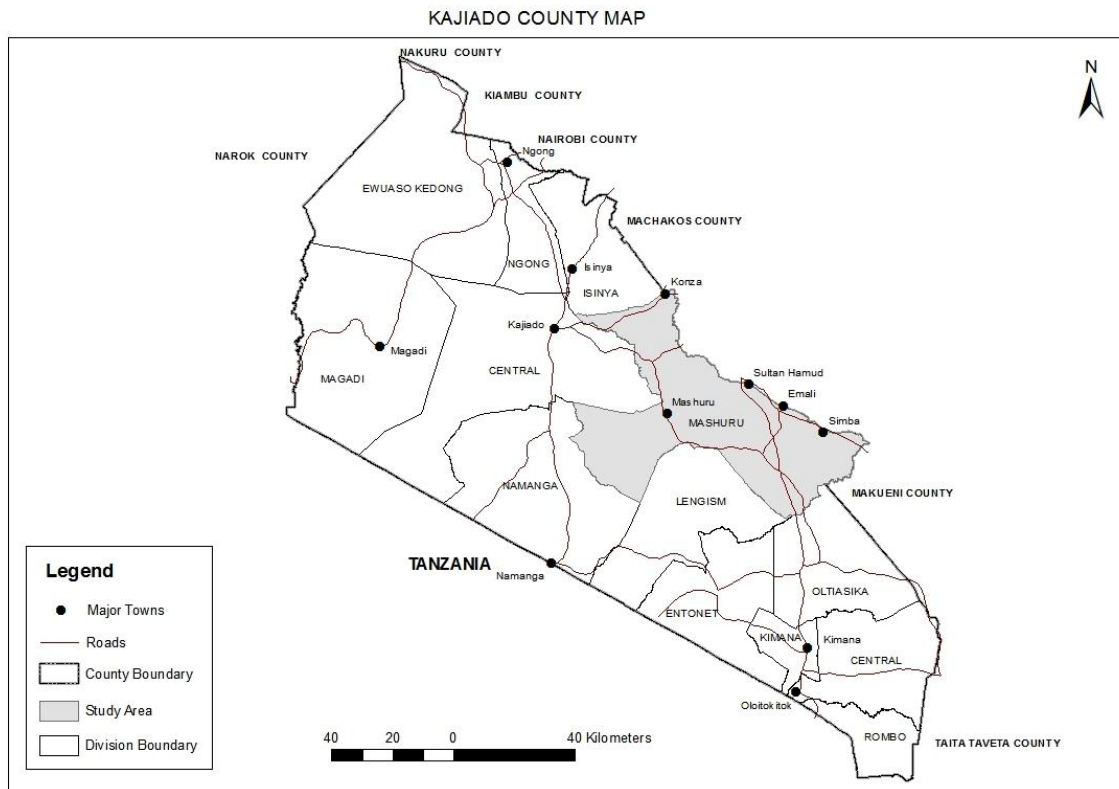
Mashuru a sub-county within Kajiado County has an area of 1066.3 km² and constitute of Mashuru and Kenyewa divisions with 11 locations and 18 sub-locations in total. It is situated 92Km South East of Nairobi.

Figure 2.1 Map of Kenya showing the 47 counties



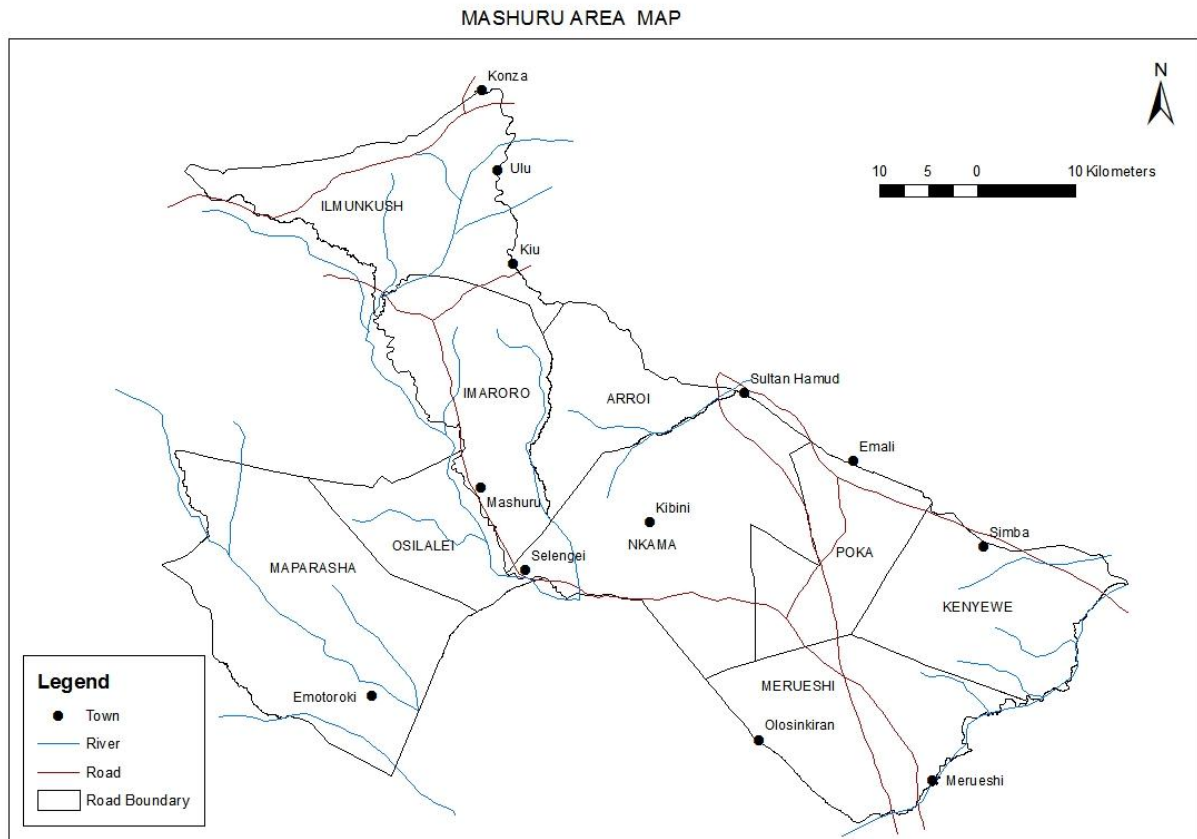
Source: Researcher, 2013

Figure 2.2 Map of Kajiado County



Source: Researcher, 2013

Figure 2.3: Mashuru area



Source: Researcher, 2013

2.3 Topography and Climate

Temperatures in the County fluctuate both with elevation and season, with most elevated temperatures of around 34⁰ C amid the most sizzling a very long time from November to April and least of around 10⁰ C amid the coolest period amongst July and August. Mashuru zone, portrayed as semi-parched district has a bimodal precipitation design with yearly normal precipitation of 500mm. Precipitation is low, profoundly flighty and vacillates extraordinarily from season to season. The downpours onsets are unusual and generally amassed in a couple of exceptional showers causing serious overflow. The problem of irregular rainfall both in time and space in the area are the recurrent droughts, where over the last 50 years the area has experienced cyclic drought seasons (Campbell, 1986; Talbot, 1986;

World Bank, 1994). In Kenya and Mashuru area, droughts have occurred in these years: 1933-1935, 1943-1946, 1948-1949, 1952-1953, 1960-1961, 1972-1976, 1983-1984, 1991-1992, 1995-1996, 1999-2000, 2004, 2005-2006, 2007-2008 and 2009-2010 (Campbell, 1986; Kajiado County Plan, 1990).

Vegetation in Mashuru is overwhelmingly lush meadow, open prairie, and semi-bone-dry bramble land and scour. The overwhelming plant species are *Acacia tortilis*, *Acacia drepanolobium*, *Balanitesaegyptiaca*, *Acacia mellifera*, *Commiphora africana* and red oatgrass, *Themeda triandra* (Ego et al., 1999). Vegetation is mainly influenced by soil distribution, relief and human settlement, with accessibility of search differing both spatially and transiently as far as amount and quality. This unpredictable accessibility of rummage and water assets as a rule commands domesticated animals versatility as a coping strategy for Maasai pastoralists. Other elements influencing vegetation include; mining, soil erosion, burning, farming, construction and grazing activities. The forest cover in the area is threatened with human encroachment, charcoal burning and agricultural activities, hence great effort is required in preservation in order to sustain viable vital ecosystems and the life forms they support.

2.3.1 Rainfall and Temperature Distribution

There tends to be a metrological drought in Kajiado County. The County is a bone-dry region, with temperatures running somewhere in the range of 24°C and 38°C with a mean of 30°C. The dissemination of precipitation between the two seasons changes bit by bit from east to west over Kajiado County. In eastern Kajiado more rain falls amid the long rains (March -May). The mean annual rainfall ranges from 300 to 800mm (ROK, 2009a). However, heavy rains occur in areas around Ngong hills, Chyulu hills and Nguruman area, receiving average rainfall as high as 1,250mm per annum. Low lands like Magadi receives an

average of less than 500mm of rainfall per annum (Berger, 1993). In the month of February the County experienced rainfall for three days: 14th, 15th and 17th which amounted to 29.7mm. The amount was below the long term averages of 30.8mm. The six month cumulative (Sept 2014 – February 2015) recorded an absolute deficit of 30.6mm which was 13.0% compared to the long term average (204mm compared to 234.6mm).

The average rainfall for the year in Mashuru is 56.21mm and only 5 months of the year (March, April, May, November and December) have rainfall higher than the average. The rainfall trend for Mashuru in this research compares to Opole (2013) who reported peak rainfall of 144.6mm in April and a minimum of 10.5mm in July for Mashuru region in Kajiado County over a period from 1970 to 2013. A total of five years 1975 (423.00mm), 1976 (419.10mm), 1984 (370.60mm), 1996 (453.60mm) and 2000 (371.50mm) had rainfall lower 500mm in a year. This agrees with UNEP and GOK (2000) that in Mashuru drought events were recorded in 1975/76, 1984, 1994, 1996 and 2000. The year 1972 to 1976, 1983 to 1985, 1990 to 1996, 2003 to 2005 and 2007 to 2009 recorded the highest spell of dry seasons.

2.4 Geology and Hydrogeology

Kajiado County at large doesn't have adequate surface water resources for livestock, human consumption and irrigation. The amount of surface water varies from area to area and to a greater extent the county depends on ground water reserves. The occurrence of ground water is mainly influenced by climate, geology and fundamental parent shale. The elective wellsprings of water for local and animals are sub-surface assets; water container, dams, shallow wells and boreholes. These are mainly publicly owned and many of them have broken down.

Kajiado County geological formation; Quaternary volcanic, Pleistocene and Basement rocks, has raised minerals of economic importance that presently are either

economically exploited or not. Some of the minerals found within Mashuru include: Limestone, Asbestos, Columbite, Feldspar, Garnet, Kyanite and Mica and sand harvested along the rivers.

Mashuru area which is 92% rangeland underpins natural life, for example, gazelles, giraffes, hyenas, bison, zebras and wild predators. Around 65– 80% of Kenya's wild life lives outside assigned preservation territories (World Bank, 1994). This is noteworthy for the whole Kajiado County, in light of the fact that Amboseli National Park, Nairobi National Park and Chyulu diversion save, can't bolster all the natural life, consequently the neighboring rangelands frame the primary untamed life dispersal zone for both inhabitant and vagrant species (Kimani and Pickard, 1998).

Although wildlife has coincided with the Maasai for quite a long time, there are wildlife related issues, for example, rivalry with domesticated animals for water and brushing assets, spread of infections to animals such as MCF, destruction of cultivated crops, predation of domestic animals, human injuries and death. Cultivators frequently fence off their property so as to keep off wildlife from pulverizing their yields, and this meddles with conventional movement examples of natural life and domesticated animals (Odundo, 1992).

2.5 People and Culture

2.5.1 Demographic

With a populace of 40 million, Kenya is the most heavily populated nation in East Africa (UNFPA, 2007). Overtime population growth in Kajiado County at large have been influenced not only by normal population growth of the residents but also influx of cultivators from highly congested central highlands into rural areas as well as other immigrants from other Kenyan areas.

Table 2.1 Population of Kajiado County 1969-2009.

Kajiado County				Kenya
Census year	Population	Inter-census growth (%)	Avg. annual growth (%)	Avg. annual growth (%)
1969	85,093*			
1979	149,005*	75.1	57.6	3.4
1989	258,659*	73.6	56.7	3.4
1999	405,000**	56.6	45.8	2.9
2009	687,312***	69.7		3.0

Sources: Government of Kenya, Central Bureau of Statistics 1969, 1979, 1989, 1999 & 2009
Government of Kenya, Kenya National Bureau of Statistics, 2009.

In Mashuru, Maasai the indigenous people of the area formed the largest part of the population; though, there was an influx of people from other parts of Kenya mainly on socio-economic purposes such as agriculture, business as well as employment by government and different organization in the area.

Table 2.2 Population, Households, and Density in Mashuru area

	Area km ²	Population	Households No.	Density sq./ km ²
Mashuru	2,903.0	50,245	10,676	17

Source: KNBS Population Census, 2009

2.5.2 Land Tenure and Economic Activities

The land tenure system is an important aspect of livestock production, because it determines the land parcel size, distribution and land use patterns. Previously, land tenure in the entire county was held under private, communal such as group ranches or public such as Amboseli, Chyulu and Nairobi national parks. However, in the recent past years land tenure has been changing mainly from communal to private tenure. Maasai are patriarchal community where sons inherit and sub-divide land from their fathers; additionally many land owners are sub-dividing and selling land thereby reducing grazing parcels. The land use

changes such as increased cultivation and mining such as sand harvesting have reduced grazing areas.

The pastoral Maasai were the main inhabitants of Mashuru comprising 75% of the aggregate populace (Ego et al., 1999), and domesticated animals raising keeps on being their principal movement. In Mashuru, pastoralism was limited by drought episodes, poor husbandry, lack of capital and inadequate management of pest and diseases. Although Maasai were practicing agro-farming, they were largely directly depending on livestock products through consumption of meat and milk or indirectly through buying maize flour and other fundamental family unit products and additionally animals' inputs after livestock sale.

In Mashuru, agro-farming was practiced by both Maasai and non-Maasai farmers who cultivated food crops such as maize, beans, green grams, banana, onions, and tomatoes. Additionally, more Maasai households were diversifying further into petty business such as bead making, clothes, shops or wage and salaried jobs as well as poultry and bees keeping.

Table 2.3 Livestock Population by Species in Kajiado County

	Cattle	Sheep	Goat	Camel	Donkey	Pigs	Indigenous Chicken	Bee Hives
Kajiado	41,1840	718,950	699,658	1,597	72,980	6,127	544,204	16,091

Source: Census- KNBS, 2009 Population Census.

2.5.3 Settlement patterns

Traditionally, semi-itinerant pastoralism was the Maasai method of life, honed on collectively claimed arable. Notwithstanding, this way of life has experienced changes due to on-going area mediation and sub-division of farms prompting singular land residency framework. Individual land ownership has expanded the rate of land deals thus opening up the area to immigration.

CHAPTER THREE: LITERATURE REVIEW

3.1 Introduction

This chapter reviews literature on impacts of drought as well as human activities onto pastoralism and pastoral livelihood. Drought and human activities impacts are very critical factors in modern day pastoralism. This is because they influence the droughts' vulnerability, severity as well as the success of coping mechanisms employed by the pastoralist. This chapter also provides theoretical underpinnings of the study.

3.2 Definition of Drought, Vulnerability, Impacts and Strategies

3.2.1 Drought

Wilhite (2002), described drought as an ordinary, repeating marvel of atmosphere that for all intents and purposes happen in all districts of the world. It is different from aridity, since, while aridity is a permanent phenomenon limited to low precipitation areas, dry season is a transitory distortion that occur in both low and high rainfall areas (Wilhite & Svoboda, 2000). Drought is an outcome of the reduction of precipitation received over an extended temporal scope, which can be one season or more (Wilhite & Glantz, 1985; Wilhite & Svoboda, 2000). High temperatures, high breezes and low relative stickiness can exasperate seriousness of dry season (Byun & Wilhite, 1999).

Drought is one of the serious environmental hazards and a continuing problem all around the world. Overtime it has drawn interest of various individuals, scientists (from various disciplines and professions), governments, non-administrative associations, media and public at large especially on its occurrence and social economic effects (Swift *et al.*, 2000). Many research scientists consider dry season to be the most complex yet minimum

comprehended of every single normal peril, influencing a greater number of individuals than some other risk (Hagman, 1984).

Drought occurs as result of various factors either natural climatic factor, anthropogenic or societal factors acting on their own or in combination (Nyandega, 1990). In ASAL pastoral areas, fluctuating rainfall and drought occurrence are accepted as inherent features, signifying the relevance of drought towards pastoralism. Wilhite and Glantz (1985) noted that over time different scholars while dealing with different situations have categorized dry spell into four particular classifications: meteorological, agricultural, hydrological and social-financial dry season.

Pastoralism a dominant form of land use in Sub-Saharan Africa, involves interaction of different components such as pastoralists, livestock and rangeland, hence includes all factors that help animals profitability, for example, arrive, markets, wildlife protection and families (Begzsuren et al., 2004, Boone et al., 2006). Pastoralism success is ensured by the ability of all components remaining at equilibrium (Bollig, 2006). As pastoralists subsist completely or to a limited extent upon their creatures, they can make productive utilization of accessible assets in ASAL territories by utilizing domesticated animals to change over grasses and peruse into animal protein to be devoured by individuals (Pratt and Gwynne, 1977; Dyson-Hudson, 1980). Among pastoralists animals serve numerous parts: as both the means and results of creation, as sources and questions of work, as qualities, and as social, cultural and capital products (Galaty and Johnson, 1990).

3.2.2 Vulnerability

Leonie (2005) explained that defenselessness is presently a generally acknowledged idea in sociology. Different creators have thought of various verifiable outlines on understanding

helplessness and recognition on disasters and vulnerability (Cannon T, 1994; Anderson, 1995; Smith, 1996).

Pastoralism in African ASAL areas is increasingly becoming vulnerable to disasters due to elements such as excessive accumulation of livestock beyond rangeland carrying capacity thereby reducing future rangeland productivity (Blaikie et al., 1987, Chen et al., 2007). This tendency is explicitly recognized in Hardin's (1968) model of the 'Tragedy of the Commons.' Hardin assumed that, since arable land is collectively possessed, there are a couple of motivating forces to decrease stocking levels. Besides, for any individual, the group increment benefits dependably surpass the cost of overgrazing. The individual proprietor sees the field basically as a free asset, which, in the event that he neglects to completely misuse, will be abused by another person. With an end goal to augment usage of such shared assets, overgrazing results (Stryker, 1984).

Additionally, defenselessness is coming about because of changes in arable land utilize chiefly because of human populace increment (Garedew et al., 2009, Jolly and Torrey, 1993) and also, changes in arable land residency possession, government directions (Thornton et al., 2006, Kimani and Pickard, 1998). Different components include: infections, dry spells, frailty and market vacillations regularly delegated sudden in spite of their incessant and rehashed events (Barrett and Luseno, 2004, Doss et al., 2005). These elements impact both the benefits and pay accessible for peaceful family units.

3.2.3 Impacts

Impacts of drought to pastoralists are demonstrated by deteriorating livestock body conditions and massive livestock deaths, which lead to decline in livestock prices (Huho et al., 2011). Pastoralists encounter decrease in levels of profitability from their herds following misfortunes in domesticated animals' capital from deaths, low calving rates, low

drain creation and weight reduction, which consequently reduce the market value of livestock. It is therefore a fact that drought results in destruction and collapse of pastoralists livelihoods, dependence on food aid and long-term destitution.

3.2.4 Strategies

Methodologies allude to ways individuals react to declining privileges and sustenance accessibility in strange seasons or years (Davies, 1996). They are here and now reactions to a pressing and inhabitual decrease in access to nourishment and methods for survival (Davies, 1996). Methodologies are useful for the time being; anyway they may not expedite a significant change work

In addition, adapting methodologies may not be monetarily and earth reasonable. For example, moving animals in a single water point, expanded charcoal creation and gathering of fuel wood are cases of earth unsustainable practices, while trade of rearing and lactating domesticated animals are cases of an adapting system unsustainable at a family unit level (Barton et al, 2001). Different adapting procedures are drilled by pastoralists relying upon various phases of dry spell i.e. gentle, medium and intense.

3.3 The Link between Livelihoods and Vulnerability

The erratic rainfall which varies in time and space highly influences poverty levels among pastoral communities in East Africa (Barrett and McPeak, 2006). According to Angassa and Oba, (2007) in pastoral systems rainfall causes substantial dynamics by directly influencing the wellbeing of those dependent on livestock, where severe droughts cause high livestock mortality rate denying farmers income (Homewood and Lewis, 1987). Barrett and McPeak (2006) noted that Kenyan pastoral system is highly reliant on rain for key productivity.

In return, transitory poverty results whenever household are unable to meet their daily need due to insufficient income for a short period of time such as during drought period (Boone and Wang, 2007, Birch and Grahn, 2007). Livestock and food prices are also affected by rainfall variability thus contributing towards transitory poverty (Barrett and Luseno, 2004). Other pastoral limitations include; losses arising from insecurity, diseases and wildlife predation (Bekure and de Leeuw, 1991; Lamprey and Reid, 2004).

3.3.1 Drought Impacts on Livestock Economy and Social Effects

The most fundamental normal for peaceful social orders is their introduction toward domesticated animals brushing on regular field. In any peaceful family unit, the salary is for the most part gotten from particular monetary exercises, animals and domesticated animals related exercises being the most essential donors (Hogg, 1997; Zaal, 1999). This fundamental component of a peaceful family unit recommends a few ramifications on family's capital aggregation conduct and Hogg (1997) recognized four critical results. To begin with, peaceful capital can recreate itself without intercession of any market system. Along these lines, except if group proprietors have feasible elective types of venture, the propensity is for pastoralists to re-put resources into crowd development, and eventually livestock populations exceed rangeland capacity. Secondly, since pastoralism is geared towards herd reproduction, inevitably there are overflow of creatures that can be arranged without influencing the groups conceptive limit. Thirdly, not at all like the case for cultivators, post-dry season recuperation among peaceful family units is a long and moderate process since crowd re-constitution after dry spell is a long and moderate process. Fourthly, domesticated animals reliance normally renders peaceful family units defenseless against vacillations as far as exchange especially among domesticated animals and grain, which is more regrettable amid the time of dry season.

Overreliance on livestock among pastoralists' exposes them to drought impact when pasture and water resources availabilities are totally depleted. Subsequently, nutritious state of animals crumbles, influencing their wellbeing, for instance, their fruitfulness, immunity and live weights, resulting in animal death, whose rates increases as the drought continues. Since pastoralist as reported by Bekure, S. and Chabari, F (1991) in their economic analysis of Maasai livestock production, often delayed in selling stock as long as possible worsens the situation. According to Bonfiglioli (1992) they delay in an attempt to maintain a certain level of subsistence production, hedging against the impulses of the very unverifiable atmosphere, epidemiological conditions and a similarly questionable political condition. For instance, in Ethiopia the Borana amass creatures as social and financial resources instead of as a wellspring of wage (Bekure et al., 1991; Coppock, 1994). The vast groups go about as a prepare for a dry spell, where the bigger one's crowd is, toward the start of dry season, the more probable one is to have a reasonable crowd toward the finish of the dry spell (Grandin and Lembuya, 1987; Nyariki and Wiggins, 1999).

The pastoralists regularly postpone offering stock to the extent that this would be possible, with the outcome that creatures are sold in poor condition, bringing low costs (Bekure et al., 1991). For instance, Bevege (2009) noted huge loss of livestock value during 2009 droughts where cattle that once sold for as much as Kenya shillings 30,000 per cow, were off-loaded for as little as Kenya shillings 1,000 among the Maasai. Oversupply of weak malnourished animals to markets often exceeds market capacity to absorb them. Consequently, in such situations many animals die despite pastoralists' belated willingness to sell (Grandin and Lembuya, 1987). Revenue obtained from such animal sales is negligible to support restocking of new herd once it rains or buy enough cereals whose price is escalating and supply declining. This often results in famine as pastoralists lose their food entitlements.

During post drought period, there are huge livestock mortalities from disease since animals are immunologically and nutritionally weak. Lamphear (1976) noted livestock diseases such as Red Water, ECF, CBPP and Trypanosomiasis are known to cause major scourges on animal population in most of pastoral areas. The sporadic epidemic nature of these diseases in East Africa could have been as a result of greater mobility of pastoralist or opening of the country by explorers. For instance, Red water and East Coast fever (both tick borne diseases) are thought to have been imported through South Africa and Madagascar around 1870s (Van Zwanenberg and King, 1975). Diseases outbreak during rainy periods after drought episodes such as Anthrax, RVF, and LSD extend mortalities. The free roaming wildlife animals in Kajiado are vectors of diseases such as MCF and tick-borne diseases that lead to livestock death.

3.3.2 Droughts Impacts on Food Security & Famine

Occurrence of consecutive droughts episodes induces a state of constant serious food shortages for instance in year 2000, 3.2 million Kenyans were reliant on sustenance help, and lack of healthy sustenance achieved 40 percent of the populace, in excess of 3 times the ordinary level (Simms and Andrew, 2005). Van Crowder et al., (1998) pointed out drought leads to loss of natural resources mainly pastures and water, environmental degradation and eventually heightening food insecurity status since both crop and livestock production are severely affected. Pastoralists are increasingly seeking outside assistance (such as food aid) more than ever before because they try not to have satisfactory assets to manage nourishment deficiencies, prompting sustenance instability and appetite that influences a great many individuals. For example, in Ethiopia, Afar pastoralists were among the main gatherings to confront intense issues amid the 1972-1973 dry spells, where they arranged along interstates in Wallo area to ask for sustenance from passing drivers (Holt and Seaman, 1976). In

Somalia, a huge number of ruined travelers looked for government help with many outcast cum-starvation alleviation focuses (Lewis, 1975; Kaplan et al., 1977; Cahill, 1980, Clark, 1985). The Sahelian dry season and starvation of 1968 to 1974 is an awful indication of the consolidated impacts and effects of dry spell. In a range of six years, a huge number of individuals kicked the bucket and a large number of creatures died. Pictures of starving kids, dead domesticated animals and destroy arrive immediately caught the world's eye (McHarryet *al.*, 2002). In Turkana county over 40% of the populations were supported on famine relief following the 1979-1980 droughts (Hogg, 1983). The residents of ASAL areas, principally the pastoralist are under strenuous food insecurity, and of concern is the extent of food insecurity and impacts on the household livelihoods.

Progressing droughts leads to the loss of pastoralists' disposable assets value thereby affecting power to purchase goods. Pastoralists lose their food entitlement when their assets esteem drops to the degree that they can never again buy the sustenance they have to manage themselves, and dry spell transforms into starvation (TDCPU, 1992; Hussein et al, 1993).According to Sen (1981), absence of acquiring power is the reason for starvation as opposed to declining nourishment supply, henceforth pastoralist can't purchase sustenance from the market, for example, oats and grains. Moreover, starvation is the normal for a few people not having enough sustenance to eat and not there being sufficient nourishment to eat (Sen, 1981). This understanding underlines the way that destitute individuals are most defenseless against the effect of dry spell, since they have less buying power, which implies less sustenance qualifications (Oba, 1997; Maxwell et al, 1990).What's then the extent of famine experienced by Mashuru inhabitants in an economy where the cost of food is rising versus declining value of the disposable assets? Are pastoralists able to feed themselves on their own or get food aid from external sources and also how does this disrupt the household setting?

When prolonged drought episodes occur they lead to a state of destitution among the residents of marginal areas. Bush (1995) argued that starvation is a first and impending danger, however the long-haul chance is desperation of pastoralists. When pastoralists end up desperate, sustenance weakness turns into a ceaseless as opposed to an impermanent issue, since there are limited economic opportunities outside the pastoralist sector. Relief food from government, non-government agencies and other well-wishers, is beneficial where other than relieving hunger, enables herd owners to minimize off take from their herds (Hogg, 1983). However, other authors argues do this source of reprieve really help them or does it have dire consequences where during drought pastoralists delay to off take their animals and as well keep on expecting the external help thereby aggravating the situation, developing food aid syndrome?

3.3.3 Droughts Impacts on the Biodiversity

Drought affects the dry land biodiversity existence with onsite impacts such as; natural surroundings and species debasement and misfortune, bringing about by and large loss of financial and organic profitability. For example, on rangelands, overgrazing not just diminishes the general defensive soil cover and builds soil disintegration, yet in addition prompts a long-haul change in the synthesis of the vegetation. Plant biodiversity regularly change after some time, where unpalatable and harmful species command lessening all out-biomass generation henceforth presenting genuine dangers to the administration, feasible utilize and impartial sharing of advantages of biodiversity.

Environmental degradation in turn triggers and contributes to indirect or offsite impacts, like soil erosion, pollution of water bodies, and death of animals as well as deterioration of biological and economic productivity. Often these huge animal losses when translated to economic terms are huge economic loss to both producers and the nation especially in Sub-

Sahara Africa nations whose economies are largely livestock based (Simpson, 1984). For example, in Kajiado County, Maasai pastoralists lost nearly 30% of their cattle population following the 1960-1961 droughts (Hutchison, 1963). According to Hutchison (reported in Maloiy and Heady, 1975) this cattle loss was evaluated at US\$7m. Similarly, in the Turkana County, losses of 80% of the sheep and goats, 40% of the camels and 90% of the cattle was reported during 1979- 1980 drought (Hogg, 1983). The inhabiting communities are therefore forced to migrate to other areas or engage in other coping activities that too may contribute biodiversity degradation.

3.3.4 Droughts Impacts on Water

Meteorological drought leads to water resources becoming scarcer and the situation is worse in Kenya, one of many water-rare nations where environmental change is relied upon to escalate the inexorably basic water circumstance. In ASAL zones like Mashuru, lessened yearly normal precipitation intensifies the circumstance by diminishing streams stream and the capacity of groundwater to 'energize'. This prompts absence of adequate water assets to keep up the ebb and flow level of per capita farming creation and in addition capacity to meet sensible water requirements for residential, modern, and natural purposes, consequently additionally fuel the risky sustenance security and monetary underdevelopment in the nation. In the locale and other ASAL regions, vitality impacts are experienced through changes in the development rates of trees on which a larger part of the general population are compelled to depend on fuel wood, prompting outrageous ecological debasement.

3.3.5 Droughts Impacts on Migration

When people are not able to meet their needs in an area, they tend to venture into new areas where they can satisfy their needs. Drought displaces expansive populaces of individuals compelling them to leave their homes and grounds looking for better

employments from where a significant number of them send home a portion of their winning to keep their families in the peaceful framework. Acosta-Michlik, *et al.*, (2005) noted that impacts of drought and livestock loss increases the probability of human migration, where especially the young people do uptake alternative economic activities such as selling traditional medicine, charcoal burning, or travel to cities to seek employment; salaried and casual jobs such as watchmen (Dahl and Hjort, 1979; Hogg, 1980) For example, between 1962-1969 the Borana populace in Nairobi bounced by 450% (Hogg, 1980). Drought related movement takes numerous structures, the dominant part happening as inner relocations (Nanyunja, 2004), that is, removals of populaces inside national limits (Zaman, 1991; Lein, 2000; Mora and Taylor, 2006). Accessibility of regular assets, for example, water and fields for instance prompts pastoralists along the outskirts of Ethiopia, Kenya and Uganda to move far from territories of diminishing assets. Movements apply weight on poor people and restricted open framework in urban regions and may intensify clashes in urban and country zones as aftereffect of shortage of touching area and water.

Migration may alleviate some problems faced by the families in short term, however in the long run may lead to breakdown and unsustainability to the same household. Hogg (1980) noted that the development of peaceful work into urban areas has had genuine results, making a work lack in the peaceful framework. Therefore, it's of concern to establish the effects of forced migrations on household sustainability.

3.3.6 Droughts Impacts on Conflicts

According to Meier and Bond (2005), there is rising competition over finite resources, thus incidences of real and potential conflict increases which mainly remain internal or could explode to trans-boundary. For instance, conflict arises between Turkana and Pokot when they move into same grazing place competing on the meager available resources. Incidences

of conflict have also been reported between pastoralist and private land owners such as with ranchers, agro-farmers. In most of these instances water has been the main problem especially after diversion of rivers or when animals are driven into farmland. Reduced pastures and subsequent reduction of herbivores prey exaggerate human wildlife conflict when wild predators such as lions, leopards stray and eat livestock. Also when pastoralists drive their animals into parks, they are faced by risks such as predators, animals contracting diseases like bluetongue, FMD, MCF, anthrax and rabies and further run into problems with owners, KWS. In pastoral areas access to the rest of the assets after dry spell have turned out to be more compelled, accordingly bringing about more asset-based clashes. (Nyariki, D.M et al, 2005)

3.3.7 Droughts Impacts on Economy

Resulting drought misfortunes can't be estimated in fiscal terms in light of the fact that nobody can figure the estimation of a broken family, companionship and social bonds which are regularly established through animals trades; or the estimation of a drain dairy animals that kicked the bucket, the loss of which denied the group of a prompt nourishment supply and future offspring. As indicated by Campbell (1968) and Lusigi (1980), couple of market analysts endeavor to assess dry season misfortunes on account of the expansive number of factors associated with such estimations. It's not only pastoralists who suffer losses, but also livestock traders, butchers, and ultimately the whole national economy suffer. Other associated loses include; disruption of agricultural production, decline in exports, sharp rise in imports especially food, decline in currency reserves. These has potential to jeopardize the economic equilibrium of a states and brings on a disturbing decline in investment possibilities, rise in food price versus the declining purchasing power of the people,

underutilization of certain hydro-electric works as a result of reduced water power, increased unemployment in the towns due to the rural exodus.

The effect of drought on any economy is cumulative where it's crippling effect on the economy arguments poverty; severely denying people opportunity to meet their basic livelihoods needs such as education. This has recently occurred in the Ethiopia, Somalia and Kenya. Therefore, are Mashuru households able to meet their economic obligations? Government and humanitarian organizations like NGOs, FBOs tries to help pastoralist in alleviating the effects of drought such as through undertaking livestock off-take interventions via activities like: de-stocking, showcase encouraging intercessions like transport endowment, veterinary mediations, supplementary sustaining, water trucking, and re-stocking. This attempts to decrease the quantity of domesticated animals which a pastoralist has before a dry spell strikes for various essential reasons like maintaining a strategic distance from animals passings, offering when costs are great, giving a more secure wellspring of proper sustenance amid dry spell, sparing biodiversity.

The attempt by the government and other stakeholders has inherently been reactive traditional approach relying largely on crisis management rather than proactive management strategies. This approach has been incapable in light of the fact that reaction is troublesome, ineffectively planned, and inadequately focused to dry season stricken gatherings or territories. Furthermore, dry season reaction is post-effect and alleviation has a tendency to strengthen existing asset administration strategies where decisively, it's these current asset administration rehearses that have frequently expanded societal powerlessness to dry spell. The arrangement of dry spell help just serves to strengthen the present state of affairs as far as asset administration.

Pastoralists have also been reluctant to take up emergency off-take as a way of managing their livestock in anticipation of droughts regardless of its reasons and advantages (Nyariki D.M et al, 2005). This scenario leads to more devastating and plummeting of livestock production in ASAL areas among the pastoralist

3.4 Drought and Rangeland Vulnerability

Pastoralism has grown independently over the world's rangelands from somewhere in the range of 7,000 years prior (Brooks, 2006). In Africa it has developed over a significant lot of time as a judicious reaction to the delicate biological community is still generally honed today and remains a predominant component in dry territories of rustic parts of the mainland. It was an effective subsistence system and framed an animals economy, serving inaccessible markets whereupon numerous non-peaceful individuals depended (Ahmed et al., 2002). Be that as it may, this is not true anymore today because of diminishing group profitability, loss of domesticated animals capital through higher death rates, low calving rates, decreased drain creation and weight reduction in creatures hence lessened market esteem. Coppock (1994), showed that the 1983-84 dry spell in Borena, Ethiopia prompted 60% decrease of cows thickness inferable from 42% lost to domesticated animals mortality, 14% lost to constrained deal and 4% lost to butcher and a high decay of drain creation of around 92% (Ahmed et al.,2002).

Additionally many of peaceful environments around the world are experiencing tension either from peaceful restricting components, for example, dry seasons, atmosphere fluctuation, the need to create more animals or clear a path for more concentrated rural frameworks or new uses (Blench, 2000). A few rangelands that used to be overseen under public land residency are being privatized, with foundation of individual property; others are under state control (Galaty, 1994). This is occurring first in rangelands that get more

precipitation, are nearer to urban focuses, and additionally contain critical key assets that are basic for effective harvest development (Galaty, 1994). Following these transformational changes, individuals are ruined and compelled to squeeze out a living on a decreasing asset base, and are at a danger of being disjoined through and through from their properties (Mkutu, 2001).

For instance, Kajiado County has encountered fast and broad land utilize and arrive cover change in the course of recent years because of an assortment of financial, social, political, institutional, and statistic forms (Campbell et al.,2000). In Kajiado, land under communal tenure is now privately owned; government controlled in conservation parks or under agro-farming practiced in arable parts of the County. These have led to a situation where pastoralists are either being pushed onto more marginal lands for grazing or they begin to take up crop agriculture themselves, becoming agro-pastoralists (Campbell et al. 2003).

The group ranches in the county previously under communal tenure-ship have been rapidly changing to individual tenure-ship after collapse of these groups. However, group ranches or communal tenure had their disadvantages in that; promoted overgrazing, overstocking and environmental degradation, corresponding to Hardin's (1968) model of the 'Tragedy of the Commons.' Group ranches in Kajiado started to collapse in early 1970s and from mid-1980s, group ranch sub-division began and farm individuals were issued with title deeds to singular plots. A large number of the individuals have additionally divided their plots and sold off segments, much of the time to non-Maasai. Little et al, (2001) clarifies that land subdivision in arable peaceful territories has the advantages of expanded efficiency, enhanced welfare and decreasing natural dangers. Different advantages incorporate; adjustment of creation, markets and social administrations, certification of the sole returns of individual endeavors towards their own piece. Thusly, this protracts the arranging skylines

and expands interest in the land. Nonetheless, arrive subdivision in African ASAL peaceful terrains is making little non-suitable holding among people groups whose animals creation was based on portability and social correspondence (Little et al, 2001). This is resulting in stock losses, social strife and ecological degradation. It exposes the livestock production through, reduced grazing areas, and herd size, breakdown of social networks, loss of drought refuge areas, reduced resources, conflicts, disruption of established migratory routes of livestock and wildlife as fencing affects mobility. According to Odingo (1978), increase in population pressure on the marginal lands, urbanization and its effects on vegetation cover in terms of fuel supply and increase in stock numbers in the pastoral lands has potential causes of droughts. These changes not only are they contributing to drought occurrence but also increasing the vulnerability of livestock production thereby hurting sustenance of secure household livelihoods.

Many pastoral areas in the region have had limited investment allocation for development as they faced trouble in interfacing with state and its structures when a state seeks after formal exercise of control, through law and compulsion, over a network and state control of social associations (Fratkin, 1997; Noriet al., 2005). Pastoralists have encountered troubles in articulating or speaking to their enthusiasm for national political setting and administration. State specialists have frequently conflicted with the interests and the act of peaceful gatherings. The conflicts are regularly on horticultural and arrive utilize strategies, outskirt game plans, and state control on social association (Nori, et al., 2005). These have affected development of livestock sector the main economic activity of pastoralist.

Many national government, multilateral and bilateral development agencies, religious missions and conservation groups have advocated and promoted perpetual settlement (sedentarization) as advantageous by incorporating and absorbing pastoralists into the

national economy, producing a national character and enhancing the material prosperity of earlier portable populaces (Little et al. 2001; McPeak and Little, 2005). Additionally, sedentarization was means to control, introduce taxes, or to bring education, health and other developments to pastoralists (Fratkin& Roth, 2005).

According to Morgan (1973), for less demanding administration, the British organization separated Kenya into three unmistakable areas: the profoundly created 'White Highlands'- meant for crop production for export, less developed nature lands which were pool of modest work; and the boondocks/peaceful zones that were remote in area, outside the allotted boundaries and seen as territories where dependable wellsprings of key crude materials to supply their home industries couldn't be developed.

The colonial government also had an idea that pastoralists were politically problematic and hard to control henceforth a risk to security (Hendrickson, etal.1998). Pastoralist decentralization was along these lines saw as a superior means in controlling and exhausting them and also improving the security by inhibiting cross-border migrations. This ideology has been adopted and perpetuated by many post-independence governments in many pastoral areas of Africa.

After independence in 1963, the Kenyan government in an attempt to counter the chronic nature of food insecurity and underdevelopment in pastoral areas formulated developmental plans and strategies, recognizing the potential of livestock products for export and consumption (Republic of Kenya, 1992). In order to encourage pastoral production, the policies aimed at sedentary livestock production system (Brown, 1963; Dames, 1964). In late 1960s Group ranch scheme (GRS) were launched in Kajiado county with an aim to modernizing the Maasai pastoral production, guarantee Maasai responsibility for in Kenya, support improvement of rangelands, and unravel the apparent debasement of rangelands

(Njoka, 1979). The GRS were to change over public land residency with adaptable access to assets, to bunch residency with settled and lawfully perceived limits (Swift and Lane, 1988; Sperling and Galaty, 1990). This change was relied upon to urge the Maasai to restrain their domesticated animals numbers to coordinate the gathering farm assets; anyway it fizzled (Pasha, 1986; Graham, 1989; Munei, 1991). The Maasai couldn't decrease the quantity of domesticated animals they possessed nor restricted their animals inside the farm limits, yet to a vast degree kept misusing bunch farm arrive along customary lines (Campbell, 1984; Grandin, 1986; Rutten, 1992).

It's important to note pastoral-sedentary relations are regularly ones of contention, especially in light of the fact that the points and destinations of peaceful gatherings are at change with neighboring area clients. In addition, the historical backdrop of peaceful stationary connection is one of embodiment of peaceful networks as opposed to consolidation (Fratkin, 1997). The states regularly support arrive residency courses of action supporting ranchers, settled horticulture and serious land utilize, for example, urban. Such state arrangement predispositions and inability to regard peaceful residency rights serve to diminish herders' portability and access to fundamental peaceful assets (Noriet al., 2005). According to Salzman (1980), wherever the decentralization process is pressed upon from outside, the consequences for pastoralists as well as the larger society can be detrimental. In Kajiado, the government measures such as Special Rural Development Project, GRS, Kenya Livestock Development Project, failed because they tried to change the pastoralists themselves, rather than the circumstances that surrounded their existence (Republic of Kenya, 1992). In 1980s sub-division of group ranches began in Kajiado in 1983, after the government enacted a policy in its favor (Grandin, 1986). Additionally, post-independence Kenyan government polices concentrated on the development of higher potential agricultural areas to the detriment of pastoral areas, thus aggravating agro-farming situation. This resulted

to high population growth and land shortage in high potential agricultural areas thereby encouraging migration of cultivators' communities onto marginal lands such as Kajiado, depriving the pastoralist's access to their dry season areas, and making them more vulnerable to drought.

International benefactors, for example, World Bank and USAID empowered privatization of previously shared range lands with resulting foundation of individual farms (World Bank, 1984; Galaty 1994). Numerous NGOs engaged with starvation help work, frequently urged poor pastoralists to settle for all time at starvation alleviation focuses, so as to ease help sustenance convey and social administrations, yet in addition to isolate peaceful populaces from their itinerant way of life, which was viewed as crude and silly (Fratkin 1997, Hogg 1982 and 1986). This ideology could have been taken up from the colonist who had mistrust on pastoralists' lifestyle and a notion that pastoralists were politically unreliable, difficult to control, primitive, violent, and hostile towards change, and therefore a threat to security (Hendrickson, et al., 1998). However, Markasis (1993) argued to the contrary that, the use of negative terms such as "warlike" and "violent" was a way of creating an enemy image and use it in their attempt to control them. These ideologies have contributed to pressure to settle and governments allocating few resources as pastoralist aren't seen as royal. As outlined elsewhere in this work sedentarization have its own disadvantages.

3.5 Droughts Adaptation Responses and Coping Strategies among Pastoral Households

Drought leads to loss of natural resources mainly pastures and water, environmental degradation and eventually affecting food security (Van Crowder et al., 1998). In pastoralism multiple outcomes results such as; herd size reduction, declined livestock market value, conflicts that may reduce social capital within a community; encroachment of land by settled farmers depriving pastoral people of key resources (Ouma, 2011). However, pastoral

communities are known to respond to both external and internal shocks through a number of ways, thus able to adapt to the harsh environment, offsetting risks or coping with impacts of hazards (drought), disasters (famines) and external intrusions (Abdel Ghaffar and Abdel, 1996; Rass, 2006).

Various studies have distinguished an arrangement of versatile and adapting procedures sought after by peaceful family units and networks (Scoones, 1996; Assefa, 1996; Dereveux, 2006; Rass, 2006). These techniques can be sorted into (i) versatile procedures/reactions, (ii) ways of dealing with stress and (iii) dry season recuperation systems. They incorporate; consistent and sharp group developments, precipitation following, species enhancement and evolving synthesis, crowd part and conveyance, domesticated animals collection, dispersal of assets and help from relatives; rummage supplementation, sustenance stockpiling, wage age from non-peaceful exercises, decrease of nourishment admission and change of organization of eating routine, etc.

Although these strategies have been and are instrumental to survival of pastoralism, their capacity and ability have been incapacitated by intrinsic and extrinsic factors in livestock production thereby increasing pastoralism vulnerability towards hazards and risks such as droughts thus severely affecting livelihood sustainability.

3.5.1 Pastoralists' Adaptive Strategies

3.5.1.1 Pastoral Mobility and opportunistic tracking

Pastoral portability empower pastoralists react to regular and yearly changes in fields and water accessibility and pastoralists can abstain from overgrazing additionally avoid sickness, strife or dry season conditions (Hesse and MacGregor, 2006). Peaceful versatility includes following precipitation by moving crowds, development between various agro-environmental

zones and to key asset regions (Scoones, 1996). Portability enables herders to track grub crosswise over scenes and make utilization of inconsistent grass generation caused by uneven precipitation or varieties in scene (Scoones, 1996; Bayer and Waters-Bayer, 1996). In ASAL territories variety in soil compose and geology frequently result in exceptionally sketchy field generation, containing key locales for peaceful creation, for example, dry season and dry spell holds, swamps, water focuses, lakes, salt licks, and oat development (Rass, 2006). Along these lines, proficient following requires development over various scales relying upon the transient and spatial example of essential creation inconstancy (Scoones, 1996).

Be that as it may, numerous pastoralists, Maasai included are currently confronting different imperatives while seeking after their following systems. These incorporate among others, authoritative game plans (fringes and limits); arrive utilize changes (transformation of peaceful terrains into non-peaceful utilizations); absence of residency security; strife with agriculturalists over key asset territories; domesticated animals illness dangers; invasion of regions; denudation of travel zones by going before groups; delayed dry season and long separation development etc. (Scoones, 1996; Ahmed *et al.*, 2002). Also, difficulties leading herds through agricultural areas before harvesting and mobility costs imposed on herders (such as movement permits, veterinary regulation) regulate and restrict their movement (Scoones, 1996). Pastoralists often are forced to move to areas infested with diseases and parasites such as tsetse fly, or where grasses are unfamiliar to animals (Ahmed *et al.*, 2002). Consequently, tracking resources through movement has become increasingly difficult for many pastoral groups in East Africa.

3.5.1.2 Diversification of Species

Pastoralists deliberately differentiate the species, and breeds inside species in their groups considering that species and breeds are influenced distinctively by most creature

infections and adjust to various conditions. Distinctive creatures have diverse specialty specializations and diverse species are reared for their strength to dry season and illnesses (Bayer and Waters-Bayer, 1996; Rass, 2006). Assorted variety is critical to peaceful survival in profoundly factor conditions like the Africa dry-lands where dangers are high and different. In this area pastoralists keep an assorted blend of domesticated animals to coordinate groups with various parts of vegetation and to lessen dangers (dry season impacts, illnesses, touching shortage). Feasible crowd can be kept up in a given region, if the group incorporates a few animal categories which eat diverse segments of the vegetation (Bayer and Waters-Bayer, 1996). A blended group (steers, camels, sheep and goats) can make full utilization of a 'bigger range of the vegetation' and 'distinctive specialties in nature'. Along these lines, dealing with an assortment of animal varieties helps take ideal favorable position of the 'heterogeneous idea of biological systems' (Bayer and Waters-Bayer, 1996; Ahmed et al., 2002). Keeping a few animal types additionally allows quicker restocking after dry season, as encouraging propensities and physiology of camels and goats enable them to survive dry seasons superior to dairy cattle or sheep and, a while later, little ruminants recoup in number more rapidly than steers and camel (Bayer and Waters-Bayer, 1996).

However the increased droughts, population demand have made pastoralists to breed weaker breeds that are highly vulnerable to diseases. Increased human population have also led to huge demand for animal products and pastoralists are breeding towards early maturing and increased production instead of resistant to diseases.

3.5.1.3 Herd splitting and distribution

In order to decrease the impacts and dangers of limited dry season, creature assaulting and ailment, pastoralists separated group and disseminated their stock through advances and trades with different herders (Hesse and MacGregor, 2006). Creatures were kept in a few

distinct territories therefore decreased impacts of confined dry spells and illness flare-up. Likewise herders partitioned their domesticated animals into little crowds touched independently in classes, (for example, draining creature, dry creature and youthful creature). This system empowered herders to make and strengthen social ties between family units in this way keeping up informal organizations for future hazard administration (Ahmed et al., 2002). Besides, crowd part empowers pastoralists to upgrade animals efficiency in connection to work, rummage and water. For example, work could be utilized all the more effectively by isolating group. Kids and ladies every now and again tend little stocks and nursing creatures. Lactating creatures are kept close property, typically crowded by men and drained by ladies (Bayer and Waters-Bayer, 1996). Dry creatures are regularly grouped by young fellows far from estate. In this manner, herders upgrade proficient utilization of work and brushing (Bayer and Waters-Bayer, 1996).

3.5.1.4 Livestock accumulation and changing herd/species composition

Pastoralists are always presented to danger of losing domesticated animals; thus amid great years they amass animals numbers past their subsistence requests intending to in any case have conceptive females for revamping their crowds after an emergency (Rass, 2006; Hesse and MacGregor, 2006). Sandford (1983), referred to in (Bayer and Waters-Bayer, 1996) contended that the pastoralist endeavors to augment crowd estimate in a profoundly factor condition is a sound move. Group proprietors try to amplify their crowd estimate amid great periods, with the goal that creature misfortunes amid dry spell don't lessen the group measure beneath a suitable size. They endeavor to "ensure themselves against the most noticeably awful assaults of dry seasons and scourges by extending their domesticated animals hanging on the rule that amount gives the best barrier against substantial misfortunes" (Bayer and Waters-Bayer, 1996).

In peaceful frameworks riches in domesticated animals gives a cradle against emergency. Families with high number of domesticated animals can ingest high dry season related animals mortality, and get adequate drain to address family issues amid dry period (Coppock, 1994). In this way, pastoralists are spurred to keep up expansive groups with a specific end goal to survive the danger of dry period and effects of dry spell (Hesse and MacGregor, 2006).

3.5.1.5 Dispersal of resources and assistance from relatives

According to Sommer (1998) these techniques incorporate group and family part, brief relocation, exchange of creatures inside informal organizations, (for example, on premise of connection, stock partners) on which people have genuine cases, asset sharing, (for example, dissemination of draining creatures). Pastoralists embrace different asset (group, work, scrounge, excrement) utilize courses of action among themselves or with their neighboring agriculturists. Pastoralists likewise scatter creatures in crowds of associated family units (Rass, 2006). Creatures are traded between peaceful family units to lessen the danger of misfortunes, or advanced to other peaceful gathering individuals who endure mishap (Bayer and Waters-Bayer, 1996). The production of such stock partnership and support likewise makes social bonds; scatters the danger of creature misfortune amid dry spell; and declines the outstanding burden of family units (Rass, 2006). Tending expansive load of creatures requires much work, and in this way rich families either give creatures on credit to poor families, or utilize poor herders (Rass, 2006). Youthful herders from peaceful families may likewise move and work for ranchers, dealers and more extravagant pastoralists for a few years with a specific end goal to revamp their own particular crowds. Pastoralists, with couple of creatures, or who lost their stock, may likewise go into crowding contracts whereby, contingent upon their understanding, they get draining rights and a portion of the

posterity of 'agreement creatures'. This has been polished for example by Wodaabe herders, in Niger (Bayer and Waters-Bayer, 1996).

Scrounge and excrement utilize courses of action are made among herders and ranchers relying upon their relations. Courses of action for scavenge use among herders and ranchers run from open access to stubble fields, to the offer of munching rights or harvest deposits to specific herder (Bayer and Waters-Bayer, 1996). As per Bayer and Waters-Bayer, "game plan among herders and agriculturists for stubble touching is regular all through West Africa". What's more, in "focal Nigeria, where stock thickness is low, couple of formal courses of action for the utilization of yield buildups are made, and in the more thickly settled zone in Northern Nigeria, herders gain rights to stubble brushing by paying trade or out kind or by helping agriculturists with gather" (Bayer and Waters-Bayer, 1996). A similar source expresses that comparative patterns are seen in eastern Sudan, and herders purchase rights to utilize trim deposits.

3.5.1.6 Forage supplementation

This incorporates feed making, trimming of trees (leaves, organic products, branches), supply of business rummage supplements, and so on. (Scoones 1996; Sommer 1998). Numerous investigations demonstrated that coppiced trees and bushes in dry land regions are basic to the nourishment of animals in the midst of dry season. Tree units specifically might be vital protein supplement for upkeep of creatures amid times of pressure (Bayer and Waters-Bayer, 1996).

A few scholars expressed that "feed making isn't generally detailed from sub-Saharan Africa; and "harvest deposits might be put away and sold especially close towns" (Bayer and Waters-Bayer 1996). In Ethiopia, the Borana ladies generally gather grass in dry season for calf sustaining. Subsequently feed making amid wet season was empowered among the

Borana. In spite of the fact that the sums gathered were little, (for example, up to 300 kg for each family), it encouraged calf bolstering in the accompanying dry season (Coppock, 1991). In Burkina Faso, the Fulani men make feed in years with great or normal precipitation. However, they can gather practically no feed in dry spell years (Bayer and Waters-Bayer 1996).

3.5.2 Pastoralists' Coping Strategies to Food Crisis

3.5.2.1 Generation of food stores

Pastoralists always attempted to store some foods in anticipation of food shortfalls thus filling food gaps and avoiding distress sales. These involved storage of; cereal storage, margarine, meat and fat; gathering and putting away wild sustenances and so forth. (Sommer, 1998). In Ethiopia, the Afar pastoralists frequently arranged and saved different nourishments from meat and grains for dry season periods or potentially for long adventures. Wild nourishments are accounted for to highlight as starvation sustenances in all parts of Africa (Blaikie et al., 2004). Dry seasons seriously influence social affair of wild sustenances, since many bramble items, (for example, berries, roots) may experience the ill effects of the effects of intermittent and delayed dry spells, and restricting their accessibility.

3.5.2.2 Reduction of food intake and changing composition of diet

Pastoralists often adjust their consumption patterns at the point when nourishment deficiencies are foreseen. This included; diminishing the quantity of suppers and measure of sustenance, depending on less favored nourishments. In peaceful territories, the quick effect of dry season is decay of drain supply which is the most imperative wellspring of calories. Pastoralists tend to take a bigger number of grains than drain, and diminish their sustenance consumption. For example, the Borana pastoralists of Ethiopia had a traditional illustrative

situation amid the 1983-86 hunger periods. They reacted through family unit abstain from food alterations, by means of: (i) offering need to youthful youngsters to get drain; (ii) moving eating regimen piece for other age gatherings to incorporate more grains, meat and blood to oblige the necessities of kids and; (iii) lessening the size and recurrence of suppers to grown-ups and more established adolescents (Coppock 1994).

3.5.2.3 Sale of non-livestock assets

Whenever there is potential sustenance lack or starvation, family units or networks endeavored to assemble resources or assets that are available to them keeping in mind the end goal to adapt to nourishment emergency. For example, offer of effectively transfer non-animals resources, (for example, gems and other non-gainful things) happens keeping in mind the end goal to help connect an impermanent deficit in subsistence supplies. For this situation, the well-off pastoralists are typically in a superior position since they have certain advantages that might be sold for purchasing grain, therefore putting off the minute at which they will be compelled to offer gainful resources, for example, animals (Ahmed et al., 2002). Be that as it may, confirmations from Darfur and Ethiopia demonstrate that even needy individuals additionally endeavor to safeguard future jobs by decreasing current utilization all together not to offer beneficial resources (Turton, 1977; de Waal, 1989).

In spite of the fact that Davies (1996) contended that poor people or defenseless individuals can survive any employments emergency by their own assets. Actually lack of healthy sustenance and youngster death rates in numerous spots are inadmissibly high even at 'ordinary' times (Devereux, 2006).

3.5.2.4 Mobilizing social support networks

These involved a network composed of individuals from family unit, or more distant families or connection bunches helping each other amid troublesome occasions. Family unit connects to bigger social groupings are fundamental for survival in peaceful networks. Inside gatherings these connections offer help arranges that help family units in the midst of emergency (Perrier, 1996). Moreover, town level affiliations are likewise enter segments in conquering starvation in a number of African countries. Support is also delivered from government and international relief agencies (Walker, 1995).

According to Blaikie *et al.*, (2004), in pastoral areas such systems and good commitments are in decay. The 'ethical economy, (for example, 'noneconomic relations among supporters and customers or among rich and poor, which is called 'a subsistence ethic' in view of the standards of correspondence) may offer a base subsistence and minor security in the midst of hardship. Furthermore, such commitments are being disintegrated, for instance and in Kenya during 1971-1976 and in South Asia (Blaikie *et al.*, 2004).

To survive the harsh challenging times pastoralist may engage in activities considered demeaning or disgraceful to the community thus severing social network. For instance, in India a few gatherings of individuals (position) took up disparaging exercises (prompted regard misfortune), demoralized by participation of a social gathering or standing or sexual orientation (consequently underneath their poise) to anchor least nourishment supply (Blaikie *et al.*, 2004).

As indicated by Doss, (2001) ponder on peaceful family units in northern Kenya and southern Ethiopia, exchanges of cash, sustenance and domesticated animals among pastoralists as a component of a social wellbeing net framework was extremely restricted amid the dry season year of 2000. The examination reasoned that there was less of social

security organize than anticipated in light of the ethnographic writing (Doss, 2001). This demonstrates the nearby level casual security nets are less ready to support against stresses or stuns, consequently pastoralist whose creatures pass on or loses their wellsprings of work are probably going to drop out of pastoralism. This has impeding outcomes for dropouts since they are normally poorly prepared to prevail in more urban settings (Doss, 2001).

3.5.2.5 Income generation from non-pastoral activities

Animals keeping faces numerous dangers (dry spell, pestilences, assaulting) that undermine sustenance security. To defeat dangers and monetary stuns pastoralists utilize elective wellsprings of salary, for example, charcoal making, handcrafts, chasing, angling, unimportant exchange, working in urban regions, and relocation to neighboring nations for work (Scoones 1996; Ali 1996; Sommer1998; Fasilet al., 2001). These and different wellsprings of pay have been of shifting significance to various families or peaceful gatherings in giving extra pay in typical occasions and a fallback wellspring of subsistence amid times of emergency. In any case, a portion of these exercises sought after as pay source, (for example, charcoal making) may undermine the premise of employment over the long haul (Blaikie et al., 2004). An a valid example is deforestation come about because of cutting trees for charcoal-production.

3.6 Drought Recovery Strategies

After a dry spell or an emergency period, pastoralists endeavor to revamp their groups. Herders who lost their rearing stock amid emergency prepared their informal organizations, for example, relatives or companions whom they had loan their creatures previously dry season to gain basic stock, (for example, female ones) to remake their crowds (Blench and Marriage, 1999). Requesting backing or creature credit from family gatherings or security relations is another methodology for restocking. Anyway with the waning and debilitating

interpersonal organization, pastoralists leaving, decreasing touching grounds these adapting procedures are extremely debilitated and restricted.

Cows assaulting was one strategy for restocking after a dry spell among East African peaceful networks (Hendrickson et al., 1998; Blench and Marriage, 1999). Customarily, steers striking have been a complex method for reallocating peaceful assets among rich and poor herders, and have been a similarly regular element of both intra-inborn and between innate relations (Hendrickson et al., 1998). Hendrickson et al. (1998) noticed that inside the setting of an indigenous origination of domesticated animals as aggregate property, assaulting serves to remake crowds after domesticated animals have been executed by dry season or seized in strikes. It is represented by complex principles and firmly attached to climatic conditions and to the predominant condition of 'inborn peace' (Hendrickson et al., 1998). Notwithstanding, this training has brought about numerous ills like expansion of little arms, uncertainty, demise of pastoralist and security specialists. The legislature has consistently shortened it and in some peaceful networks spare a couple in northern Kenya it's not any more practical, for example among Maasai pastoralists' steers attacking is not any more suitable.

Expansion of salaries or commitment in transitory paid work is a backhanded method for restocking (Blench and Marriage, 1999). Wellsprings of family salary, for example, wage work and insignificant ware creation or craftsman are additionally taped to win a pay for the restoring of reproducing crowds. Especially those peaceful family units, who can't be restored in the peaceful part, relocate to different spots searching for business. They may go to work for other group proprietors; or search for work outside the peaceful economy, (for example, in water system plans, ranches and towns). In Ethiopia, Afar and Borana peaceful gatherings enhance their wage by making business open doors for the adolescent in non-peaceful

exercises or by sending some portion of the family (young fellows) in close-by towns or to other outside nations (Assefa, 1996; Fasilet al., 2001). While the Afar more often than not send their young fellows to Saudi Arabia, Djibouti and Yemen (Assefa, 1996); the Borana youth relocate for work to Kenya (Fasilet al., 2001).

Pastoralists additionally endeavor to recuperate from dry spell by running little scale organizations and exchange. These may incorporate, among others, cross-outskirt exchanges, salt generation and exchange, exchanging handcrafts and creatures, 'stash exchange', and so forth. A few examinations demonstrate that exchange, especially "informal cross-outskirt exchanges", are regular in the Horn of Africa. For example "informal cross-fringe exchange Eastern and Southern Ethiopia includes various individuals from the significant peaceful gatherings including the Afar, the Borana and the Somalis (Assefa, 1996). A few specialists expressed that because of the way that the peaceful regions can't give work openings in different parts, the informal cross-outskirt exchange the Horn of Africa had all the earmarks of being the main way out from the peaceful division (Ahmed et al., 2002).

Pastoralists are taking up sedentarization or consolidating development with creature raising as post-dry spell recuperation methodology. Among pastoralists sedentarization gathers progress from migrant to a sitting way of life or with minimal physical movement (Miller 2009). As indicated by Kari (2010) it has been polished since Biblical occasions of Abraham in the Middle East to the present days where pastoralist, for example, the Saami individuals of Northern Norway are on change towards a more settled life. Albeit, a few gatherings have even gone all through the itinerant life; from nomadism to sedentism and back, contingent upon imperative subsistent factors (Barfield 1993; Salzman 1980). Of significance, is what gathers roaming pastoralists to settle? As indicated by Kari (2010) the reasons why some pastoralists settle pretty much for all time are numerous and interlinked

and driven by different powers, either in light of 'pushes' far from the peaceful economy or to 'pulls' of urban or agrarian life (Little et al. 2001; McPeak and Little, 2005). Once in a while is there one particular, disengaged motivation to why one family or gathering settle; yet the choice could be followed back to various variables that in whole overweighs the roaming elective. Fratkin and Roth (2005) referred to five main considerations prompting sedentarization; 1) populace development; 2) dry season and starvations; 3) loss of regular property assets; 4) commoditization and urban movement; and 5) political strife, common war and state intercessions. Different creators (Salzman 1980, and Ahmed et al., 2002), contends sedentarization results from either intemperate neediness or inordinate riches among pastoralist. If there should be an occurrence of neediness, (for example, loss of domesticated animals) pastoralists are compelled to settle among agriculturalists and begin development, while in the event of riches, prosperous pastoralists secure land and have it developed by employed hands or wards of different sources (Ahmed et al., 2002).

In Kajiado County for example, in excess of one reason have 'pushed' or 'pulled' Maasai pastoralist to settle. The expanded recurrence of dry spell, loss of brushing zones through development of rural and peaceful populaces, subdivision and privatization of gathering farms, and extension of visitor diversion parks, have prompted agro-pastoralism and sedentarization (Campbell 1999; McCabe et al. 1992). In the more parched and meagerly populated northern zones of Kenya possessed by Turkana, Samburu, Rendille, Gabra, Borana, and Somali pastoralists a considerable lot of them have settled in light of the natural worry of dry season and starvation joined with political savagery of domesticated animals striking and ethnic clash (Fratkin 2001; McCabe 2004; Galaty 2005).

As indicated by Markakis (2004) sedentarization takes different structures; one, stay in the district and turn out to be progressively subject to development while holding an

exhausted group, or two, relocate to neighboring region where arrive is accessible and to take up development or turn into a specialist in business ranches. This is never again conceivable in Kajiado in light of the fact that there is no common or land without proprietors left. Sedentarization by means of development, (for example, agro-pastoralism) is a quickly propelling wonder all through the Horn of Africa, from the Maasai district of Tanzania to the Somali area of Ethiopia (Markakis, 2004). For example, in the past all BeniAmer of Eritrea were pastoralists, however now there are three sorts of BeniAmer - one is a rural wage worker, another is a unimportant shipper, and just the third claims animals (Markakis, 2004). As proposed by Markakis this is the state of future as the versatility of pastoralists turns out to be progressively obliged, their living space continuously corrupted, and their methodologies for adapting to dynamic, mounting emergencies depleted.

Hogg (1986) and Little (1985) noticed that, sedentarization prompts the impoverishment and dejection of pastoralists who settle. This is through diminished domesticated animals versatility, sickness shirking, dry season strength and restricted execution of customary dry spell procedures. Dry season and consistent brushing around the settlement – brings down plant profitability, support spread of unpalatable herbs and bushes along these lines influencing dry land biodiversity presence through living space and species corruption and misfortune, prompting generally loss of financial and organic efficiency (Talle, 1988).

Also, sedentarization has other negative social and wellbeing outcomes, for example, poor sustenance, insufficient lodging, absence of clean drinking water, and higher rates of certain irresistible ailments (Hill, 1985; Galvin et al 1994). Decidedly, sedentarization empowers settled populaces to have better access to formal training, human services and expanding and extending financial asset base, in this manner enabling pastoralists to ease occasional change of sustenance accessibility and make due amid times of extreme dry season (Little et al. 2001; McPeak and Little, 2005). There are different advantages acknowledged, for example, expanded showcasing, for

example, ladies offering milk and rural items, along these lines evolving employments (Fratkinand Smith, 1995; Smith, 1999).

3.7 Theoretical Framework

3.7.1 Vulnerability Theory

The investigation utilized helplessness show where three distinct perspectives and procedures could disclose defenselessness in connection to the examination. In connection to regular reason, for example, mechanical, logical arrangements, there exist faults on nature and normal perils as the reason for individuals' weakness, which changes as indicated by the force, greatness and term of outer stuns. Defenselessness results from perils (counting power) and hazard (introduction to occasions, estimated as far as vicinity). Keeping in mind the end goal to diminish powerlessness, there ought to be frameworks for foreseeing perils and advances to empower human structures to withstand negative effects, for example, climate guaging, remote detecting for dry spell and early cautioning frameworks. This view applies to creating nations ASAL region where dry spells are normal, for example, in Kajiado County.

Be that as it may, nature, for example, whimsical precipitation isn't exclusively to fault for the pastoralist's powerlessness to dry season. Keeping in mind the end goal to help decrease the pastoralist's defenselessness, system or procedures that have been set up ought to always be assessed and in addition their viability, for example, the capacity and adequacy of meteorology division in foreseeing dry spell in time.

Concerning, for example, monetary and money related arrangements in the cutting edge days, individuals keep on suffering. This is on account of expectation and alleviation advancements are so expensive particularly so to creating nations like Kenya. Additional time, financial specialists have created are as yet enhancing strategies to gauge the misfortunes from catastrophes, for example, compute whether, when, how, and where

lessening defenselessness is more suitable. In like manner, weakness could be diminished if national government adjust wellbeing nets, protection disaster reserves and give money related help to develop people groups resources (World Bank, 2001). These measures would require immense venture in this way creating nations aren't ready to actualize, for example, Livestock protection among the Kenyan pastoralist has not been executed as it's considered excessively costly. Moreover, more frequently individuals living in dangerous situations particularly in creating nations are left to rely upon their own celestial alleviations with regards to managing perils, for example, in Kajiado the legislature is just giving responsive estimates just when dry spells have happened.

Societal structures as cause, for example, political arrangements, there is a view sees that fiascos have differential effect on individuals living in risk inclined zones. It's not just the introduction to perils that puts individuals in danger, yet in addition the social-financial and political procedures in the general public that create powerlessness. This makes conditions that antagonistically influence the capacity of networks or nations to react, to adapt to or recuperate from harming impacts of catastrophe occasions. These conditions for the most part go before fiasco occasion adding to its seriousness and may keep on existing even a short time later (Anderson, 1989; Blaikie et al, 1994).According to Cuny (1983), diminishing the helplessness of the poor is an advancement question and such an inquiry must be addressed politically. With respect to these observations, a more secure condition must be accomplished if catastrophe reaction of any nation changes the procedures that put its kin in danger. Accordingly, the long haul arrangement lies in changing the social and political structures that breed neediness and the social elements and mentality that serve to sustain it (Heijmans and Victoria, 2001).

Notwithstanding, these perspectives aren't restrictive of each other, and most catastrophe reaction offices in their examination of and activity on calamities tend to join them. They see "helplessness" to result from both outside elements and absence of money related limit. As indicated by these offices, needy individuals are tormented by basic patterns, stuns and regular issues which lie a long ways outside their ability to control. Subsequently, the help offices in endeavor to help these individuals they centers around either alleviation help in approach to give defenseless populace time to move out and adapt, or giving money related help intended to develop individuals' advantages – including protection (Annan and Bender, 1999).

The powerlessness setting hypothesis was pertinent to the examination in that: Maasai pastoralists are defenseless against dry spells not just as a result of their topographical area they involve yet in addition social, financial and political polices in the nation. Kenyan economy, a creating nation doesn't permit appropriation of the latest and progressed logical innovations on catastrophe expectation and avoidance. Moreover, ASAL zones have been dismissed and given less consideration as far as infrastructural advancement, for example, schools, markets.

Pastoralists are looked with expanded crowd measure decay because of tremendous domesticated animals' misfortunes through dry spells, illnesses, deals, lessened touching regions and expanded weight on condition. There is coming about sustenance deficiency because of animals' misfortune and yield disappointment and additionally expanded nourishment costs in the market. In any case, regardless of whether individuals go hungry under these conditions, relies upon the level of presentation to dry season, the quality of protection procedures and cradle limit in their general vicinity. The adapting systems among

the pastoralists are debilitated and their elective procedures frequently aren't ready to guarantee their sustenance security.

3.7.2 Sustainable Livelihood Approach

The defenselessness of animals generation and its expanded affectability to the dry season impacts, consequences for supportability, versatile estimates taken and also the job results could be seen well through practical employment approach. This is on the grounds that the approach puts a great deal of accentuation on responsibility for access to resources which individuals can use to develop their own courses to and support jobs.

The idea of manageable occupation approach ended up unmistakable in the mid-1980's as a response to the 'fundamental needs' advancement talk of the 1970's, and the 'best down' methodologies that had been predominant inside the improvement talk for quite a while (Ellis, 2000; Scoones, 1998). Faultfinders of the 'best down' approach, for example, Robert Chambers underscored on the requirement for improved spotlight on the on-screen characters of advancement: - the needy individuals themselves, consequently supplanting the 'best down' approach thought with activity from beneath (Chambers, 1983). The approach was created nearby different fields and methodologies in the 1980's. As indicated by Chambers (1987) economical job believing was framed by intertwining thoughts on the earth, improvement, and business, with awesome spotlight on the manageability, efficiency and needy individuals' occupations. The fundamental unit of the idea taken as the beginning stage is the real individuals' occupation procedures. The idea takes a gander at, where individuals are arranged, what they have and additionally what are their needs and interests (Chambers, 1983).

3.8 Conceptual Framework

As pointed out before, with a specific end goal to comprehend the impacts of ecological change on the supportability of family occupation, manageable employment system was embraced, which was a perfect device in understanding jobs, particularly those of powerless individuals, for example, poor pastoralists. The structure gave an exhaustive and complex approach in seeing how individuals bring home the bacon, since it's appropriate to various scales going from singular, family unit, families group, town, locale or even country (Scoones, 1998; Carney, et al, 1999). With a specific end goal to give an unmistakable photo of the factors relationship under the investigation, different segments were interlinked in the structure.

3.8.1) Vulnerability context.

According to this approach people are accepted to work concerning defenselessness. The external condition in which people exist is considered responsible for colossal quantities of the hardships looked by the world's poorest people. The segments that make up vulnerability setting are basic in light of the way that they have a prompt impact upon people's advantages and the work choices that are accessible to them. The standard nature of these components is that they are not frail to control by neighborhood people themselves at any rate in the short and medium term (DFID, 1999).

The powerlessness setting gave the beginning stage to the investigation, where three kinds of helplessness, for example, stuns, patterns and seasonality were distinguished to influence individuals' employments (Carney et al, 1999; Heffernan and Misturelli, 2000). It's the patterns of changes and changeability in these components that influence vocations and specifically depicts basic procedures that can disturb distinctive parts of work forms (Carney et al, 1999). Examples are ordinarily whole deal and generous scale, and consolidate design

in: people, resource, monetary (both national and worldwide), organization, legislative issues and creative. They affect rates of return from the picked jobs strategies. Paralyzes joint tamed creatures prosperity dazes (contamination epidemics), standard dazes, for instance, drought, money related staggers, for instance, brisk change in exhibit expenses and struggle shocks. Staggers either destroy assets particularly; if there ought to be an event of dry season, floods, seismic tremor or result in crumbling of advantages by suggestion as a result of approved arrangements and exchange made with a particular true objective to help usage such as adjusting procedure in the midst of times of calamity (Ellis, 2000). Consistency could be imparted through infrequent moves in precipitation, creation, sustenance availability, expenses and business openings.

Powerlessness setting if there should arise an occurrence of Mashuru pastoralists was portrayed by the intermittent dry seasons, its impacts on pastoralism and sustenance security outcomes. It's likewise found as far as patterns through expanded: populace development, inundation of transients, expanded cultivating exercises, arrive discontinuity, sedentarization, clashes and environmental change and decreased brushing area and loss of dry season shelter territories. The capital resources, for example, domesticated animals the fundamental financial unit were unfavorably influenced in this manner debilitating job of Maasai pastoralist.

b) Assets

In sensible work approach framework assets are key sections. Ellis (2000) elucidated that preferred standpoint status of needy individuals are significant in understanding the choices open to them (the common poor), the methods they grasp for survival and their shortcoming to adversarial examples and events. Assets are either generous or subtle resources that a nuclear family is responsible for through: ownership, control, claim or

increment by various means, and could be used direct or by suggestion to create employments (Ellis, 2000). Along these lines, the more important and more moved the advantage base is, the higher and more strong the level of supportability and security of livelihoods. Ellis (2000) requested assets into; customary, physical, human, fiscal, and social capital.

c) Transforming structures and processes

Changing structures incorporate; open, private segments and common society associations, for example, NGOs, FBOs. They decide how the structures and people work and collaborate through setting and actualizing arrangement and enactment, conveying administrations, exchanging and performing different capacities that influence family's jobs. They incorporate polices, enactment and different principles, for example, standard decides that manage access to resources, markets and social relations in the general public. They can diminish or compound the effect of outer stuns on defenseless individuals, for example, need or inexistence of polices that help nearby endeavors of powerless individuals to upgrade their vocations, in this way prompts expanded destitution.

The vocation results normally impacts on the changing structures and procedures where, negative results in a general public frequently results in expanded unsustainable utilization of regular assets. Consequently, it's imperative to have successful and proficient changing structures and procedures that will bolster individuals' endeavors towards helplessness decrease.

d) Livelihood strategy

The investigation embraced occupation techniques as the autonomous variable. It's confined of balanced assets that exists in a range or mix of activities or choices that people

make remembering the true objective to achieve their work goals (Ellis, 2000). They are made out of orchestrated activities that make family survival inferences, including age, compensation and use practices used by people (Ellis, 2000; Niehof and Price, 2001).

Unmistakable scientists have masterminded business strategies contrastingly, for instance, Ellis (2000) described by the possibility of the advantages used into: Natural and Non-normal resource-based activities, while Scoones (1998) perceived three wide occupation frameworks: Agricultural (increment of existing provincial activities); Diversification (by grasping additional productive activities); and Migration (counting an undertaking to make beneficial activity elsewhere). Regardless, these systems aren't chosen and habitually are joined before long.

e) Livelihood outcomes

Ampleness of the activity systems can be seen through the work results, for instance, sustenance security, sustenance, prosperity, direction, arrange intrigue and functional condition. The outcomes are basic in light of the way that they help to understand the yield of current setup factors inside the livelihoods structure, for instance, what goads people to bear on as they do, what are their needs, and how are they at risk to respond to new shots.

Frankenberger et al, (1999) cleared up that activity results could be used to choose if nuclear family are productive in looking for after their job frameworks. This ought to be conceivable by looking outcome evaluates that catch the need or thriving satisfaction. A viable work to nuclear families incorporates an adequate down to earth access to pay and advantages for address principal issues, for instance, access to sustenance, prosperity workplaces, and informative possibilities, organize support and social compromise (CARE, 2002). In like manner, it's the appealing consequence of each nuclear family to have occupation frameworks that can oblige its people monetarily (de Satge et al., 2002).

Work results whether positive or negative, have a criticism cycle impact onto the benefits. Business techniques decide the family unit's results security estimated, for example, by pay level, nourishment security and defenselessness degree. Other quantifiable employment results incorporate; supported access to sustenance, instruction, wellbeing, interpersonal organization investment, physical security, and ecological assurance. Singular techniques and exercises embraced by the family, for example, charcoal consuming and sand collecting influence the natural asset supportability and the encompassing households that rely upon it (Ellis, 2000). The feasible employment system gave the premise on which the investigation assessed the connection among free and ward variables.

Figure 3.1 beneath plots the reasonable structure demonstrate.

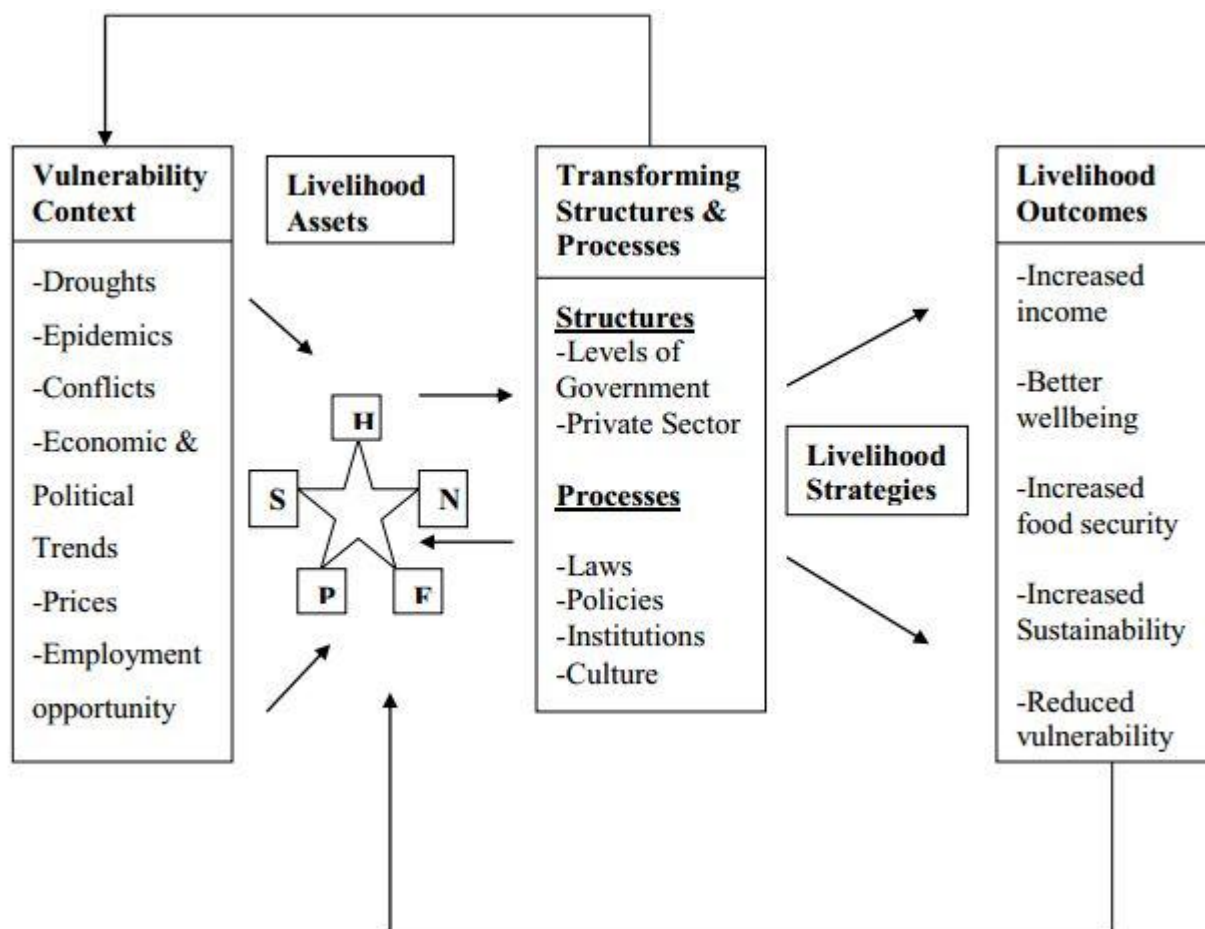


Figure 3.1: Conceptual Framework Model

CHAPTER FOUR: METHODOLOGY

4.1 Introduction

This section subtle elements the strategies connected to execute the examination think about. It has point by point portrayals on the examination configuration, sort and wellsprings of information, information accumulation, preparing and investigation strategies utilized in this investigation.

4.2 Research Design

The investigation utilized a study explore plan where both quantitative and qualitative techniques were utilized in information gathering and examination. Quantitative information was gathered through the planned survey, key witness meets and also perceptions of the investigation territory. Qualitative strategies included audit of past recorded information in light of the investigation targets.

4.3 Target Population

The study targeted Maasai pastoral households, community elders, government officers and NGOs representative. According to KNBS census report 2009, Mashuru had a population of 50,245 persons, 10,676 households and area of 2,903.0 square kilometers with a population density of 17 persons per square kilometer. Table 4.1 below outlines the locations, sub-locations, population, households and population density in Mashuru as follows;

Table 4.1: Mashuru Population Households, Area in Km² and Density by Location and

Area Name	Total Population	Households	Area In Sq. Km	Density
Mashuru	50 245	10676	2903.0	17
Arroi	3213	601	193.6	17
Arroi	1321	237	132.3	10
Lesonkoyo	1892	364	61.3	31
Ilmunkush	8068	1639	359.7	22
Emarti	1577	322	143.6	11
Erankau	6491	1317	216.1	30
Imaroro	5815	1103	298.9	19
Kiloh	3549	626	171.6	21
Mashuuru	2266	477	127.4	18
Kenyewa	4208	1124	309.9	14
Kiboko	2881	786	192.4	15
Masimba	1327	338	117.5	11
Mafarasha	5635	1206	538.1	10
Emotoroki	2039	421	292.3	7
Olmoelianani	3596	785	245.8	14
Merrushi	3335	663	330.0	10
Imbuko	1667	317	231.2	7
Merrushi	1668	346	98.8	17
Nkama	11449	2496	475.8	24
Nkama	2722	476	198.0	14
Sultan Hamud	8727	2020	277.8	31
Osilalei	2955	660	172.3	17
Olkeriai	2955	660	172.3	17
Poka	5567	1184	224.8	25
Emali	4034	911	144.8	28
Lumbilin	1533	273	80.0	19

Source: KNBS Census Report, 2009

The targeted key informants included; Maasai elders, Government officers from Ministries of livestock development, agriculture and provincial administration, as well as officers from non-governmental organization (NGOs).

4.4 Sampling Procedure

4.4.1 Sample Size

According to Devote (2008), a sample is a set of data obtained from the statistical population using specified data collection techniques. In order to determine the sample size, the study will use scientific formula:

$$S = \frac{X^2 NP (1-P)}{d^2(N-1) + X^2 P (1-P)}$$

Where s = the required sample size

X^2 = table value of chi-square for one degree of freedom at the desired confidence level (0.05) which is equal to 3.841(or 1.962)

N = the population size

P = the proportion for the population, assumed to be 0.06 since this would provide the maximum sample size.

Applying the formula, a population N of 10,676

$$S = 3.841 * 10676 * 0.06 (1-0.06) / 0.05^2(10676-1) + (3.841 * 0.06(1-0.06))$$

S=86 respondents

Therefore the sample size will be 86 households in Mashuru area.

4.4.2 Selection of Sample from Population

Ragin (1994) characterized testing as the way toward choosing a delegate set of cases from a considerably bigger set. In this manner, the standard goal of an examining system was to anchor an example, which, subject to impediments of size, would recreate the attributes of

the populace (Mwangi and Mbeche, 2004). The study used purposive and multistage sampling such as multistage stratified random sampling procedures. Multistage sampling was appropriate since research covered large geographical areas and respondents were distances apart.

Multi stage sampling procedure involved stage selection of the study areas and sample. In the first stage, Mashuru area and its two divisions were selected purposively. In the second stage, one location in each of the two divisions of Mashuru was randomly selected. This was important in order to capture extensive information from different respondents and areas. The locations in each division were listed down, numbered and through simple random sampling technique two of them were identified such as Arroi location in Mashuru division and Nkama division in Kenyewa division.

The third stage, involved selection of sub-locations from the two selected locations. The sub-locations within each selected locations were listed down, numbered and using simple random sampling technique, one sub- location was selected from either of the location. The selected sub-location in the Arroi location was Arroi which had a population of 1,321 persons while in Nkama was Nkama which had a population of 2,722 people (KNBS, 2009).

The fourth stage, involved subdividing the selected sub-locations into four sub-units or villages with the help of the animal health assistants, local elders and provincial administrators such as sub-chiefs. This helped in monitoring the areas' trend, movement and faster data collection, since the areas were vast and sparsely populated with a density of 10 persons /sq.km in Arroi and 14 persons/ sq.km in Nkama (KNBS, 2009). The four sub-units were listed down, numbered and through simple random sampling technique two sub-units were selected. These sub-units were assembled as per the nearest borehole or water source in order to increase the chances of meeting pastoralist as they watered their animals.

4.4.3 Unit of Analysis

The unit of analysis was Maasai household, with household heads (man or woman) or their representative (woman or son/ daughter over 20 years) as the respondents.

4.5 Methods of Data Collection

4.5.1 Type and Sources of Data

Primary data was acquired through dissemination of the structured questionnaire with both closed and open questions to the selected Maasai pastoralist households heads in Arroi and Nkama areas of Mashuru, while interview guides were used to interview key informants such as community elders, government officers as well as the field observations and photographs. A pre-test of the designed questionnaires was done during the pre-visit to the area, and afterwards the instruments were fine-tuned based on the pre-visit experience in order to ensure that they not only collected the correct information but also as much of it as possible.

Secondary data was obtained through review of literature and previous research work done, both on published and unpublished data. Published data reviewed included: academic thesis, journals, books, government articles. Unpublished data reviewed included: newspapers, policy statements, articles and research reports. These materials were sourced from various sources such as; UoN Libraries, Kenya Meteorological Department Library, Ministry of Livestock, KNBS, Kenya National Archives and online.

4.5.2 Structured Questionnaires

Household survey through the pre-tested questionnaires was conducted through face to face interview with the household heads or knowledgeable member of the household

whenever the head was absent. Formalities such as greetings, introductions of research team and briefing respondents on the purpose of research and what was required of them preceded the interview process. Interviews for the most part occurred at the respondents' estate, in the grazing field under a tree or at the watering point. The interviews were conducted in Swahili language but Maasai language was used by research assistant to interview those respondents who were not comfortable with national language, or instances where emphasis was required.

The respondents were guided through the questionnaire by one member of the research team. This ensured the closed and open ended questions were responded to with open ended questions providing room for more information and clarification from the respondents. The data gathered was on various variables, such as: household demographics, pastoral production, challenges and opportunities, ownership and control of land, food security as well as environmental conservation. Toward the day's end, a short review was held with assistants to talk about and make clarifications on the day's work as well as reviewing the next day program.

4.5.2.1 Data Quality Assurance

The factualness of the study was ensured through undertaking prudent measures during preparation, commission, analysis and presentation stages. The measures used included; Following due diligence on ethical research principles; where formal endorsement from authorities, educated assent of respondents and secrecy of data was followed. A pre-test study was done in order to fine tune the research instrument, as well as training the recruited research assistants prior to data collection process. Additionally, before the commencement of the interview, respondents were clearly and absolutely disclosed to, that the examination work was altogether implied just for scholastic purposes as it were, with information given was to be held with utmost confidentiality. There was also no promise of any reward from

that point, for example, restocking for cooperation in this way discrediting an intention in conceivably lifted cases

4.5.3 Key Informants Interviews (KII)

Kumar (1987) characterized key sources as people who are probably going to give itemized data, thoughts and bits of knowledge on a specific theme. The fundamental guideline managing the examination was that only one out of every odd pastoralist had similar information on domesticated animals creation, dry seasons and fitting elective systems. The objective of this examination was to see how dry season's impacts have affected Maasai pastoralism, and thus it was important to connect with the most proficient pastoralists and experts in the area. The key informants among pastoralist were purposively chosen based on their age and experience, while officers were chosen based on organization and expert obligations.

There were 4 different categories of key informants selected such as Maasai elders and young people, local leaders as well as key government and non-government organizations officers. KII were conducted using interview schedules through face to face interview, only after a prior visit and notification to key informants where dates and timings of the interview were scheduled. The KII were carried out at venues of optimal comfort and convenience to informants such as the elders were interviewed in their homes, the young men in grazing and watering points while the officers in their offices. The data collected was on aspect such as historical and cultural Maasai perspective on drought, vulnerability, mitigation and alternate measures. The key sources were talked in a relaxed and casual way, to evoke top to bottom information that gave profound comprehension of study subjects. The interviews were led utilizing an agenda of key themes that were prior recognized from the family review. Issues that surfaced from the family unit study were separated into four wide themes livestock

ownership and herd size, natural and human changes occurring, livelihood strategies away from pastoralism and future viability of pastoralism

After each meeting, the data was promptly dissected so as to recognize gaps, logical inconsistencies, and prerequisites for illumination. Thus, new subjects and inquiries were figured for the following cycle of talking with different sources. This approach was utilized to guarantee that the information being accumulated was important, valuable, and as total as could reasonably be expected. All through the exploration, the analyst accepted the part of student, keeping a receptive outlook and suspending judgments amid the elicitation procedure.

4.5.4 Observation Schedule

According to Babbie (2001) perception implies watching and recording wonders as they happen in nature with respect to circumstances and end results or common connection. Keen observation of the area was done during interviews and while moving around with significant phenomena recorded using a hand held camera. In this study, observation formed an important integral part of data collection, because it facilitated gathering information on aspects that weren't expressed as well as confirming what respondents had said. The collected data was on aspects such as livestock species raised, physical status of land and environment, economic and livelihood activities. The photographs helped to understand, compare and document different aspects such as the present status of field, forms of activities, animals etc.

4.6 Data Processing and Analysis

Information association included guaranteeing the whole polls were unblemished and all inquiries were reacted or replied. With a specific end goal to embrace quick, proficient and exact examination, the quantitative information from organized survey was coded and a while later went into a computer software programs such as SPSS.

The descriptive statistical tools such as; pie charts, bar charts and tables were derived from the study work statistic using frequencies and percentages. They were used to generate summarized statistics for the relative variables. The findings obtained were discussed and formed the basis for the research summary, conclusion and recommendations. Chi-square a statistical test was used in hypothesis testing. The Chi square strategy was utilized to test the relationship between the reliant variable and the autonomous factors.

CHAPTER FIVE: RESULTS AND DISCUSSION

5.1 Introduction

This part introduces the results of information examination, translation of these outcomes into findings and in addition their discourse in the light of writing and hands on work encounters. The primary goal of this investigation was to discover how dry seasons were adversely affecting on peaceful family work, among the Maasai pastoralists in Mashuru division. As laid out in Chapter Four, information was gathered through the organization of polls to family unit heads, interviews with key witnesses and in addition perception.

5.2 Characteristics of the Household Survey Sample

5.2.1 Response Rate

After data collation process, there were 70 questionnaires fully filled or a response rate of 81.4% and apt for analysis. This reaction rate was great and delegate and complies with Mugenda and Mugenda (1999) stipulation that a reaction rate of half is sufficient for examination and revealing; a rate of 60% is great and a reaction rate of 70% and over is magnificent.

5.2.2 Demographic Information

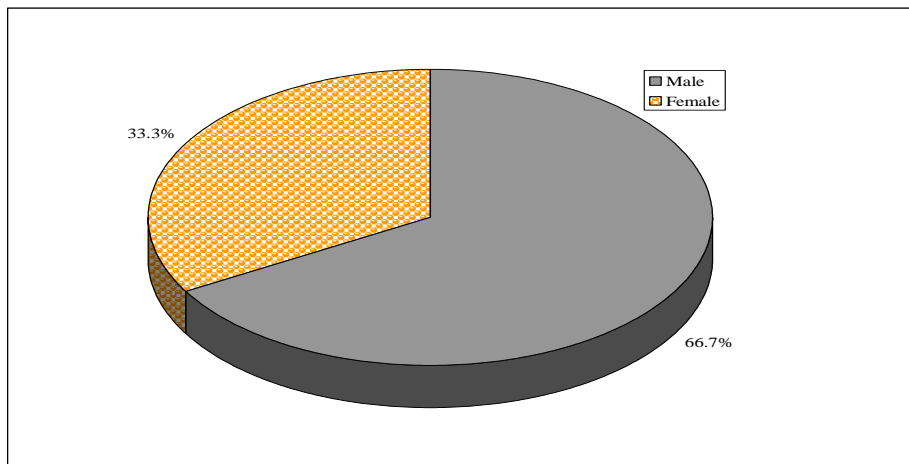
The demographic information of the respondents was important in understanding the respondent's background, experiences and their relevance to the study theme.

5.2.3 Gender of the Respondents

The study found that out majority (66.7%) of the respondents were male while 33.3% were females (Figure 5.1). Generally, in the Maasai culture, men are the household head and

spokesperson on issues regarding their families. This therefore explains the high percentage of male respondents in this study.

Figure 5.1: Gender of the Respondents



Source: Field Work, 2012

The study found out that most women were apprehensive to speak to strangers and whenever approached to participate in the study, they would seek permission or call on their spouses or male relatives. However, despite all these the female participation in the research was able to realize fair gender inclusiveness. This enabled the study not to be male biased, though the interview with women didn't uncover altogether extraordinary reactions from the men as far as understanding the choices made by family units in light of domesticated animals generation; in the end it was the male (and grown-up) see that was basic since its them who rule basic leadership. However, women did outline clearly critical issues about food security status among their families.

5.2.4 Age of the Respondents

The scope of period of respondents shifted enormously with the most youthful being 23 years and the most established 90 years. The examination discovered that 5.7% of the respondents

were in the age section of 21 – 30 years, 12.9% in the age bracket of 31-40yrs, 25.7% were in 41-50yrs age bracket, 21.4% were aged between 51-60yrs, 27.2% were in the age bracket of 61-70yrs while those above 70 years were 7.1% (Table 5.1).

Table 5.1: Age of the Respondents

Age bracket of respondents (Yrs)	Frequency	Percentage (%)
21-30	4	5.7
31-40	9	12.9
41-50	18	25.7
51-60	15	21.4
61-70	19	27.2
Above70yrs	5	7.1
Total	70	100

Source: Field Work, 2012

The respondents who were aged 41 years and above were 81.4% and formed an important segment of respondents because most of the information required stretched over a period of time. The older the respondents were, the better it was for the study, since they are likely to have experienced more than one drought episode in their lifetime. Though 18.6% of the respondents were aged 40 years and below, had not experienced an equal number of drought related hardships like their elderly counterpart, but they were in a better position to provide vital information on the changes taking place and the new avenues the younger generations were adopting or are likely to adopt apart from livestock production.

5.2.5 Education Level of the Respondents

The study found out that, majority (72.9%) of the respondents didn't have education beyond primary level, with 33.3% of respondents having not to have been to school, 39.6% had only been able to acquire basic education such as primary level. Those with post primary education were 27.1% of all respondents with 14.6% secondary, 8.3% tertiary, 4.2% university (Table 5.2)

Table 5.2: Education Levels of the Respondents

Educational levels	Frequency	Percentage (%)
None	23	32.9
Primary	28	40
Secondary	10	14.3
Tertiary	6	8.6
University	3	4.3
Total	70	100

Source: Field Work, 2012

The low level of education in Mashuru especially among the old generation could be attributed to the fact that, there was little level of infrastructural investments in support of education such as very few intermediate schools, and those schools that existed were too far away for children to walk on foot hence very low previous school enrollment rate (Kantai B.K, Ole 1995 and Sankan S.S, ole 1995). In past days, there was also cultural prejudice and resentment on education among Maasai's. In this regard, those who did succeed had either to split from their traditional Maasai lifestyle and went to live in cities, or they returned to their traditional way of life in their villages without utilizing their education. The result of this was that children who were sent to school were considered "lost", and Maasai became reluctant to send more, because they weren't available to herd animals. The cultural practice of marrying girls early also limited the education opportunities among the women. However, this has continuously changed since post-independence Kenya where development in the Maasai land has increased with more schools, hospitals and roads being built, but more is still to be done. There is also realization among Maasai's that they can't solely depend on pastoralism lifestyle. They are now working towards having an effective presence in the Kenyan economy (Kantai B.K, Ole 1995 and Sankan S.S, ole 1995).

In addition, more of the younger generations are pursuing education to higher levels; for instance 2 of the respondent were university students and 3 others were in tertiary college on

vacation. According to them, acquisition of education will provide them with an opportunity to make sound decisions, expand their occupational and investment opportunities. In contrast lack of adequate education often results in lack of permanent and pensionable jobs, as well as limiting the ability to make economically viable decision such as; when to sell animals during the drought. Low education level drives people to engage mainly in manual jobs in informal sectors forcing them to undertake environmentally abrasive or destructive activities in order to survive. Additionally, the rising education uptake and levels could be attributed to the increased rate of sedentarization among Maasai people. However, as more young people are educated, pastoral productions will likely suffer negatively following the outward migration, reduced human capital and uptake of investment opportunities away from it.

5.2.6 Marital Status of the Respondents

The study found out that the majority (66.1%) of the respondents were in polygamous marriages, 17.1% in monogamous marriages, the widowed were 11.4% and the singles being 4.3% (Table 5.3). The study didn't find neither divorced nor separated couples among the respondents. According to the elderly men they attributed this scenario to the strong Maasai traditional cultural ties and arbitration as huge bond on marriages.

Table 5.3: Marital Status of the Respondents

Marital Status	Frequency	Percentage (%)
Single	3	4.3
Monogamous	47	67.1
Polygamous	12	17.2
Divorced	0	0.0
Widowed	8	11.4
Separated	0	0.0
Total	70	100

Source: Field Work, 2012

Traditionally the polygamous marriage unit among the Maasai community was regarded with high esteem because a large family unit was a sign and source of wealth. The wives would provide children, and daughters would lead to more cattle as would bring bride-wealth to their relatives when they were married off to other families. The sons or Morans would provide labour and security which is an important human capital asset for livestock production.

5.3 Factors that Determine Vulnerability of Livestock Production to Drought

The study identified both extrinsic and intrinsic factors in Mashuru that were contributing to the weakening and vulnerability of pastoralism. These factors were driven by push and pull forces such as population growth, urbanization, education level, occupation and also the natural ones such as climate variability, drought.

5.3.1 Occupation Activities of the Respondents

The study found out that some of respondents (45.7%) were engaged with livestock production as their main occupation activity (Table 5.4). Hence livestock production was the economic backbone of the area.

Table 5.4: Main Occupation of Respondents

Occupation	Frequency	Percentage (%)
Livestock Production	32	45.7
Agro-Farming	10	14.3
Business	13	18.6
Formal Employment	7	10
Informal Employment	3	4.3
Student	5	7.1
Total	70	100

Source: Field Work, 2012

The study found out that 14.3% of the respondents were involved with agro-farming activities growing crops such as bananas, maize, beans, green grams, onions, fruits and vegetables. There were 18.6% of the respondents engaged in different business ventures where women were engaged with; selling of milk, charcoal, ornaments, traditional clothes (shukas) and farm produce while men ventured into money generating activities such as middlemen in sale of livestock, operating business such as shops, butcheries, selling of traditional medicine, burning and selling of charcoal, sand harvesting and motorcycle transport commonly called *bodaboda*. The 10% of the respondents in formal employment were teachers, animal health assistants, health workers and local leaders such as chief. The 4.3% of respondents were engaged in informal occupation activities such as herders, security guards and casual laborers both within and outside the area. The 7.1% of the respondents were students in university and tertiary college.

The Maasai pastoralists have continuously remained heavily reliant on rain fed agricultural activities such as livestock production. This has made them to remain highly vulnerable towards drought and rain deviations usually incurring huge losses.

Additionally, whenever most of these occupational activities such as livestock production, agro-farming, mining continue unabated especially where there is utilization of communal resources, overexploitation and misuse results such as “tragedy of common” (Hardin’s 1968) leading to environmental degradation. There was degradation such as vegetation loss, soil erosion on communal areas especially watering point such as boreholes. On these degraded areas, as seen in plate 5.1a and 5.1b ipomoea- unpalatable weed grew competing with and reducing pasture availability.

Plate 5.1a Degraded areas at water point. Plate 5.1b. Ipomoea weed.



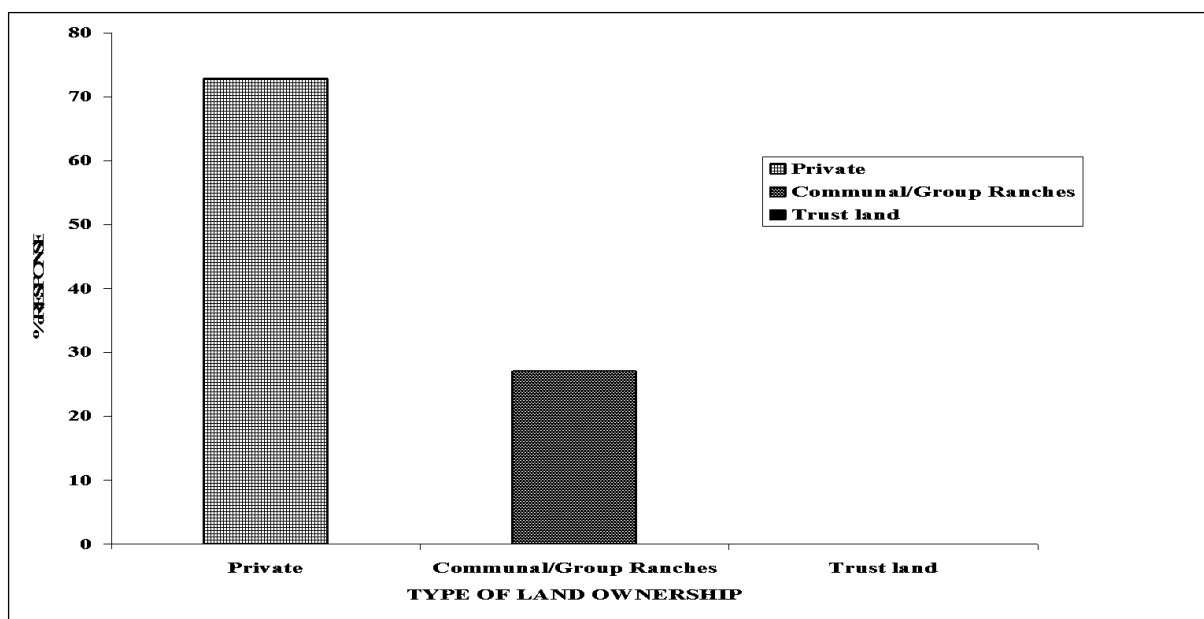
Source; Field Work, 2012

The agricultural activities especially along river banks, were leading to destruction of drought refuge areas, soil erosion, blockage of rivers, water ways, and a potential pollution threat with agrochemicals as well as conflicts resulting from resources competition. Other occupational activities undertaken such as sand harvesting, charcoal burning and mining by cement making companies were degrading and destroying the environment. These resulted in destruction of water reservoirs, grazing area, posed a potential for injuries and diseases as well as exposing the area to agents of environmental degradation such as soil erosion.

5.3.2 Land Ownership

Traditionally Maasai held their land communally as per their clans and after independence land was held either under individual, communal or group ranches. However, after collapse of these group ranches and subdivision of land started among group members. The study found out that, majority (72.9%) of the respondents were occupying and grazing on privately owned land while 27.1% were grazing on communal land while none on trust land (Figure 5.2).

Figure 5.2: Type of Land Ownership at the Study Area



Source: Field Work, 2012

The study found out that the process of land fragmentation wasn't only now due to collapse of group farms but also due to family inheritance, selling of land, agro-farming purposes and the need to settle permanently. The increased urbanization rate and mushrooming of residential estates in the neighboring areas of Kitengela, Ngong, Kiserian, Kisanju, Kaputinei, Konza city, Sultan Hamud, Emali as well as Mashuru town have brought the excitement and optimistic of owning individual land and selling to developers and immigrants from the rest of the country. *“We very happy of the Konza city this area will develop, you know vast lands are only found in Maasai land and we are going to sell plots like in Kitengela.... you (researcher) should buy one now before they become very expensive”* said Joseph Sankale.

Table 5.5: Presence of Land Subdivision

Response	Frequency	Percentage (%)
Yes	60	85.7
No	10	14.3

Total	70	100
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Source: Field Work, 2012.

The study found out that the majority (85.7%) of respondents had already subdivided their land while 14.3% of respondents hadn't (Table 5.5). Subsequently, as land was continuously being subdivided, the grazing areas were being severely reduced eventually affecting pastoral production. It's worthwhile to note, success of traditional Maasai pastoralism system was based on the ability to keep a variety of animals and access to a variety of resources, hence the ability to cope with the seasonal changes in the availability of water and pasture. However, the study found out that pastoral mobility a very crucial coping strategy was severely crippled as evidenced by strict warning signs with intruders risking prosecution as in Plate 5.2a and 5.2b. In return, whenever pastoralists were migrating conflicts, resistances were bound to emerge. These have not only affected pastoralism in the area but also social network fabric among the residents.

Plate5.2a. Blockage of routes and Pastures. Plate5 .2b Land subdivision in Mashuru



Source: Field Work, 2012

5.3.3 Increase in Severity of Drought

The study found out that respondents were generally agreeing to the perception that the severity of the drought had increased in the recent times. Those who strongly agreed to this perception were 45.7% of the respondents, while majority (54.3%) agreed it's increasing (Table 5.6). It's worthwhile to note that none of the respondent had the perception that drought severity in the area has remained at constant over years or it's decreasing. This was an indication of the increased losses to pastoralist over time.

Table 5.6: Increase in Severity of Drought

Response	Frequency	Percentage (%)
Strongly agree	32	45.7
Agree	38	54.3
Total	70	100

Source: Field Work, 2012.

The study found out that the severity of drought was due to the increased drought frequency and human activities such as; land subdivision, agro-farming, quarrying and sand harvesting, tree cutting, charcoal burning and permanent settlement that discouraged

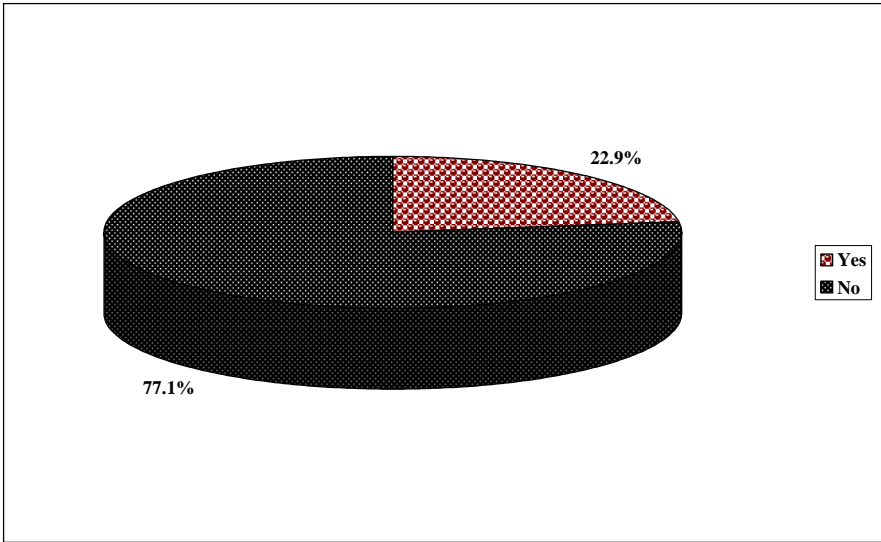
migration. Overtime, there have been destruction and reduction of grazing and water catchment areas, blockage and diversion of rivers as well as destruction of drought refuge areas. These negatively impacted on pastures and water, especially during the dry and drought seasons, thereby adversely affecting livestock production in the area. The study found out that majority of respondents pointed out inadequacy of water and pasture resources as their main negative effect of drought affecting their livestock production activity leading to loss of animal products, livestock and earnings. The study found out that, in response Maasai were adapting to altered circumstances not only by their traditional strategies but also diversifying their sources of subsistence.

5.4 Strategies Adopted by the Maasai Household to Cope with Drought

The Maasai pastoralist in Mashuru did acknowledge that drought will continue to occur as previously in the past. However, they pointed out a number of precautionary measures that help them to reduce drought impacts and safeguard their livelihood such as; building up their livestock reserves by keeping more animals, sharing of livestock, migrating during drought, agro-farming, business, uptake of employment, and saving cash.

The sharing of livestock or reciprocal ownership is an important aspect in pastoral production as well as maintaining strong social network in the Maasai community. The study found out that majority (77.1%) of the respondents didn't have animals belonging to others in their herd, while 22.9% of the respondents had animals in their herds that belonged to others (Figure 5.5).

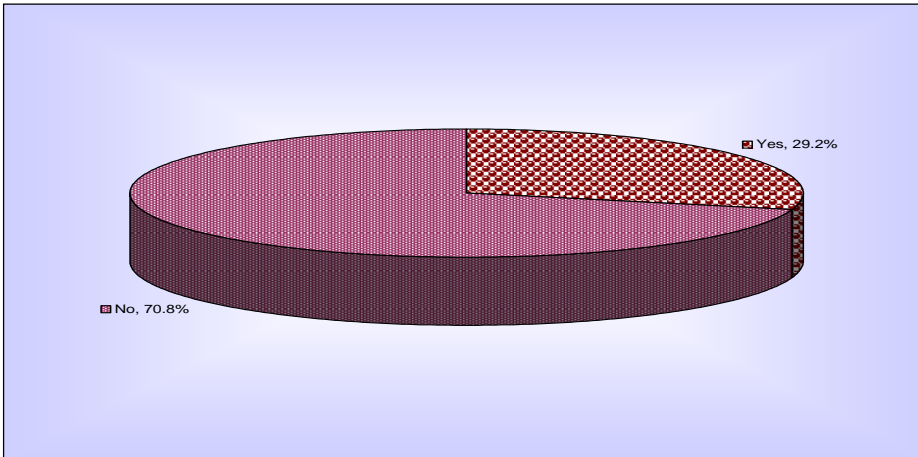
Figure 5.2: Presences of Livestock from a Different Herd



Source: Field Work, 2012.

Animals were not only given out but also respondents had animals belonging to others in their herd. The study found out that majority (70.8%) of the respondents didn't have any animals belonging to them outside their herd, while 29.2% of the respondents had their animals being reared on their behalf by others (Figure 5.6).

Figure 5.3: Presence of Animals Being Kept Outside the Herd



Source: Field Work, 2012.

The study found out that the herd splitting or reciprocal arrangements of sharing livestock was an important strategy in reducing the probability of losing all animals during drought, disease outbreak or in case of raid. It's honed by part up the group and moving an extent to be taken care of by a relative or companion in various geographical zones. This methodology was utilized for rearing purposes and additionally methods by which the individuals who have deficient domesticated animals could acquire creatures to help meet their subsistence needs. This reciprocal arrangement helps to maintain very strong social networks among the Maasai community enabling them to cope with disasters where it's common during drought but also useful for breeding during others seasons. However, the reciprocal arrangement is on decline thus not only affecting livestock production but communal cohesiveness hence livelihood of Maasai people in Mashuru.

5.4.1 Migration in Search of Water and Pastures

The peaceful portability is a standout amongst the most proficient customary adapting methodologies that have empowered the pastoralists especially from African ASAL areas to adapt and survive a number of past droughts. The decline of water and pastures in one area triggers migration of pastoralists' herds in search of these resources to other areas. The study found out that all respondents (100%) had migrated in search of these resources during the past drought and dry season (Table 5.5)

Table 5.1: Migrated in Search of Water and Pasture

Response	Frequency	Percentage (%)
Yes	66	94.3
No	4	5.7
Total	70	100

Source: Field Work, 2012.

The study found out that the frequency and intensity of migration depended on the distribution of available resources such as spatial and transient fluctuation of the rangeland vegetation, pasture, water and labour availability. Majority 94.3% of the respondents said they kept on migrating in search of diminishing pastures or until it rained. Therefore, as drought intensified, pastures deteriorated and water became scarcer, thus the movement in search of these resources became far and wide, some pastoralists in Mashuru migrated as far as to Mt. Kilimanjaro. In result the herd and family were split, thereby severely affecting the nutritional status of the pastoral families especially the children.

However, the study found out that migration in recent days has been limited by sedentarization, land subdivision, urbanization, conflicts incidences and changing lifestyle. As migration was limited, pastoralist suffered as their movement and chances of pastures reach were reduced. The success of migration was also limited by many pastoralists converging in drought refuge areas, thus extinguishing the diminishing pastoral resources quickly and ensuing conflict as a result. Although pastoral mobility wasn't a success to all, some did benefit from it. The study found out that there was divided opinion on the success with 50% of the respondents indicating migration was a successful move for them while others it wasn't (Table 5.6).

Table 5.2: Success of Migration in Search of Water and Pasture (n=66)

Response	Frequency	Percentage (%)
Yes	33	50
No	33	50
Total	66	100

Source: Field Work, 2012

The study found out that the migration wasn't successful because of either severe drought, extensive lack of water and pastures, resistance, conflict and diseases. The study found out that diseases posed health risk both to the animals and herders especially when the Maasai pastoralist from low altitude region took their animals to high altitude areas, several of them died from brisket edema/ high altitude disease. As one elder who have ever migrated to Mt. Kenya and Kilimanjaro reserve lamented, *“It's a double curse moving our animals to those mountains, here (lowland) they die of hunger up there they die of cold.”* The other lowland areas that pastoralist migrated to were heavily invested with disease vectors such as ticks, tsetse fly and mosquitoes resulting in heavy livestock mortalities and illness among the herders.

5.4.2 Migration of Household Members in Search of Employment

The study found out that the majority (67.1%) of the respondents had none of their household member migrating to other areas in search of employment while 32.9% had a household member migrating in search of employment (Table 5.7).

Table 5.3:Migration of Household Members in Search of Employment

Response	Frequency	Percentage (%)
Yes	23	32.9
No	47	67.1
Total	70	100

Source: Field Work, 2012.

The study found out that men; husbands or sons were the household members who migrated mainly to the urban areas in search of employment. They occupied with casual exercises, for example, security watches, offering conventional medications, in light of the fact that as

pointed by one lady, “*My husband was employed as watchman to guard a garage because he didn’t have any course or education to find formal employment*”. The inability to find gainful employment prevented many to move out, this in return affected household livelihood whose main economic source such as livestock production was under threat and unable to provide sustenance products.

5.4.3 Access to Assistance during Droughts

The Maasai were once called 'the wealthiest clan in East Africa, both in arrive and the stock they could support' (KLC, 1934). However, the frequent occurring droughts and socio-economic changes have weakened their food security. In past they could get assistance from their relatives and friends during period of severe crisis. However, today pastoralists are becoming more dependent on relief. The study found out that majority (87.1%) of the respondents had received drought relief assistance from the government and other agencies towards livestock production, while 12.9% didn’t receive any assistance (Table 5.8).

Table 5.4: Access to Assistance during Droughts

Response	Frequency	Percentage (%)
Yes	61	87.1
No	9	12.9
Total	70	100

Source: Field Work, 2012

The study found out that, though the government and other agencies such as NGOs such as World vision and Caritas and FBOs were providing assistance during drought seasons, they did so when it was too late. The pastoralists pointed out there was a need for proactive rather than reactive measures such livestock insurance, improvement of water reservoirs, hay

preservation and conservation assistance. An NGO representative said, *“It’s not that we (assistance providers) are usually late but the pastoralists aren’t ready to sell their animals in time and cushion themselves. What we provide is not usually enough but its only subsistence, besides we have many dependents and we try beyond our limits”*

5.5 Opportunities used to Promote Drought Resilient Maasai Pastoralism

Livestock production has been an integral part of Maasai community who according to a Maasai folktale, *“God brought cattle to the earth specifically for the ancient Maasai”*. However, this situation is not tenable anymore because Maasai are becoming aware that pastoralism isn’t able to support them. The study found out that majority (82.9%) of the respondents could not see the future viability of livestock production as a livelihood while 17.1% could, and based their reasons on the; Maasai culture where animals are highly regarded as sign of wealth and ever rising demand of animal products mainly meat and milk. One elderly man said *“A Maasai man wealth is seen by how many wives, children and livestock he has”*. Those who couldn’t see livestock production viability based their reasons on the; changing cultural preferences among the young generations, reduced grazing areas, increased drought frequencies and development of new opportunities of investing such as property development, business (Table 5.9).

Table 5.5: Future Sustainability of Livestock Production

Response	Frequency	Percentage (%)
Yes	12	17.1
No	58	82.9
Total	70	100

Source: Field Work, 2012

The study found out that, although the majority of respondents indicated that they don't see the future viability of livestock production, surprisingly majority (87.1%) of them are reinvesting their earnings into it either through restocking, expanding their herd as well as buying drugs and supplements such as medicines, acaricides and mineral licks for the livestock, while 12.9% of respondents doesn't re-invest back into it (Table 5.10)

Table 5.6: Re-investment into livestock production

Response	Frequency	Percentage (%)
Yes	61	87.1
No	9	12.9
Total	70	100

Source: Field Work, 2012

The study found out that the reinvestment into livestock production was due to the good returns during good days, cultural affinity to livestock and presence of grazing lands that belonged to absent owners or communal lands. The study found out that more often overgrazing and environmental degradation resulted in these areas as grazing wasn't controlled.

5.6 Ways to promote livelihood security among Maasai households

5.6.1 Presence of Enough Food in the Households during Drought

Droughts results in scarcity of pastoral resources thus a decline of animal products and crop failure, hence shortage of food results. The study found out that majority (78.6%) of the respondents didn't have enough food in their houses during the drought period while 21.4% of the respondents had enough (Table 5.11). Those who had enough food had other various sources such as; either had large herds, agro-farmers, employed or engaged into businesses.

Table 5.7: Presence of Enough Food in the House during Drought

Response	Frequency	Percentage (%)
Yes	15	21.4
No	55	78.6
Total	70	100

Source: Field Work, 2012.

As the drought progressed food shortage often turns to hunger among the affected communities. This could be attributed to huge livestock mortalities, scarcity of cereals and high price for the cereals. The study found out that majority (74.3%) of those households who didn't have enough food faced hunger during the drought periods especially at the peak of drought while 25.7% of respondents were not under severe threat of hunger, since they could get assistance either as food or remittances from friends and relatives (Table 5.12).

Table 5.8: Household that Faced Hunger during Periods of Drought

Response	Frequency	Percentage (%)
Yes	52	74.3
No	18	25.7
Total	70	100

Source: Field Work, 2012

The livestock products are the staple food of the Maasai community and livestock losses due to starvation, diseases and sale by stock owners, lead to a disruption and reduction of food supply to the population. The study found out therefore that, the animal decline had its effects on the Maasai household notably, in monetary loses due to animal death, inability of the herd to provide sufficient food (i.e. meat and milk) to meet the family's subsistence needs,

inability of pastoralists to re-build up enough livestock numbers in good years, as well as loss of their cultural prestige. The study found out that the decline and deficit especially of sheep and goat had severely affected the provision of food (meat and milk) and cash (after they are sold) to buy food thereby straining food security among the pastoral households.

5.6.2 Livelihood Security

The study found out that majority (75.0%) of the respondents felt their livelihood was less secure, 18.8% of the respondents felt their livelihood was averagely secure, 4.3% of respondents felt theirs was secure, while 2.1% respondents felt their livelihood was least secure. None of the respondents felt their livelihood was very secure (Table 5.13).

Table 5.9: Security of Livelihood

Livelihood Security	Frequency	Percentage (%)
Very Secure	0	0.0
Secure	3	4.3
Average	13	18.8
Less Secure	53	75.0
Least Secure	1	2.1
Total	70	100

Source: Field Work, 2012

Weakening of livelihoods among Mashuru pastoralists was attributable to reduced livestock numbers and returns, increased drought frequencies, reduced herd size, reduced grazing areas, lack of employment, poor harvest and lack of appropriate knowledge on better drought resistant crops e.g. cassavas, katumani maize breed, among others.

Livestock production and agricultural activities were the main occupational activity and economic back bone of the respondents and the area. Therefore, negative impacts toward these activities translated to weakening of pastoralists livelihoods. The study found out that

majority (92.9%) of the respondents could not be sustained by their livestock products through the last drought which occurred in 2009, while 7.1% of the respondents' families were well sustained by their livestock (Table 5.14).

Table 5.10: Livestock Sustenance during Drought

Response	Frequency	Percentage (%)
Yes	52	74.3
No	18	25.7
Total	70	100

Source: Field Work, 2012

5.7 Hypothesis Testing

H₀: The increased frequency and severity of droughts have not affected the ability of pastoral household to generate and maintain livelihood through rangeland livestock production.

The chi-square test tested at significance level of $\alpha=0.05$ was employed in validating this hypothesis. This test suited better for testing this hypothesis because:

- All observations were collected and recorded on a random basis.
- All categorical variables were independent of each other.

The chi-square test is a statistical measure of the significance difference between the observed frequencies (f_o) and expected frequencies (f_e) obtained from hypothetical universe.

The chi-square test has the following formulae:

$$X^2 = \sum (f_o - f_e) / f_e$$

Where f_o = mean of observed frequency, f_e = mean of expected frequency. Degrees of freedom (df) where $df = n - 1$ where n = number of groups. 1, 2 = number of constraints.

In order to test the hypothesis of the study, various aspects were evaluated such as whether households: had enough food during droughts, were faced with hunger and if their livelihoods were secure. These aspects were tested and cross-tabulated in order to make inferences on the hypothesis.

Table 5.11: Cross-Tabulation on Presence of Enough Food during Drought Season with livelihood security

			Presence of Enough Food for the Household during Drought		Total
			Yes	No	
Livelihood Security	Secure	Count	2	20	20
		Expected Count	.4	1.6	2.0
	Average	Count	1	18	19
		Expected Count	1.9	7.1	9.0
	Less Secure	Count	7	29	36
		Expected Count	7.5	28.5	36.0
	Least Secure	Count	0	3	3
		Expected Count	.2	.8	1.0
	Total	Count	10	60	70
		Expected Count	10.0	70.0	70.0

Source: Filed Work, 2012.

Table 5.12: Cross-Tabulation on household that faced hunger with livelihood security

			Household facing Hunger		Total
			Yes	No	
Livelihood Security	Secure	Count	0	2	2
		Expected Count	1.2	12.8	14.0
	Average	Count	3	6	9
		Expected Count	5.3	3.8	9.0
	Less Secure	Count	25	24	49
		Expected Count	21.0	25.0	46.0
	Least Secure	Count	0	10	10
		Expected Count	.6	.4	1.0
	Total	Count	28	42	70
		Expected Count	28.0	42.0	70.0

Source: Field Work 2012

In the above tables, shows the chi-square values on observed and expected frequencies between the combined variables, such as from Table 4.1 there were 2 households with secure livelihood as they had enough food during drought and their expected frequency was 0.4. All the frequencies are then summed together as follows in Table 4.3 and 4.4, in order to test the hypothesis.

Table 5.13: Chi-Square Tests Results on Presence of Enough Food during Drought Season

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.421 ^a	3	.038
Likelihood Ratio	7.381	3	.061
Linear-by-Linear Association	2.474	1	.116
N of Valid Cases	70		

Source: Field Work, 2012.

Table 5.14: Chi-Square Tests Results on Household that Faced Hunger

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.343 ^a	3	.039
Likelihood Ratio	9.429	3	.024
Linear-by-Linear Association	4.297	1	.038
N of Valid Cases	70		

Source: Field work, 2012

The calculated chi-square statistic value for the households that lacked food during the drought season was 8.421 with p-value of 0.038, while that of households that faced hunger was 8.343 with p-value of 0.039 both at 3 degrees of freedom.

The decision rule on hypothesis testing under chi-square could be made either through comparing the X^2 calculated value with the X^2 tabulated value done at a certain α -value and df, where X^2 calc. > X^2 tab. then H_0 is rejected. The test could also be done through comparing test's p-values with α -value where, if p-values are less than or equal to the α -value (0.05), then H_0 is rejected. In this study, decision rule was made through comparison of p-values with α -values.

The p-values of 0.038 and 0.039 of the hypothesis under test were less than α -value of 0.05, hence H_0 was rejected and H_1 was taken. Therefore, the increasing frequency and severity of droughts was affecting the ability of the pastoral household to generate and maintain secure livelihood through rangeland livestock production.

5.8 Discussion of Findings

Drought has adversely affected the livelihood of Maasai pastoralists in Mashuru Division. The study revealed that major impacts included depletion of water and pasture; loss of livestock; poor human health and livestock morbidity; increased food prices; famine

and reduction of livestock prices. Reliance on seasonal wells, coupled with absence of water and pasture preservation practices exacerbated the effects of drought on forage and pasture. This has consequently resulted in livestock deaths and reduction of livestock ownership, where more than 70% of households lost 1-20 sheep in the last one year. This finding concurs with Huhuet al (2010) who observed that 2009 drought has resulted in loss of Maasai livestock in Mukogondo Division of Laikipia District from starvation. Therefore, since livestock are the main source of livelihood to pastoralists, their decimation disrupts pastoral socioeconomic existence.

The study also showed that drought lead to poor health of pastoral households. Cases of malnutrition increased during drought episodes owing to food insecurity. This mostly affected children under 5 years, whereby up to 200 suffered from acute malnutrition following the 2011 drought. In the same period, incidences of typhoid, diarrhea and amoebic dysentery were rampant, as a total of 84 households had at least one member affected by one of these ailments.

The pastoralists in the study area considered mobility as their key strategy to cope with drought, a finding that is consistent with that of Rass (2006) who found that mobility is a prominent livelihood strategy employed by pastoralists in anticipation of seasonal or annual changes of pasture and water availability. In recent times, mobility has been restricted to divisional or county level due to reduced livestock holdings, reduction of grazing range, availability of few grazing reserves and water sources, and insecurity.

CHAPTER SIX: KEY FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter reviews the core themes and results of the study in regard to the research objectives. It also discusses the measures and policies that can be undertaken to strengthen and secure the livelihoods as well as ensure sustainable environment in the area.

6.2 Summary of Key Findings

The study evaluated the negative impacts of drought and vulnerability of livestock production among the Maasai pastoralists in Mashuru. The study found that livestock production was the main economic activity but agro-farming, business, employments both formal and informal were the other alternative sources of income. The study found that the frequent droughts and anthropogenic changes have led to a reduced herd size in majority of households thus weakening Maasai livelihoods. Additionally, it found that majority of households lacked enough food and faced hunger during drought season and had to depend on aid from relatives, friends, and non-government organizations and government.

The study also found that majority of respondents had low level of education and were mainly engaged in informal and manual occupations that depended on exploitation of natural based resources for income generation. It found a significant relationship between the drought, human activities and conflicts in the area. It was noted that as the drought and human factors increased, they created intense pressure on the finite resources in Mashuru resulting in overexploitation, exhaustion and conflict ensued.

Furthermore, the study found that majority of the resident was trying to cope with the changing situations, in attempt to secure their weakened livelihood. They were practicing their traditional coping strategies such as; overstocking, migration, breed and species

selection and these strategies weren't successful due to the transformational changes in ASAL areas resulting in reduced pastoral resilience. Though, alternative strategies adopted such as sand harvesting, agro-farming could help an individual household to solve their immediate problems, they were causing environmental degradation potent to affect the whole area on long term basis. This was then aggravating the situation by; increasing vulnerability, poverty and natural resources dependency. This attested to the hypothesis that the droughts have affected the livelihood of Maasai pastoralists.

6.3 Conclusion:-

Livestock keeping is the main source of livelihood to pastoral community studied. Despite the past studies on drought impacts on pastoral community, their effects on livelihood presently are more adverse. Loss of livestock due to depletion of water and pasture, and drought-related livestock diseases have consequently resulted in decline of livestock ownership, food insecurity and famine. This has made the majority of pastoral households studied to rely on emergency food aid. Increase of resource conflicts and livestock rustling attributed to drought have left families impoverished. Poor livestock quality in drought seasons resulted in drastic decline of livestock prices and low purchasing power of pastoralists. Moreover, lack of livestock markets and poor road infrastructure has hindered livestock trade.

There are notable changes in terms of coping and adaptation strategies employed by the pastoralists studied. There are past strategies which are no longer practiced. For instance, food preservation and livestock loaning were practiced in the past due to abundance of wildlife and livestock. There are emerging strategies which were not employed in the past. They include livelihood diversification, herd merging, food consumption adjustment and sale of livestock.

The findings further outlined that drought per se isn't necessarily the only cause of weakened livelihood among Maasai but other intervening variables like the anthropogenic factors and socio-economic activities are important. Those who had limited alternatives and cushioning mechanism suffered, while those who had a wider and better resource generally survived well.

Lastly, what was taking place in the Mashuru sub county was an indication of what might become the scenario in the wider Kajiado County and other ASAL areas during drought. Therefore, there are suggested changes through recommendation in order to maintain sustainable livelihoods, development and environment in these areas.

6.4 Recommendations:-

6.4.1 Recommendations for Policy Makers in National and County Government

The governments should support and promote water and pasture conservation in the area. It should provide tools, machineries and technical expertise on hay preservation that would help to conserve the plenty pastures during rainy season and ensure constant supply. There should be efforts by county government and pastoralists to conserve the water catchment, underground sources such as; borehole, reservoirs dams, pans and water-points. This should help in providing constant water supply to livestock, for agriculture purposes as well as household needs thus helping to improve health status through control of waterborne and water related diseases.

The governments should promote environmental conservation through stopping degrading activities and overexploitation of natural resources such as; compelling mining companies to refill the exhausted open mining holes, control sand harvesting, deforestation and charcoal burning in the area. The residents need to stop destruction and encroachment of drought refuge areas as well as spread of unpalatable weeds species (Ipomoea weed) where they can join hands and uproot the weeds. There is need for government to facilitate seminars, training and demonstrational work where the people can be taught the causes and consequences of human activities on environment such as charcoal burning, soil erosion and how to control them and environmental conservation.

There is need for the national government to strengthen and equip KMD with the modern equipment in order to precisely foretell hazards occurrence. In Kenya natural hazards are national problems that cause enormous economic cost and EWS should help in avoiding them, thus avoiding or reducing the huge economic losses.

There is need for county government to promote development activities in rural Mashuru areas where majority of pastoralists live. Services such as; schools, hospitals, veterinary services should be taken to where people live. This is because improved key infrastructure investment in the area such as roads, will promote the way Maasai people can use new opportunities to interact with the outside world; market, education, tourism. This will improve instruction, wellbeing and sustenance which are fundamental parts of the physical human capital which emphatically impacts the limit of people to acquire a salary. Pay winning chances and efficiency additionally rely upon their instruction and abilities. Markets would empower deals and trade of domesticated animals and products and in addition making greater work openings.

There is great potential for tourism in the area, through the endowment with wild animals and scenic landmark such as Kirasha hill and the use of Maasai brand, which is known world over as Kenya's tourism brand. Thus the county government and individual investors could promote tourism in the area. This would create formal and informal employment opportunities, harness foreign exchange, provide market, control human-wildlife conflicts and promote environmental conservation.

6.4.2 Recommendations for international development partners

There is need for development actors such as NGOs and governments such as county and national, to join hands with pastoralist and support agriculture sector in the area. Development actors should provide extension and supportive services such as provision of appropriate seeds for dry land agriculture, market for harvest as well as grain storage facilities. These will help to counter food inadequacy, reduce poverty, relief food dependency and vulnerability of households to droughts.

6.4.3 Recommendations for pastoralist communities

The findings of the study have outlined there is paramount need to expand and diversify the available livelihood strategies in order to expand the economic base of the pastoralists. This will enable them adopt, cope and strengthen their livelihoods. As earlier outlined, many families especially those; dependent on livestock production, the poor who had few animals, those with low education levels and weak social network lacked viable alternative sources of income. Therefore, there is need for pastoralists to embrace education and sustainable alternative livelihood strategies that will promote and strengthen their livelihood outcomes, eradicate poverty and reduce the dependency on environment, hence reducing pressure on the environmental resources. Pastoralist must be ready to learn and

adopt alternative agricultural means away from livestock such as; poultry, pig and apiculture. They must also extrapolate their present interest and willingness beyond agro-farming.

6.4.4 Recommendations for further research

There is need for further study to understand the losses due to mortality and forced sales suffered by pastoral households during droughts.

There is need for further studies to examine the connection between constrained sales and the degree to which individual family units sell cows amid times of good access to pasture and water assets as there was no data.

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APPENDICES

APPENDIX I: KEY INFORMANT INTERVIEW GUIDE

- 1) Have there been changes in the weather pattern in this area?
- 2) Have the drought incidences increased in the area?
- 3) What are impacts /effects of drought in the area, livestock production &livelihood?
- 4) What are the major coping strategies used by farmers to survive recurrent drought?
- 5) In your opinion why do farmers seem to invest more in livestock production than other activities?
- 6) Explain the motives behind livestock keeping?
- 7) How do you evaluate the contribution of the livestock production to livelihood security compared to other livelihood activities carried out by farmers?
- 8) What is your opinion about livestock sector as an economic potential in the area?.
- 9) What is the role played by the government and other institutions in livestock sector?
- 10) Are there institutions that could help add value to livestock products? Which ones?
- 11) What do you think are the major constraints to livestock development?
- 12) What do you suggest as measures to improve and maximize livestock development?
- 13) What assistance is provided to Livestock farmers against drought and is it helping?
- 14) What should be done to help the pastoralist and livestock production?
- 15) According to you what is the future of livestock production among pastoralist?

<u>Relation to head</u>	<u>Marital status</u>	<u>Education level</u>	<u>Main occupation</u>	<u>Main source of income</u>			
1=head 2=spouse 3=ownchild 4=step child 5=parent 6=grand child 7=relative 8=worker 9=other specify	1=single 2=monogamous married 3=polygamous married 4=divorced 5=widowed 6=separated 7=never married 8= other specify	0=none 1=primary 2=secondary 3=tertiary 4=university	1=livestock production 2= business 3= formal employment 4=informal Employment 5=student	1=livestock production 2=business 3=formal employment 4=informal employment			

1) Main location of residence:

2) a) How long have you been keeping livestock.....

(1=<1-4 yrs; 2=5-9yrs; 3=10-14yrs; 4=15-19yrs; 5=20-24yrs; 6=25yrs – Above.)

b) How did you acquire them?

(1=Purchase; 2= Inheritance; 3=Bride wealth; 4=Loan; 5= Gift exchange; 6=Other specify.....)

3) What type and how many animals do you keep?

Species of livestock.						Number owned.
Cattle.	Goats.	Sheep.	Donkey.	Poultry.	Others.	

4) A) In your herd, do you have animals that belong to somebody else?

1=Yes, 2=No, if Yes, how many?.....

b) Do you have animals being kept for you outside the herd?

1=Yes, 2=No, if Yes, by who and how many?.....

5) What is your major reason for livestock production?

(1=Livestock trade; 2= Milk & meat source for the family; 3=Social/Cultural prestige; 4= Brideprice; 5=Source of manure; 6=Saving; 7=Others: Specify.....)(If livestock trade is major reason, kindly proceed to Question 6, otherwise proceed to 7)

6) a) Concerning livestock trade, which month of the year is it most profitable?.....

b) Concerning livestock trade, which month of the year is it least profitable?.....

c) Whats the average price of mature livestock in the area?

Animal Species	Cattle	Sheep	Goats	Poultry
Average price				

d)What are the major reasons behind livestock selling? (Rank?)

Reason.	RANK.
Herd management	
Impeding drought	
Disease outbreak	
Buy food	
Pay school fees	
Hospital bills	

e) Which problems do you encounter with livestock sales?

Problems encountered	✓ TICK.
Low market price	

Price fluctuations	
Quarantines	
Middlemen exploitation	
Distant market place	
Lack of market	
Thin animals	

Challenge to livestock production	✓ TICK
Livestock disease and pest	
Inadequate pasture	
Walking long distance for water	
Inadequate rainfall	
Lack of capital to invest/ low capital	
Poor animal husbandry	
Insecurity	
Low market prices	
Expensive drugs/ lack of vet services	
Reduced grazing areas	

7) What are the major constraints to livestock production in the area?

8) a) What's the type of land ownership in your grazing areas?

(1=Private; 2=Communal/Group ranches; 3=Trust land/eg park; 4=Other specify)

.....

b) Have there been subdivision of the land? 1=YES, 2= NO.....

9) Did you experience any conflict during the last drought? 1=YES, 2=NO.....

a) With who? (More than one Tick possible)

Identity.	✓ Tick
Farmers	
Other pastoralists groups	
Ranchers	
Institutions such as schools, research stations	
Park administrators	

Wildlife animals	
Government	

b) What were the reasons that led to conflicts arising? (Tick the reasons)

Reason	✓ Tick
Lack of Water access	
Lack of Pasture access	
Crop trampling	
Encroachment of cultivation	
Predation of animals	
Compete for grazing area	
Compete for water	
Spread of diseases	
Human injury	

c) How were these conflicts resolved? (Tick action taken)

Activity	✓ Tick
Compensation	
Warning	
Reprimand	
Legal actions	
Traditional abitration	
No action	

d) According to you, what's the status of these conflicts in the area?

1= Increasing; 2= Decreasing.....

10) According to you, what needs to be done to improve livestock production?

.....

11) Did the livestock you had, able to see you through the drought period without asking for addittional assistance? (1=YES; 2=NO)

(If yes, skip question 12 and 13)

12) a) Did your family had enough food to get through the 2009 drought?

1=Yes, 2= No.....

b) If not, did your family face hunger? 1=Yes, 2=No.

Give reasons for your answers:

.....

13) a) Did you receive food aid during the last drought?

1=Yes; 2=No.....

b) Whom did you get food from; [Tick your answer(s)]

Food source	✓ TICK
Relatives	
Friends/Neighbours	
Self-help groups	
Government	
Non-government Organisations NGOs	
Faith Based Organisations/ church	

c) How would you rank the effects of drought? (Start with the worst to least effect)

Droughts effect	RANK
Livestock mortality	
Lack of water and pasture	
Reduced milk and meat	
Conflicts	
Crop failure	
Migration of family members	

14) What is your perception on the severity of recent drought compared to past drought,

do you agree it's increasing?.....

(1=Strongly agree, 2=Agree, 3=Not sure, 4=Disagree, 5= Strongly disagree)

Human activity	✓ TICK
Land subdivision	
Farming	

15) a)	Quarrying/ sand harvesting		Apart from the natural causes of
	Charcoal burning/ deforestation		
	Government policies		
	Settling of pastoralist in one area		
	Settlement areas		
	urbanization		

drought, what human activities are influencing drought severity in the area?

b) What are the effects of the above factors towards drought? (To rank starting with worst)

Effect.	RANK
Destroy drought refuge areas	
Reduce grazing areas	
Block migratory routes	
Reduced stock size	
Destroy water catchment areas	

16) According to you how can the drought be controlled?

.....

17) A) What does your household normally do to respond to drought?

Activity.	✓ TICK
Migrate	
Mixed stocking	
Herd splitting	
Species selection	
Breed selection	
Slaughter of calves to save mothers	

Slaughter of weak ones	
Scavenging for fodder eg acacia	
Selling of livestock	
Increase in watering intervals	

b) Were these strategies useful and adequate in helping your household to respond to drought episodes? 1=Yes; 2 =NO.....

Give reasons for your answer:.....

c) What other strategies did you normally embrace to cope with drought problem?

.....

18) Did you migrate in search of water and pasture, during the last drought?

1=Yes; 2=No.....

If yes,

i) How many times did the family move?

ii) Was the move successful? 1=YES; 2=NO.....

iii) If no, why?

(1= Lack of water and pasture; 2=Lack of drought refuge areas; 3
3=Immobility; 4=Conflicts; 5= Others: Specify)

19) Did any member of your household migrate in search of wage employment during the 2009 drought? 1=Yes /2=No

If Yes:

i) Who?(1=Husband; 2= Son; 3= Others: Specify).....

ii) Where to: (1= Urban area; 2= Rural area).....

iii) What job:.....

20) During the drought did you: a) Seek any help from relatives? 1=YES; 2=NO.....

b) offer help to relatives? 1=YES; 2=NO.....

21) Did you get any help from the government or organisations? 1=YES; 2=NO.....

i) If Yes, which ones? 1=Govt; 2=Organisation; 3=

Both.....

ii) which help?

(1=Food aid 2=Livestock Offtake 3=Livestock Restock; 4=Others

specify.....)

22) Considering what we have discussed, how would you describe the household

livelihood security now? (1=Very Secure 2=Secure; 3=Average; 4=Less Secure;

5=Least Secure).....

Reasons;.....

23) a) Do you have other sources of income next to main occupation:

1=YES;

2=NO.....

i) If Yes, which:.....

ii) If No, why:

Reason.	✓ TICK
Enough income from livestock	
Lack of capital	
Lack of interest	
Lack of skills	
Lack of labour	
Inadequate education/ knowledge	

24) Do you invest your livestock earnings? 1=Yes; 2=No.....

b) If Yes, how:

25) Do you think livestock production will still be a viable future opportunity?

1=Yes; 2=No.....

Reasons:.....

26) a) Did the government give any livestock assistance against drought during 2009 drought? 1=YES; 2=NO.....

b) What assistance did you receive during 2009 drought period?

Assistance	✓ TICK
Veterinary eg Massive treatment, Vaccination	
Restocking support	
Destocking; Buying, slaughter mainly weak animals	
Loan provisions	
Supplementary feeding- hay feed	
Destocking	
Water trucking	
Transport subsidy to market	
Conflict resolution	

c) Were the measures effective in alleviating drought effects during the last drought? 1=Yes; 2=NO.....

Give reasons:

d) Were all pastoralists able to benefit from these measures?

1=YES; 2=NO.....

27) Would you like the government to repeat such measures next when there is drought?

1=YES; 2=NO.....

28) Any other comment?

.....
.....

=====END=====

Thanks alot for your time and participation!!