MANAGEMENT OF EFFECTS OF DROUGHT BY PASTORALISTS OF EL-WAK, MANDERA COUNTY OF KENYA

BY:

AHMED M. MOHAMUD

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DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES

DECLARATION

This project report is my original work and has not been presented for an award at any other university:

NAME: **AHMED M. MOHAMUD**

SIGNATURE…….

DATE …….

This project report has been submitted for examination with our approval as University supervisors:

1. NAME: **DR. MARTIN MARANI**
   DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES, UNIVERSITY OF NAIROBI
   SIGNATURE ……..……

   DATE …….....

2. NAME: **DR. MIKALITSA S. MUKHOVI**
   DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES, UNIVERSITY OF NAIROBI
   SIGNATURE ……

   DATE ……

ABSTRACT

Pastoralism is the main source of livelihood for about 120 million people who keep cattle, camels, sheep and goats in the drylands of the world, which are characterized by low and erratic rainfall and frequent droughts. This study examined effects of drought on pastoralists of El Wak in Kenya's Mandera County and how pastoralists managed such drought episodes. The study also set out to achieve four specific objectives: (i) Identify effects of recurring droughts on pastoralists of El-wak since 1999; (ii) Establish strategies employed by the pastoralist households of El-wak to manage the effects of recurring droughts;(iii) Determine whether strategies used by pastoralists to manage recurrent droughts had been changing from one drought to another, and; (iv) Suggest possible evidence-based interventions that pastoralist households of El-wak could use to manage effects of recurring droughts. The study employed a cross-sectional study design and data were collected from a random sample of 102 households using a questionnaire. Data from key informant interviews, focus group discussions and observations complemented the questionnaire data.The results of the study show that effects of drought among El-wak pastoralists included death of family members (33.3% of respondent households) death livestock (33.6%) migration of people (87.3%), and conflicts (65.7%) over limited resources.Results also show that pastoralists of El-wak used different strategies to manage drought effects at different social levels. These included migration in search of pasture and water, herd division (to reduce drought risk on stock), destocking (selling of livestock at cheap prices in order to use the money to buy food), and seeking relief from the NGOs and the government (food Aid). Further, the study also established that the strategies employed by pastoralists of El-wak to manage effects of drought are the same regardless of the drought episode thus reaching the conclusion that pastoralists of El-wak have stuck to their long-held approaches to managing droughts. The study recommends that the government of Kenya, the County government of Mandera, NGOs and the pastoral community at large should support the poor households in asset building and to create income diversification through strengthening rural education and health programs in El-wak.

DEDICATION

To my wife Hawa Sheik and my children with all my love and gratitude for the support and encouragement.

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TABLE OF CONTENT

LIST OF FIGURES

LIST OF TABLES

LIST OF PLATES

LIST ACRONYMS

ALDEF:	Arid Lands Development Focus
ALRMP:	Arid Lands Resource Management Project
AMREF:	African Medical and Research Foundation
ASAL:	Arid and Semi-Arid Lands
CARE:	Cooperative for Assistance and Relief Everywhere
COOPI:	Co-operazione Internazionale
DFID:	Department for International Development
ECDE:	Early Childhood Development Education
ECHO:	European Civil Protection and Humanitarian Aid Operation
EMIS:	Education Management Information System
FAO:	Food Agriculture Organization
FSNAU:	Food Security and Nutrition Analysis Unit
GDP:	Gross Domestic Product
HH:	Household
IASC:	Inter-Agency Standing Committee
IEBC:	Independent Electoral and Boundaries Commission
IISD:	International Institute of Sustainable Development
ILRI:	International Livestock Research Institute
KIHBS:	Kenya Integrated Household Budget Survey
KNBS:	Kenya National Bureau of Statistics
LEGS:	Livestock Emergency Guidelines and Standards
MCIDP:	Mandera County Integrated Development Plan
MDG:	Millennium Development Goal
MOE:	Ministry of Education
NAPAD:	Nomadic Assistance for Peace and Development
NEPAD:	New Partners for Africa's Development
NGO:	Non-Governmental Organization

RACIDA:	Rural Agency for Community Development and Assistance
UNDP:	United Nation Development Programme
UNEP:	United Nations Environment Programme
UNISDR:	United Nations Strategy for Disaster Reduction
VSF:	Veterinaires San Frontieres

CHAPTER ONE: INTRODUCTION

1.1 Background

Pastoralism remains an important economy in the drylands of the world. Huho *et al,* (2011:1) states that this economy supports lives and livelihoods "of about 120 million pastoralists worldwide who keep cattle, camels, sheep and goats in the drylands, which are characterized by low and erratic rainfall and frequent droughts". In Kenya's drylands, "pastoralism accounts for 90% of the employment and 95% of family incomes and household securities" and "contributes about 10% of Kenya's gross domestic product (GDP) and 50% of the national agricultural GDP" (Ibid). Although range pastoralism is known to thrive in drylands, these areas are often characterized by high human pressure on ephemeral resources (especially water and pasture), rainfall fluctuations and frequent drought episodes (Haji, 2014). During severe droughts, these scarce resources often run out leading to a period when pastoralists have travel long distances in search of water and pasture while households have to depend of relief services to access food and water. Failure to access adequate water and pasture may lead to massive losses of livestock and depletion or decimation of herds, which is a major factor contributing to poverty among pastoralist households.

Despite provision of water, public health facilities, veterinary services and livestock marketing avenues, pastoralists have often questioned government commitment to supporting the cause of dryland range pastoralism as an economy. State interventions to drought often run into challenges such as falling behind of the drought responses, lack of functioning, fullyfledged dynamic livestock trade, lack of monitoring of migratory movements to enable mitigate livestock losses and failure of the government to involve the community in the design and implementation of most interventions.

As the frequency, magnitude (intensity) and severity of droughts in Kenya's drylands continues to significantly increase due to human factors and climatic variability (Fratkin & Roth, 2006), range pastoralists will not only be looking to government for solutions but also ways of re-inventing their own long-held strategies to cope with drought episodes.

The pastoralists will most likely have to confront a future that is more uncertain in terms of geographic coverage and costs of drought (Hendy & Morton, 2001; Abdi, 2016).

The impacts and effects of drought in the dry lands are often measured in terms of human, economic and environmental losses (Fratkin & Roth, 2006). Loss of human lives, numbers of livestock types lost during a drought, and drought-influenced human-induced environmental degradation are indicators of severity of a drought (Fratkin & Roth, 2006). In order to cope with economic losses from drought episodes, traditional nomadic pastoralists in Kenya's drylands have developed a resilience system in which herd sizes depleted during drought are restocked during years of better rainfall (Haji, 2014). However, this resilience system has been adversely affected by human pressure on the dryland ecosystems.

In the Horn of Africa, for example, sequences of recurring droughts, human-induced environmental degradation and changing regimes in the use of dry land natural resources have caused increased water and pasture scarcity, led to irreversible herd depletion and, pushed pastoralists out of a once thriving livestock economy into poverty and food aid dependency (Fratkin, 2001) with serious implications on resilience. Traditional drought resilience of the pastoralist economy in the drylands has therefore been facing challenges mainly induced by forces of the modern market economy (Smith-Sebasto, & Cavern, 2006) thereby imposing changes that have led to adoption of semi-sedentary or sedentary pastoralism, increasing urbanization, and a growing interest among nomadic pastoral communities in the accumulation of cash and material wealth outside the livestock economy (Barton *et al.*, 2001).

This study sets out to examine ways that pastoralists of the region of El-wak in Kenya's Mandera County have used to cope with drought episodes since 1999. The study is particularly keen to know how pastoralists of El-wak have managed the effects of recurrent drought since 1999 and possible interventions suggested by the pastoralists to offer long term solutions to drought effects.

1.2 Statement of the Problem

Frequent, increasingly longer and severe droughts have been blamed for reducing herd sizes, debilitatingpoverty and malnutrition as well as frequent resource conflicts among pastoralists of northern Kenya (ALRMP, 2011). As stated by Haji (2014), "droughts often occur in contexts where conflict, high food prices, and restrictions on traditional livelihood strategies have already impoverished large sections of the population".

Traditionally, pastoralists responded to drought through spatial-temporal mobility hence exploiting vast lands that are sparsely populated (Fratkin & Roth, 2006). However, growing populations and land sub-divisioncoupled with many other factors have increasingly undermined mobility as drought coping strategy. In the light of frequent droughts, increasingly hindered mobility, and heightened resource scarcities, it was not clear from previous studies whether effects of frequent droughts had worsened and what pastoralists were doing to manage such effects, taking a specific interest in pastoralists of El Wak. Also the study considered other factors: First, pastoralism is a multifaceted communal environmental structure with connections to natural structure that often result to unexpected behavior changes (Walker *et al.*, 2002). Second, many single aspects of pastoralism have been investigated so far, but their combined effects are unclear (Abdi, 2016) e.g. the overlapping effects entangle pastoralists into a dilemma in the event that a drought comes in before recovering from the previous session. The study findings will form an important input to drought interventions in general and specifically for pastoralists of El-wak.

1.3 Research Questions

The study was set out to answerfour questions:

(i) What were the effects of drought episodes on the livelihoods of El-wak pastoral households since 1999?

(ii) What were the strategies that pastoralists of El-wak used to manage effects of recurrent droughts?

(iii) Had strategies used by pastoralists of El-wak to manage effects of recurrent droughts been changing from one drought to another, and;

(iv) What evidence-based interventions could pastoralist households of El-wak use to strengthen their drought management capacities?

1.4 Objectives of the Study

1.4.1 General Objective

The general objective of the study wasto assess effects of drought episodes on pastoralists of the El-wak in Mandera County between 1999 to 2011.

1.4.2 Specific objectives

The specific objectives of the study were to:

i. Identify effects of recurring droughts on pastoralists of El-wak since 1999;

ii. Establish strategies employed by the pastoralist households of El-wak to manage the effects of recurring droughts;

iii. Determine whether strategies used by pastoralists to manage recurrent droughts had been changing from one drought to another, and;

1.5 Research Hypothesis

H_0: There is no difference between strategies employed by pastoral households of El-wak to cope with or manage the effects of recurring droughts. That is,strategies employed by pastoral households of El-wak to cope with or manage the effects of recurring droughts were the same regardless of the drought episode.

1.6 Justification of the Study

The fragile dryland ecosystems of Kenya support livelihoods of millions of people, whose economic mainstay is livestock keeping. Severe droughts are a frequent occurrence in these regions and are a trigger to multiple socio-economic practices by herders. Herding economy is vulnerable to drought shocks. Thus, astute management of drought is inseparable from the sustainable management of fragile ecosystems of these

regions and their herding economies. Any interventions to effects of drought require an in-depth understanding of how local people use their tacit and expert knowledge to attempt to survive drought episodes.

The study is imperative in understanding the differentiated pastoral livelihood without explicit response mechanisms. The dissection takes cognizance of specific needs and distinct pastoral experiences necessary for formulating coping strategies in long-term management systems rather than short term that do not work well.Successful interventions to effects of drought have to address factors such as population growth, pastoral mobility, geographic remoteness, infrastructure development,state of the environment; grazing areas; water availability; livestock species; access to food and income sources; disputes and conflicts on localized resource shared between the clans which the study was set to find out.

El-wak sub-county of Mandera County offered a suitable environment to undertake this study since it is a drought-prone area that is dominated by herding pastoralists thus providing a suitable laboratory to investigate effects of drought on a herding economy and livelihoods of pastoralists. The findings of this study can be applied to drylands with a similar herding environment.

1.7 Scope and Limitations of the Study

This study took place in the El Wak border region of Mandera County in Kenya. The region plagued by drought and physical challenges is optimistic. The study sought to assess strategies used to manage effects of drought on livestock assets, humans, and the environment. Additionally, the research sought to analyze the influence of drought episodes on choice of livelihood strategies (sources of food, income, and expenditure) of pastoral households in El-Wak region of Mandera County. Despite major research conducted in the north-eastern region, no significant documentation has been made in the academic front. Additionally, most pastoralists have conflicting information or have not justified their steps overtime. Additionally, the vast area without sustainable

infrastructure and water makes it difficult to conduct research within the existing timeline. Nevertheless, a consistent and adamant approach assisted by adequate preparation remained the key to the success.

CHAPTER TWO: STUDY AREA: EL-WAK REGION OF MANDERA COUNTY, KENYA

Introduction

This chapter describes f El-wak in terms of location, environment and society.

Location and Size of El-Wak.

El-wak is an administrative sub-county located in the Mandera South of Mandera county. On its East the sub-county shares a transnational boundary with Somalia. It also borders Wajir County to the south and west, while on its North it borders Ramo Sub-county of Mandera County as shown in Figure 2.2. El-wak is found in Mandera County, Northern part of Kenya which extends from approximately 2^0 11' N to 4^0 17' N and 39^0 47' E to 41^0 48' E of the Equator (IEBC). Mandera County borders Ethiopia to the North, Somalia to the East, and Wajir County to the south and southwest as indicated by figure 2.1.

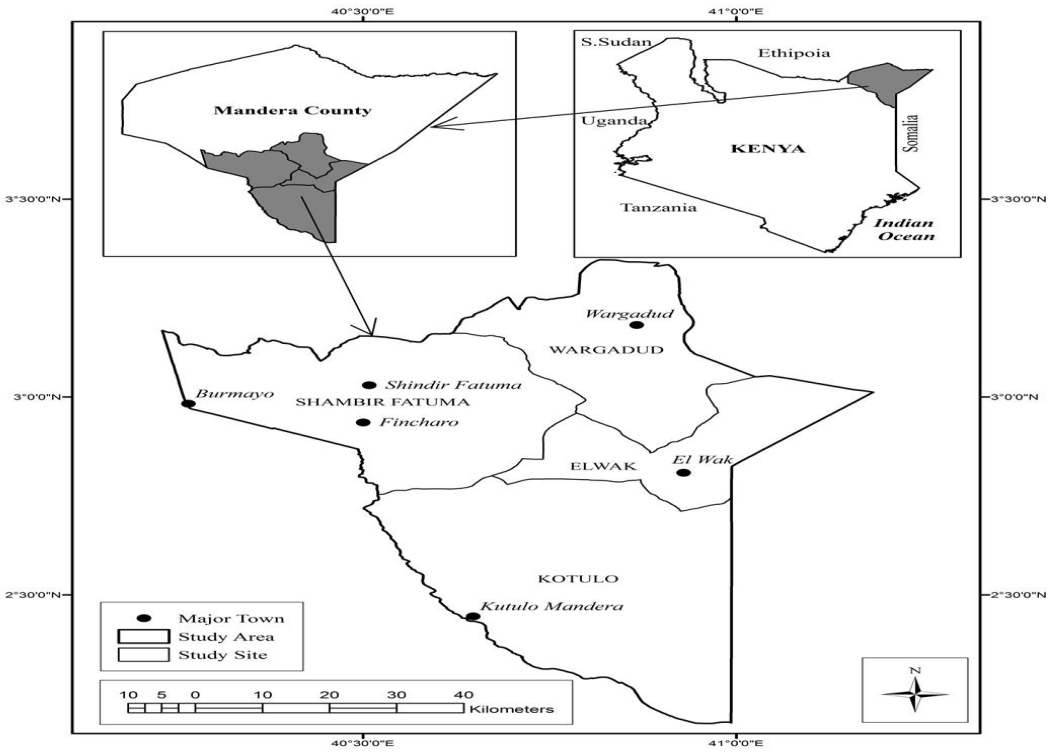


Figure 2.1: Map of Kenya, Mandera county and El-wak (study area)

Source: Researcher

2.3 Biophysical Environment

2.3.1 Topography and Landform

MCIDP (2013-2017) "The county is characterized by low lying rocky hills located on the plains that rise gradually from 400 meters above sea level in the south at El-wak to 970 meters above sea level on the border with Ethiopia". Most of the areas in the county have sandy soils, although reddish soils of varying texture, depth and moderately fertile are found on hilly areas of El-wak, Rhamu and Finno regions.

According to MCIDP (2013-2017), "Mandera County has two Ecological zones known as Arid and Semi - arid. About 95% of the county is Semi-arid with dense vegetation of thorny shrubs and bushes along the foot of isolated hills, and mathenge (prosopis juriflora) trees along riverbanks and gullies. Livestock keeping and drought tolerant crops are suitable Enterprises found in the Ecological zone (LM IV-VI) of the study area (El-wak)".

2.3.2 Land use and vegetation

Land is the most important resource in agricultural production. Mandera County is approximately 25,991.5 km^2. Most of the land in the study area is rangeland supporting livestock production. However, it is marginal in crop production due to limited water and soil suitability for crop production. The common livestock species reared are goats (galla breeds), cattle (borana breeds), camels (Somali breeds), sheep (Somali black head breeds), donkeys (Somali breed) and chicken (indigenous breed).

Theregion has no forest, but the deciduous bushlands are the dominant vegetation in El-wak. Shrub-land extended from Northwest to Southern parts of El-wak. The neem tree (Azadirachta indica/ Mwarubaini/ Qarerow) is often grown and used for medicinal purposes e.g. against malaria. The region is also characterized by annual grassland in the North East part.

There are wild animals; such as antelopes, gazelles, hyena with almost 50% of them residing outside the national parks (MCIDP 2013-2017). These animals aggressively compete for the available resources hence subjecting pastoralists to further problems. Additionally, hyenas kill animals thereby subjecting pastoralists to serious problems.

2.3.3 Climate

Mandera County is a semi-humid arid region with erratic bimodal rainfall seasons. Mandera County has an almost uniform climate in all sub-counties with El Wak not being exceptional. The County experiences an average of 250mm-255mm of rainfall in a year. It has two rain seasons i.e. long rains (Gan) between April to June and short rains (Hagaa) between October to November. The long dry season (Birra) in the region spans from December to April (MCIDP, 2013-2017). The long rain season is always characterized by plenty of grass and foliage and often marks the return of pastoralists from distant areas where they migrate to during peak times of the drought. MCIDP (2013-2016) "Surface temperatures in the region range from a minimum of 24°C in July to a maximum of 42°C in February". High solar intensity in the region causes high evaporation rates on the surface water points such as dams, pans and seasonal rivers causing complete drying up within a few weeks or months after the long or short rains (GoK, 2003).

2.3.4 Hydrology

Mandera County has limited surface or sub-surface water resources with river Daua whose water runs from Ethiopian highlands through Malkamari, Rhamu and Mandera then into Somalia as the only surface water source (MCIDP, 2013-2017). The seasonal river contain water for about nine months in a year. Other sources of water in the region consist of dug wells, earth dams and boreholes dug at several points in the rural areas for both human and livestock consumption, as well as for small scale irrigation. The quality of the water from these sources is poor and residents are advised to treat it before use. The average distance to the nearest water point is 25Kms (MCIDP, 2013-2017). The distance reduces in rural areas during rainy seasons and vice versa. Access

to water is improved by piped water in a few urban centres but only populations that reside in such urban centres benefits.

2.4. Socio-Culture

2.4.1. Social structure:

The Garre clans of the Somali people dominate El-wak region of Mandera County. The Somali tribes were converted to Islam in the 1400's, and today, the Garre clans are virtually all Muslim. Though Somali communities adhere to the same Islamic faith and share a common cultural heritage, they are divided by language. The Garre clans are diverse and complex consisting of two major sections, the Tuff and the Quranyowa. Tuuf are divided into Ali and Addoola while Quranyowa are sub-divided into Asarre and Furkeesha.

Ahmed. A. (1995) clarifies that "The Garre people live in three neighboring countries i.e. the Garre Konfur (Somalia), Garre Libin (Kenya and Ethiopia). In Somalia, they live in Lower Shebelle and part of Bay region and El-wak District in Gedo region. In Ethiopia, they live in Moyale, Hudet and Woreda, while in Kenya they live in Mandera County. Those who live in Kenya and Ethiopia speak Borana and Rahanweyn language, while those in Somalia have Somali dialect (Dhoog-Dhoog) and Rahanweyn dialect. Most Garre households practice nomadic pastoralism and they move with all their herds whenever there is prolonged drought to areas with pasture and water. They live in houses that can easily be carried alongside with herds. Their main source of livelihood is domesticated animals, which the household head (man) is the controller. They built their houses (huts) in circular manner enclosing livestock cages.

According to Lewis, I. M. (1982), the Garre just like other nomads'disrespect those who work with their hands, considering artisans and artisans a part of the lower and inferior class. Hanley,G. (1971) "The Garre's diet consisted of almost solely dairy products. Today, however, maize, rice, and some vegetables are also included. Chewing Kat, a mild stimulant, is a favorite social pastime use among the Garre".

2.4.2. Family unit and Garre Household

Garre men can marry up to four wives, each living with her children whom she nurtures. Each wife assigned the responsibility of some herds for their food security. In cases of divorce, the man/husband takes custody of the children, despite of culturally allowed for the man to take custody of boys, while the woman takes care of the girls. The father will usually enjoin the boys to one of his other wives to treat them as her own while the divorced mother may stay single or remarry. In the event that the latter takes shape, she may go with the girls or hand them over to the biological father. Drought-induced water scarcity and nutrition have major influences on family relations as well as child raising.

In the household, it is a man's responsibility to take charge of the livestock, make judgment on mobility, seasonal surveillances and selling and buying of anything in the family. Female counterparts are responsible for domestic chores e.g. cooking, fetching water, milking, looking after animals left home (e.g. milking herd and sick ones) taking care of young children, as well as constructing houses and taking care of the home. Garre women usually have a very busy day due to these responsibilities, which are exacerbated or made even heavier by drought.

Apart from herding, the Garre social value system embodies practices such as arranged marriage in which parents select a desired girl for their sons on the basis of her ancestral root, kinship, dignity, generosity, beauties, bravery and caring of animals, strengths and wisdom. Initially, the parents of a groom send a message to the bride's family and take a pound of Coffee, Sugar and tea tied to the corner of a small white sheet of about two and half yards as a proposal to their daughter. If the family accept the offer, they respond by saying we heard (Laisan dhageen). This is a kind of notice for the rest of the community and youngsters in the area. Few months later, the groom's follow up with something of bigger value (10-20 goats, Cattle, special cloths for the Mother and aunts) as a dowry to complete the engagement. Then the bride's family declare acceptance quote (we accept).

Wedding Ceremony: Invited People from both sides attend the wedding ceremony where a number of animals are slaughtered and enough food, tea and roasted coffee prepared. Participants from both sides show traditional dances and songs known as "Isoo allimaa", The two parts express the strengths and values of their son and daughter, or sometimes teasing one another, which is allowed for such occasions. If, a wife delivers a baby boy, the father sacrifices to slaughter a goat or a sheep and organizes a feast to pray for his newborn son and gives him a name. The father or an uncle gives a calf or a heifer to newborn boy. Similarly, the child gets his own animals during circumcision, if he does not cry during the initiation as a reward for his bravery.

2.4.3. Garre Traditional Governance

The Garre have customary traditional governance that addresses their issues of politics, conflicts and resource management. The core of Garre customs is stemmed from the Islamic sharia and have shaped their values and norms. Most importantly, the Ugaas/Suldan who are elected (shuuman) by the community, in line with the ancestral heritage is the custodian of the Garre customs. The elected Ugaas works with religious leaders; neighboring clan and; government representatives to determine, or make decisions on matters affecting the Garre. Under the Ugaas/Suldan, there are sub-clan heads (Sagaalle), or council of elders with advisory powers to Ugaas/Suldan.

The most prominent traditional leaders include Ugaas Aw- Gabaaba. The Gababa have had an influential traditional rule initially in Kenya, but later shifted to Ethiopia, after he got dispute and disagreement with the British colonial system. Also in Rhamu (Kenya), Sayid Abaas Sayid Sheikh Ali rose to prominence both as religious and political leaders, while in El-Wak Chief Adawa Edo and Chief Jari remain influential. Similarly, Ugas Ali Damdamlle took over the control of El-Wak Somalia., while Ugaas Baroole and Faroole were also other traditional leaders in Garre koofur of Somalia (Lower shabelle region).

Traditional leaders make decisions, which are transmitted to the lowermost level of the Garre people. They deliberate and decide on issues such as divorce, waging of wars against rival clan, blood compensation, managing water access, pastureland and revenge to back the evil committed against the clan members (Lewis, 2002). However, women are not clearly mentioned or recognized at the level of judgment or attend the elders meeting and discussions. The role of women is restricted to that of supporting the ideologies and judgments of men but not engaging in the routes leading to the decision. However, owing to increasing rural migration to urban towns, increasing settlements and deepening food insecurity and nutrition situation, due to frequent droughts and conflicts, their role is changing fast. Apart from child caring and working as homemakers, they are actively seen as breadwinners for their family. They engage in formal and informal businesses and trade. Drought has therefore been a key aspect of changing Garre culture and the evolving role of women in Garre lives and livelihoods

2.5. The El-Wak Pastoral Households' Economy

Pastoralism is the main economic activity among the householdsof El-wak and the larger Mandera County. Herding is not just a livelihood strategy but part of the Garre social system that provides important social relationships. Approximately 80% of the households' food sources and income are derived directly or indirectly from livestock products and by products e.g. camel, cattle, sheep and goats. ManderaCounty at Largehas poverty level of 68% (MCDIP, 2013-2017). Other economic activities include quarry mining, sand harvesting, smallholder handcraft production and trade with two commercial banks providing the financial services in the area as well as tourism with tourist attractions sites in Malkamari fort, national park, and Game reserves.

Prolonged and persistent droughts devastatelivestock keeping which renders the community to food insecurity hence relying on relief food. In relation to food insecurity, there are several NGOs in the region with programs mainly meant to support the pastoral community such as Islamic Relief, CARE, COOPI, RACIDA, Horn Aid, NAPAD,

AMREF, Save the Children and Emergency Pastoralists Assistance Group (EPAG), Kenya Red Cross, Habiba International, Solidarity, ALDEF, among others.

2.6. Population and Demography

El-wak region covers 5,021, square kilometer with approximately 217,220 persons (KNBS, 2009). Majority of the population in the study area are between the ages of 0-19 years. This interprets to a high dependency ratio in the region. In El-wak there are both migrating pastoralists called *baadia*, found in the grazing areas and the settled populations who live around trading centers. There are social amenities and administrative offices in El-Wak town (Montani, 2001).

According to KNBS (2006) report "The proportion of the rural population below the absolute poverty line in Kenya is 49% nationally and 74% in North Eastern Province. Nationally, the population of individuals 15 years and above who can read and write is 79% and 28% in Northeastern province with gender percentages of males 42% and females 14%, and the female percentage in Mandera are lowest in the country. Mandera has the highest proportion of population aged 0-14 years in the country at 53%, against the national average of 42% suggesting a high dependency ratio. Additionally, Mandera has the highest average household size of 6.0 members, against the national average household size of 5.1 members". The dependency makes pastoralists vulnerable to drought hence subjecting their livelihood to serious problems.

2.7. Education

The county has 175 public ECDE centers with 16,324 children, with 94 trained and 115 untrained ECDE teachers. Only 4 ECDE teachers are currently employed by the former Mandera Town Council. The County does not have an ECDE public Tertiary learning institution, apart from an In-service ECDE Training Centre at Mandera Secondary School. The objective of the county is to train ECDE teachers and employ.

The County has 175 public Primary schools with a total enrolment of 71,506 pupils with 47,451 boys and 24,045 girls and total of 808 teachers with a shortfall of 703 teachers thus giving a teacher pupil ratio of 1:88. The dropout rate is 6.6 per cent. The Primary Education NER for the county is 42.4% (53.4% boys and 29.8% girls) compared to the national rate of 77.2%(76.2 per cent males and 78.3% females) as per the spatial analytical report for North Eastern region (2011) and Ministry of Education EMIS (2009). There are 30 mobile schools, eight in Mandera East, seven in Lafey, two in Mandera West, eight in Banisa and five in Mandera North constituencies. There is also a total of 27 low-cost boarding schools which are fully funded by the national government in the county (MCIDP 2013-2017).

There are 32public secondary schools in the county with Moi Girls'and Mandera Boys Secondary schools being National Secondary Schools. The total enrolment is 8,798 (6,592 boys and 2206 girls) and a total of 264 teachers with a short fall of 200teachers thus giving a teacher student ratio of 1:33. The Secondary NER for the county stood at 5.2 %(7.6 per cent boys and 2.2% girls) compared to the national rate of 24.0% (22.2% boys and 25.9% girls) as per the MOE spatial analytical report for North Eastern region (2011) and Ministry of Education EMIS (2009).

Basic Integrated Household Survey-revised edition (2005/ 2006) "The county's population literacy rate is 25.4% compared to the national which is 79%". This is caused by pastoralist lifestyle, high levels of poverty, shortfall of teachers, retrogressive cultural practices like early marriages. According to the KIHBS (2005/06), 49.4% of the people from the age 6 to 17 years are illiterate. The Kenya Demographic and Health Survey (2008/09) indicate that, only 22% of women and 59% of men have received any education at all. This presents a challenge in implementing national and county programs especially where consensus and awareness is required for the success of the programs (MCIDP 2013-2017).

CHAPTER THREE: LITERATURE REVIEW

3.1 Introduction

Chapter three gives an in-depth evaluation of previous research on pastoralism in sub-Saharan Africa as a livelihood system and the drought impacts as well as management and mitigation strategies adopted by pastoralists to avert the impacts. The review was necessary as it enabled the study to develop new knowledge from the gaps identified in the literature which was used to further explore pastoralists' drought impacts' management/mitigation strategies in Kenya's' arid semi-arid and arid regions and its influence on the livelihood system of pastoralists based on the themes of the study, which were derived from the objectives of the study.

3.2 The Idea of Pastoralism

People who practice pastoralism are referred to as pastoralists. Pastoralism simply means the use of open pasture to raise livestock. The use of cultivated forage to raise livestock is divergent to pastoralism. Crawford (2005: 5) define pastoralism as "The finely-honed symbiotic relationship between local ecology, domesticated livestock and people in resource-scarce and highly-variable regions", pinpointing close ties between livestock keeping and environment.

A pastoral livelihood in ASALs largely centered on livestock. They move with animals from 'place to place in search of scarce pasture and water which results from unreliable and scarce rainfall in these regions. The mobility (transhumance) habit of these pastoralists is an adaptive strategy aimed or which meant to shield the inconsistent pasture and water in order to secure their livelihoods. The external environmental and socio economic change may affect the ecosystem service negatively e.g. the forage supply. For example, the production of animal food and rangeland condition may negatively be affected by rainfall and temperature changes.

East African region is largely occupied by dry lands i.e. greater than 80% of the land in Kenya, nearly 50% in Tanzania, 95% in Somalia and 60% in Uganda are occupied by dry lands (Kirkbride & Grahn, 2008). Dry lands are very vital to the national development as they support a variety of economic activities like crop growing through irrigation or during short rains, they support both domesticated and wildanimals, they enhance tourism among other activities (Nori & Davies, 2006).

These dry lands are prone to environmental challenges resulting from climate change and population pressure. Environmental changes may upshot on dry lands ecosystem due to both livestock and human pressure since they are delicate. These changes may in turn lead to negative effects like soil erosion on the rangeland, which impedes soil fertility hence, decline in agriculture. It is therefore vital to come up with proactive measures to combat these environmental changes before the irreversible catastrophes happen. The environmental changes that affect negatively on the well-being of the hydrological systems, vegetation cover and composition can negatively affect both man and livestock (Mouat & Lancaster, 2008).

3.3 The Development of Pastoralism in Africa

The emergence of pastoralism in Africa according to Brooks (2006) dates back to 7000 years. In Africa, it has come up from many years back as a reaction to delicate ecosystem. It was efficacious survival approach and made up a livestock economy to the dry lands people irrespective of whether they kept livestock or not (Ahmed *et al.*, 2001). The situation has changed over time in dry lands due to inconsistency as well as global change of the climate. This in turn is affecting the well-being of the pastoralists who largely depend on livestock for survival. Swift *et al.*, (2002) noted that, "The major constraints facing the pastoralists in dry lands include the inherently erratic nature of rainfall, a high rate of evapotranspiration and low organic levels". The pastoral systems are at the verge of collapsing due to often emerging droughts. Mkutu (2001), noted that cumulative droughts in dry lands has made people poor (disadvantaged the pastoralists) and compelled them to survive on a dwindling resource base which has prompted some

to move to other regions at least where they can access natural resources like water, pasture and food.Heavy stocking of livestock in shared rangelands (common space) has negatively affected the quality of pasture in rangelands. In the "Tragedy of commons by Hardin in 1960", the herder thinks it is wise to increase his herd of animals in a shared rangeland/common space because he will benefit significantly for having a huge herd and incase of any adversity, then he will share with other herders. Shared (communal) grazing lands and huge keeping of livestock is a key reason for deteriorating states of grazing lands and pastoral financial prudence (Sandford & Habto, 2000). There is minimal proof that pastoral lands in dry areas are overstocked/overgrazed other than the divergent view that pastoralism cause strain on pasture (UNDP, 2003, Olukoye, 2003; Roba & Oba, 2008). Degraded pasture is more seen around permanently settled regions as opposed to open grazing lands for transhumance, which paves way for renaissance of grass (Niamir-Fuller, 1998).

The production of domesticated animals in African continent was seen as a meager venture for economic progress for quite a number of years' way back but due to the escalated need for proteins from animals, the situation has changed. Animal keeping in the 3rd world nations is rising very fast as compared to the entire agronomic sector and it is projected to be the significant subsector in Africa by 2020 (Scoones & Wolmer, 2006). Africa as a continent has been encouraged to make use of its gigantic capital on animal keeping and advance entry to new markets that are coming on board globally.
Poverty among pastoral community need to be fought out to pave way for development among the pastoral communities especially in Africa as a continent through increasing access of Africa's' agronomic products to superior markets that fetch good pay (ILRI, 2000; Perry *et al.,* 2002; Scoones & Wolmer, 2006). There is also need to venture in rural set-up to improve viable and entry of livestock yields to the market (NEPAD, 2005).

3.4 The Characteristics of Pastoralism

Pastoralism is one of key socio-economic activity carried out by pastoral communities in the dry lands. The different ways pastoral communities carry on themselves in reaction to the adverse climatic conditions distinguish pastoralism from other socio economic activities in the entire universe (Behnke *et al.,* 2007, Helland, 2000; Hogg, 1997a & 1997b; Mohammed *et al.,* 2001; Shazali & Ahmed, 1999; Zaal, 1999). The area settled on by pastoralists is very vital feature of pastoralism. It is commonly practiced in dry lands, that is, both arid and semi-arid regions.

Extreme seasonal changes in the quality of pasture (vegetation), defective precipitation and susceptibility to drought are common in these areas and causes adverse impacts to the socio economic well-being of the people (Ndikumana *et al.,* 2000). The growing of crops in dry lands is negligible due to failure of supportable rainfall to enhance crop growth giving room to keeping of animals as the only sensible and practicable possibility in the region though still there are some challenges faced by the pastoralists in these low production areas. Due to the threats that pastoralism does face during adverse drought episodes in dry lands, Hogg (1997a) pointed out that "the number of herds per pastoralist is more vital than the productivity when it comes to pliability to drought and disease i.e. productive kinds could be more exposed to adverse effects of drought as compared to unproductive ones. Pastoralists have to keep on moving with their herds to areas with pasture and water to reduce death of the herds during drought episodes that are characterized by degraded pasture and water points as well as food for pastoralists. Pastoralists also do keep different varieties of animals e.g. goats, sheep, cattle, donkeys, camels etc. cattle are most vulnerable while camel is least and this is a good response to avert total loss. Occurrence of drought and diseases can clatter herds and therefore pastoralists are advised to have big herds and look for areas to graze them and should not curb/contain the number of animals to have".

The economies of pastoral communities are generated from the domesticated animals and the sale of their by-products (Hogg, 1997a; Zaal, 1999). This forms the greatest basic feature of pastoralists.Hogg (1997) suggests that "Domesticated animals being the greatest capital of pastoral communities, it can regenerate itself and therefore pastoralists have to venture in expansion of the herds. Enlarging the number of herds may surpass the area of grazing leading to the sale minus affecting the procreative ability of the herds. During droughts, a number of animals are lost and regenerating the herd takes quite a long time since it is very slow. Herders are advised not to depend so much on livestock alone since it makes them susceptible to instabilities on trade items in prolonged dry spell".

Pastoralists in different region share similar characteristics but not similar environment and ethnic contexts. They have different ways of living and experience distinct environmental challenges. This calls for a special way in coming up with the intercessions and guidelines in suppressing the effects of drought in each environmental location affected by drought and not generally as ASALs (IISD, 1999). Pastoralists across Africa who live in dry lands face a number of traumas and the approaches to mitigate the adverse effects of drought but the effects of these droughts to their means of support could be meaningfully dissimilar. Nomadism is seen among some pastoral societies in Africa as opposed to others that are transhumant. Since pastoral societies in Africa neighbor each other, during drought season there is cross-border movement looking for water and pasture for example pastoralists in the northern Uganda and northern Kenya (Kenya's 'Turkana' and Uganda's 'Karamonjong' move across the border during prolonged dry spell) (ITDG, 2005a). when a group of pastoralists move with their herds to other regions where there is pasture and water, they create pressure on the available natural resources designated for a limited number of herds hence a transfer of a problem from one drought region to another.

3.5 Livelihood System of the Pastoralists

Pastoralism is seen and practiced as the livelihood among the pastoral community. When the herds reproduce greatly, the livelihoods of the pastoralists improve. Majority of the pastoralists do not engage in the growing of crops due to the severe environmental condition they live in not forgetting the migratory nature of the community. The decline in pasture and water in these drought prone environments have together made the pastoral community to look for ways of either mitigating the impacts accrued to drought episodes or adapting strategies to the same e.g. moving with animals to areas with pasture and water and also identifying the animal species that can withstand the adverse impacts of droughts (Pratt. 2010).

In East Africa, the drought affected areas are in the north. These are the areas that have quite a number of pastoralists. When the episode is severe, they move to other areas in relation to the onset of rains where there is water and grass. The movement may be for a long distance but within the traditional migratory grazing region. During the rain seasons, the pastoralists' herds reproduce in large numbers but this numbers is affected severely during severe drought when the grass and water isn't available. The reason behind high numbers is to make use of the available pasture and water that is available to have the most viable herds that can somehow withstand the severe drought effects and curb the losses (Eileen. 2005).

The pastoral resource-use pattern is characterized by risk-spreading and flexible mechanisms, such as mobility, communal land ownership, large and diverse herd sizes and herd separation /split-ups. Pastoralists keep mixed herds of animals i.e. sheep, goats, cattle, donkeys and camels which react to drought episodes differently. The cattle are the most vulnerable, then sheep, then goat, then donkey and lastly the camels. Keeping a variety of species is a strategy used to spread the risks during the severe drought among the pastoralists. The impact of recurrent droughts for the past years in dry lands of Africa's pastoral communities has been disastrous, causing massive livestock losses, acute rates of malnutrition and high morbidity and mortality among pastoralist

communities. Indigenous drought strategies have come under significant strain and the capacity of pastoralists to resist and recover from drought-related shocks has deteriorated (Pratt, 2010).

3.6 Pastoralism in Kenya

Pastoralism in Kenya is practiced in the northern part by the Pokot, Samburu, Maasai among other communities. Several severe droughts have affected this socio economic activity negatively in Kenya for so many years. Droughts are recurring not only in Kenya but almost all parts of the world due to climate change. The socio economic activities of pastoral communities are being shaped negatively affecting their livelihoods adversely. In Turkana and Mandera Counties in Kenya, new homes have sprung up as a result of climate change i.e. environmental refugees. Most of these refugees are from pastoral communities and they survive wholly from food aids that come from the NGOs and the government of Kenya.

Pastoral land is no longer able to maintain pastoralism because the drought is increasingly becoming severe making pastoralists to move to greener pastures where there is food, water or grass for animals. Relocation of the pastoralists is a call to the stresses from prolonged dry spell. It is not necessarily that pastoralists relocate to areas with water and pasture for their animals but some do relocate to towns where they end up working for wages in order to survive or entirely depend on relatives who already moved to town or food aid from NGOs or well-wishers. The act where these people move to urban areas makes them abandon their initial lifestyle. Today, insecurity in most of the African countries have made the affected nations to cease the movement of pastoralists across the national boundaries e.g. the movement of Somali people to Kenya and vice versa is restricted by the government of Kenya. However, they relocate to the surroundings of the nearby towns where they beg for food from the NGOs.

3.7 Droughts in Sub-Saharan Africa

Drought is defined by UNISDR (2009) as "The deficiency of precipitation over an extended periodof time, usually a season or more, which results in a water shortage for some activity, group, or environmental sectors". Morton & Meadows (2000) explains drought as "A temporary reduction in water or moisture availability significantly below the normal or expected normal amount for a specified period of time". Buchanan & Barton (1999) states that "A reduction of water availability might qualify as a 'drought' when two or more consecutive dry years occur in which the length of the growing period is less than 75% of the mean, i.e. a drought is driven by several consecutive rainy seasons in which deficient rainfall has detrimental effects on the production system." FAO (2002) describes drought as "A naturally-occurring phenomenon that exists when precipitation is significantly below normal recorded levels, causing serious hydrological imbalances that adversely affect land resource production systems" Death of animals, total loss of moisture in the soils to support the survival of vegetation, drying up of water points and rivers all resulting from failure of rainfalls to occur reliably for at least two times is what this study describes as drought.

Failure of precipitation in one season may not necessarily lead to drought. Drought is a phenomenon that occurs recurrently and not just once. Particular features have to be eminent for a dry spell to be termed as drought. However, these features include decline in precipitation, drying up of water points and vegetation as well as decline in the health of people, animals and deaths of people and animals. Drought paves way to desertification or rather dry lands. These dry lands are characterized by large tracks of land with sand, scanty or no vegetation, scorching sun with little or no moisture in the atmosphere and limited or no water points like rivers, lakes, swamps etc.

UNISDR (2009) states that "There are specific types of droughts depending on the duration it takes and the effects it causes to the environment i.e.Meteorological, agricultural, hydrological and socio economic droughts". The time it lasts the shortfall of rainfall in relation to the normal season describes the meteorological drought while the

hydrological and agricultural droughts are described as the shortfall of rains/water supply that results in failure of the vegetation (crops) to grow. When a drought occurs and it affects the socio economic activities of people e.g. livestock, then it is termed as socio economic drought. Socio economic droughts leads to shortfall in supply of things e.g. milk, pasture, blood, water, food, etc. in relation to the demand of the same. LEGS (2009) describes drought in pastoralism context as "A slow-onset emergency where the key livelihood is lost".

Blench &Marriage (1999) designated the misunderstandingthat "The monitoring, measuring and modeling of climate is usually conceptualized as a technical matter left to meteorologists and distinguished from the realm of both policy and crisis management." This is to say that "Scientists should present technical data, while politicians and development agencies are to come up with appropriate responses." The societal structures of the world are used to classify the happenings and the forms of the climate of any given region and hence "Drought exists in relation to what is considered to be normal rainfall rather than as entities that can be defined objectively".

The sub-Saharan region of Africa is commonly known as Sahel. It experiences shortfalls in precipitation amount and duration. The inadequate and unreliable precipitation in the Sahel region has made the region's population to be poorest worldwide.Gommes & Petrass (1996) echoed that "The worst droughts in the region were those of the 1910s, which affected East and West Africa alike". Pastoralists normally inhabit marginal areas characterized by poor rainfall and high temperatures. There are about 120 million pastoralists in the world, of which about 50 million live in Sub-Saharan Africa roaming the dry sub-Saharan belt extending from Mauritania to Ethiopia (Rass, 2006). Rass, (2006) says that "Pastoral areas occupy 40 percent of Africa's land mass with over 70% of the land in pastoral areas unsuitable for crop farming making livestock production to remain as the most viable economic activity". FAO (2005) "There were about 235 million cattle, 472 million goats, 21 million pigs and 1.3 billion poultry in Africa valued

at US$ 65 billion in total". Oluoch (2007) quotes that "Statistically, 70% of the total livestock population and 90% of wildlife population inhabit arid and semi-arid lands".

3.8 Occurrence of Droughts in Kenya

In Kenya, major droughts normally occur once in every decade at national level, causing severe loss of production in most ecological zones covering at least two or more provinces. At regional level drought occurrence varies according to the production activities such as; types of crop grown, livestock species, and distribution as well as grazing patterns. UNEP/GoK (2000) "Minor droughts occurs in every three to four years and are mainly confined to medium and low potential areas of arid and semi-arid land, with the exception of the arid northern part, where it is experienced yearly with varied consequences". 2000-2001, 2009 and 2011 dry spells were the worst with interval of several failed rainy seasons. Consequently, these droughts reversed the country's' years of development efforts, causing keyconcern to MDGrealization, principally reducing poverty halfway among the people by 2015. Republic of Kenya (2007) "In arid and semi-arid areas there are economic and environmental constraints to food security such as low productivity, lack of or constricted livelihood diversification, poor infrastructure, few or a lack of social services, neglect of Pastoralism, slow responses to changes, limited understanding of the vulnerability, gender disparities and globalization".

3.9 Causes of Drought

According to Zwaagstra, *et al*., (2010), drought has been attributed to both natural and human causes. The latter include clearing of land for settlements, urbanization, deforestation, poor agricultural practices, overgrazing, and industrialization. On the other hand, the natural causes include dry winds and global warming.

Inadequate Rainfall-Inadequate rainfall is responsible for drought in many regions. Evidently, many areas receive very little or no rainfall annually hence very dry without vegetation. The rivers, dams, and any other water sources dry out. Due to the situation,

water does not evaporate to the atmosphere to generate rainfall. Similarly, the inadequate rainfall leaves little agricultural development and no water bodies.

Deforestation-The menace of cutting down trees for different reasons has been a threat to the survival of Kenya from different perspectives. Apparently, people have little understanding that trees are responsible for bringing in rain hence drought and famine (Oba, 2001). Forests are responsible for different things including cleaning the air. Cutting down trees directly affect and encourage deforestation. Regardless of the new measures put in place to arrest the problem, little achievement has been registered due to the high need for growth in the areas.

Global warming -Statistically, temperatures on earth have been rising due to green gas emissions and urbanization. Warm temperatures throughout the year makes it difficult for plants and animals to survive the harsh temperatures (Marshall, 2011). High temperature, evaporates moisture from the earth and generates a lot of heat in the soil making difficult for plants to survive.

Land encroachment -The high rate of population growth has caused a lot of tension on the existing resources. In many instances, the carrying capacity of existing resources is exceeded making it difficult for the environment to sustain people's needs. People have encroached on water bodies, wetlands and forests. They do not conserve these areas but are rather resolved to change the face of these areas through their desires. As this encroachment spreads drought is inevitable.

3.10 The Impacts of Drought in Pastoral Areas

According to Ahmed *et al.*,(2001) "The term drought always has a negative connotation in the minds and understanding of the general public because it does have a lot of negative impacts and more so in the pastoral areas. Drought plays a major role in pastoral areas that can be understood in looking at the balance between humans, herds and pasture; and the descriptions of the management and husbandry decisions of individual stock-holders". Inadequate and unreliable rainfalls do not tell the drought's enormity alone but the presences of complementary possessions also do speak a lot on the drought enormity. Blench & Marriage, (1999) "Of greater importance among

pastoral people is the period of recuperation from drought which may be much longer than the return of the rains would suggest".

Ahmed et al (2001) "Drought should not be seen in the pastoral context as some external event, alien to the experience and working of the pastoral economy but rather as an element within the production system itself, around which producers orient their activities, determining forms of organization and strategies to be followed". Barton & Morton (2001) clarifies that "The pastoral societies should look for the ways of curbing the consequences of the declining economy than getting more from the upsurge i.e. traditional pastoral systems are better understood if one supposes them to be more concerned with reducing potential losses than with maximizing individual gains". Poverty is eminent in the northern parts of Kenya caused by recurrent dry spells frictions among the residents.

FAO (2002) "A big part of the region's population lives on less than 1 Dollar (1US$) a day". Production of food, dispersal and access, tough environment, delicate bionetwork, deprived governance and monetary enactment are the major challenges facing people in the region. Drought impacts on the number of herdsaffect the people in a negative manner. This upsets the threshold number that can adequately support them during prolonged dry spell. However, due to this negative impact on the herds, the pastoralists are rendered to losses in terms of animal products like milk, weight loss and value drop, deaths, drop in the milking period among others which subjects the pastoralists to poverty. Ahmed et al(2001)"The 1983-1984 drought in Borana, Ethiopia, reduced 60% of cattle density owing to 42% loss to livestock mortality, 14% lost to forced sale and 4% lost to slaughter. He also mentioned that the decline of milk production was very high, about 92%".

Dry spell in dry areas comes with its own shortfalls in relation to exchange or buying of commodities. The number of animals is reduced drastically during this time of the season and this affects the purchasing power of the pastoral community. The grains by

this time are also reduced in quantity since prolonged dry spell also do touch the farming sector adversely rendering the pastoral communities to food shortage. There can only be need or desire for something if there is capability of the people to buy and vice versa. Dry spells do reduce farm yields, animal products as well as decline in the value returns culminating into low need. However, the different ways pastoralists employ to survive during prolonged dry spells' adverse impacts matters a lot not forgetting the plans to uphold flexibility and stimulate drought controls for the well-being of the people living and affected by recurrent drought episodes.

The impacts of the drought on the environment and people can be illustrated better using the north Americas dust bowl drought that occurred in 1930s. Schubert *et al.*,(2004) "Dust Bowl drought of 1930s in North America was one of the most dreadful events in the history of the region affecting about two-thirds of America, parts of Mexico and Canada". Poor usage of land coupled with shortfalls in precipitation as compared to the normal season caused the drought. Miller & Seager (2009) "The drought pushed more than three million people out of their farms on the Great Plains, and half a million migrated to other states". During this drought episode, plans to mitigate the effects were not laid in place apart from ways of curbing erosion that were again minimal.

Crops in extensive lands failed during this dust bowl drought, the lands remained unproductive which rendered the unconsolidated soils to the agents of erosion. Afrin (2012) "The Dust Bowl drought thus had natural roots as well as human-caused consequences". The dust hindered the insolation from the sun which affected the precipitation and at the same time led to deteriorated ability to see far. Miller & Seager (2009) denoted that "There had never been dust storms like these in preceding droughts in America, besides, more soil was lost by wind erosion than any other form of soil erosion and it's believed that hundreds, if not thousands, of Plain's residents died from dust pneumonia".

Prolonged dry spells in east African countries have led to recurrent skirmishes among inter and intra ethic tribes resulting from animal looting. In Kenya for example, there has been insecurity in Mandera, Turkana, Baringo, and Samburu among other regions for quite long where looting of animals is common coupled with killings. Along Kenya Somali border, Somali, Borana and Turkana have looted from each other causing uncertainty. The shared grazing lands in dry lands are dwindling due to recurring uncertainties. Pastoralists are now turning to permanent residence at specific areas and avoiding moving from one region to another in search of pasture and water.

A part from the insecurity, movement of pastoral societies from place to place pauses a threat to the environment especially soil erosion and vegetation failure. Droughts also pauses a threat to the economy of the pastoral societies. Little & Leslie(1999) "A shift from pastoral subsistence based on cattle to one based on small stock when livestock holdings *per capita* start decreasing. Cattle have the disadvantage of being large indivisible units, such that substantial amount of the herder's wealth is stored in only a few animals. Poor households are therefore relatively less vulnerable to livestock losses when concentrating on small stock, since the capital accumulated in each animal is minimal".

Rich pastoral communities do swing from low productive animals to high productive animal like the Ethiopian Borana who moved from cattle to camel so as to improve the production of milk for commercial purposes (Roth & Fratkin, 2005). Animals like goats and sheep are reared by poor people since their rate of procreation is faster after the droughts and they are easily affordable on the markets. One more important reason why pastoral communities prefer sheep and goats is that they are well of adapted to dry condition with low grass than other animals.Pastoral societies who settle at a particular point on a permanent basis invent growing of crops as a cushioning strategy against hunger.

3.11 Effects of Drought on the Livelihood Strategies of the Pastoral Communities

Pastoral communities do not engage mostly in crop growing and therefore they get their (grains) food mostly from the markets. FSNAU/FAO (2011) "Most wealth pastoral groups received about 80-90% kilocalories (Kcal) from the consumption of purchased cereals (rice, wheat/flour, sorghum, maize etc.) and non-staple foods (sugar, Oil, Cowpea etc.)". Quite a number of animals during the drought episodes reduce their weights or die exposing people to poverty. This in turn deteriorates herder's ability to buy food since the animals have declined in health, died and cannot fetch good money. Herders therefore end up selling even the productive animals so as to get money to buy food at the expense of livestock capital. Selling of herds during dry season is meant to buy food for the family and also fodder for the remaining herd (Bevege, 2009).

When the herds die and others sold, wealth sharing among the pastoral communities is affected since the number of herds has reduced. O'Leary (1980)& Sandford (1977) "Droughts tend to have a stratifying effect within communities, where the weaker members become impoverished further while the rich are able to minimize their-losses and may even increase their assets during such periods of stress". Sometimes drought can impoverish both the low class and the middle class to the extent that they end up being the same. SC- UK (2007) baseline report, in Wajir district "The top 15% of the population has herd sizes and cash income levels similar to the middle wealth group in 2002".

Droughts in Kenya have ballooned the number of the poor over the past decades by declining their aggregate monetary wealth. These eventually forced many poor households drop out of Pastoralism in search of relief foods or moved to the villages with their remaining livestock and become sedentary. Recently, in the El-wak Area livestock mobility has been restricted by two main factors i.e. insecurity and need to enhance the rise of families among others that have prompted increasing sedentarized pastoral system.

For instances the ongoing Somalia incursion by the Kenya forces and rising cases of terrorism in Northern Kenya could be one good example that constrained free movements of livestock. In addition, pastoralists escaping from Zakat (religious obligation) imposed by insurgents in the areas previously used for migration options. These and other mixed factors have adversely affected livestock production and increasingly exposed to shocks, as herd size recovery low (Longley & Wekesa, 2008). As a result, herders are unable to recover from stressbut only become more vulnerable-leading to many pastoralists adopting a sedentary lifestyle. The long known ways of alleviating the deteriorated buying is to vary the ways of feeding in terms of type and amount, looking for help from different groups, charitable aids among others.

3.12 Managing Drought Crises in Border Regions

Drought contingency planning: This is the study of particular occurrences or the ever-changing situations that are threatening to the society and the environment and putting in place the strategies beforehand to alleviate the effects of such occurrences i.e. They are well-timed and operative proactive measures put in place to control or mitigate the negative effects of a particular disastrous occurrence to any society or environment. IASC (2007) describes contingency planning as"A management tool used to analyze the impact of potential crises and ensure that adequate and appropriate arrangements are made in advance to respond in a timely, effective and appropriate way to the needs of the affected population".

Drought cycle management: This is a recurring process that concedes drought as episodic occurrences and states way outs to be undertaken in every stage to mitigate the effects to the society and environment at large.

Adversity (drought) menace management: This is a logicalprocedure of employingexecutiveinstructions, establishments, and workingexpertiseas well as the abilitiesto put into placeapproaches, guidelines and upgradedsurvivingcapabilitiesso as to reduce adverse effects of drought peril and the likelihood of calamity arising.

Communitybased catastropheperillessening plan: This is a situation whereby members of the community are involved reducing the menace of drought for their own good through stipulated and accepted methods that are effective.

Humanitarian actions towards drought effects alleviation: Effects that reverse droughts to catastrophes are dealt with by their respective national leaders permanently. Mousseau & Morton (2010) "Governments in the Horn of Africa are working with donors and implementing agencies to eliminate the divide between emergency response and development, for example by instituting safety nets and social protection programs". 2005-2006 droughtwas very devastating in the horn of Africa. This initiated concerns from the funders/well-wishers to stay on and help in avoiding the menace that could arise from the drought effects by directing extra funding to the affected nations (ECHO, 2009 &EU, 2010).

Grunewald et al (2006a) and Nicholson et al (2007) confirmed, "Humanitarian Assistance Program of Belgium in 2005-2006 drought allowed FAO to divert funds from the Pastoralist Livelihoods Initiative to fund early animal-health interventions as a proactive response to the diver stating effects of drought to the pastoral community". The selling of herds before the onset of drought is encouraged among the pastoral communities so as to fetch good money that can be used to restock their herds after the drought and also increase their food purchasing power during the drought. To reduce the adverse effects of the prolonged dry spell on the means of support of the pastoral communities in the dry lands needs workable and progressive interpolations on the roots of poverty and susceptibility.

National misadventure reactiontactics are linked to 'productive' safety nets, which can be expanded in times of food stress in order to mitigate the negative effects accrued to that catastrophe (Slater *et al.,* 2011). Preparedness among all the stakeholders working towards managing or mitigating the effects of drought in dry lands is vital. Levine *et al.,* (2011) and PACAPS (2009) "Long live agencies in drought prone areas should base their programs on timely money aid and willingness, skills and ability in altering the course on drought cycle management and conduct joint analysis to identify windows of opportunity for intervention, and preparedness auditing, including preparing off-the-

shelf interventions to remove in advance some of the obstacles that delay emergency responses".

Diversification of livelihood strategies: Diversification of livelihoods is generally viewed as an attractive strategysince it is a means to spread risk and reduce resource dependency, which is perceived as a key vulnerability driver (Adger, 1999; Pedersen & Benjaminsen, 2008). Bekele & Akumu, (2009) and Steglich & Bekele (2009) said that "Interventions that support normal 'coping strategies' if done right do not only save lives and livelihoods but can lead to more resilient and cohesive communities".

It is important to strengthen traditional ordinary governance among the people and build on the peoples' own knowledge and enhancing involved stakeholders effect valuation in order to come up with the workable and successful solutions to effects of drought episodes to the people involved (Nicholson&Desta, 2010; Boku, 2010). Diversification of livelihood is becoming prominent among the people affected by droughts in dry lands including urbanization among others. International organizations must be pertinent with respect to changes happening in the pastoralist people and not only pay attention to livestock interventions (IFRC, 2011).

Sedentarization and diversification: When pastoral communities start settling at particular places permanently, a good number of them end up keeping animals but they try as much as they can to supplement their means of support e.g. engaging in petty trade, crop growing, and working for other people for money.Morton and Meadows (2000) clearly states that "When many poor households are forced to seek supplementary and/or alternative income-generating activities in order to survive, this is called 'involuntary strategies'but when a small group of wealthy herders, usually from the business sector seek supplementary income generating activities as they invest their accumulated savings, they do it voluntarily". According to De Bruijn & Van Dijk (1995, "The diversification of pastoral activities is a form of adaptation strategy that can be conceptualized as technological, social, and cultural, deployed to deal with risks and uncertainties may end up modernizing pastoral activities".

Traditional Drought risk management: To minimize weight loss and death of livestock which may culminate into food insecurity risks among the pastoral communities, Pastoralists do practice breeding control (mating control) of some species, susceptible to the harsh dry period effects in dry lands. For instance, most of the pastoralists in Somalia do practice mating control measures among the goats and sheep by putting onthe fertile males an anti-tapping apron (xamil) as seen in Fig.3.1, in order to prevent giving birth to young ones in the onset of drought for this may make the mother together with the young vulnerable to drought effects i.e. loss of weight drastically and even death of both the mother and the young one. When this happen, the community is affected in terms of livestock reduction and declined purchasing power of food. So often, mature ewes are mated during the last weeks of the rainy season (last week of November or first week of December) so that the lambs are born in the first half of the following rainy season especially in Gu' (end of April or beginning of May). A lamb born in the dry season has less chance of survival FSNAU/FAO (2010).

Plate 3.1: Anti-tapping apron to control mating

The other method used by the pastoral communities in dry lands is the castration of the male animals so as to make them resistant and less vulnerable to the adverse effects of the drought during the drought spell. Castrated male animals also do fetch huge amount of money as compared to those not castrated hence increasing food purchasing power among the pastoral community especially during the shock.Pastoralists also do kill or slaughter number of kids and calves (culling system) in order to rescue their mothers when they sense animminent drought resulting from lack, unreliable or severe rainfall deficit and limited options for migration.

3.13 Theoretical Framework

3.13.1 Introduction

The theoretical framework of this study is based on the resilience theory, the sustainable livelihood approach and the discussions on the drought effects and adaptation which provide some insights that contribute to the framework as they offer tools that complement the usefulness of resilience thinking for the purposes of this study.

3.13.2 Resilience

Adger (2000) define resilience as the extent to which a system can endure blows and pressures and continue to maintain its functioning state.Chambers & Conway (1992) define stress as predictable and cumulative shortage or decline in resources while shocks are sudden and traumatic. The speed of recovery from a disturbance is one aspect of resilience which separates it from response which describes the direct reaction to the impacts of stress.Adger (2000) "Resilience of the social system has the additional capacity to foresee and adapt to changes as compared to ecological resilience".Walker *et al.*,(2000) refers to resilience as "The degree to which a system is capable of learning and adopting new systems".

Folk *et al.*, 2002) "Change in social-ecological system are inevitable, and they allow resilient system a possibility of developing its capacities and re-organizing itself to match the new circumstances".Each system must be in a position to develop its adaptive capability so as to manage the new circumstances accordingly.In the framework of this study, resilience is considered particularly through its links to adaptation (resilience of the focus communities of this study is assessed largely through their aptitude to adjust to the changes).

Biological resilience is associated to communal resilience only if the livelihoods of people solely hang on naturally available resources. According to Folke *et al.,* (2002) "Human activities are capable of dramatically changing the surrounding environment, which may lead to negative changes both in the ecological and social system". The

pliability of the societies is a sum of many factors and the pressure on livelihoods do not only emanate from environmental changes but also from other sources like the economic or institutional.

Vulnerability, another concept frequently used in development discussions can be thought of as a flip side of resilience. While resilience describes the levelat which individuals or a group of individuals can managethe situational variations. Vulnerability defines limitations in the face of challenges. Adger, (2000) termscommunalliabilityby way of"The exposure of a group of people or individual to stress as a result of the impact of ecological or environmental change". This strain may result into challenges in maintaining prevailing livelihoods creating tension and conflict over critical natural resources.

Loss of livelihoods can lead to rapid changes from relatively stable state of welfare to increasing poverty and destitution particularly in the most vulnerable communities (Folke *et al.,* 2002). Increasing resilience expands the potential to cope with stress and can thus help in decreasing vulnerable communities (Folke *et al.,* 2002). Increasing resilience expands the potential to cope with stress and can thus help in decreasing volubility.

Assessing the current level of resilience ofa group of individuals can be done using different tools, focusing on their capacity to adapt and manage the shocks and stresses.Attention is given to their asset levels, historical profile of the community i.e. assessing the impact of stresses and shocks 'in the past' and how the community adapted to the changes, is an important issue to consider as continuum and a product of the past (walker *et al.,* 2002). Grass root stakeholders should be involved from the early phase of assessment to the last phaseso as to acquire a realistic opinion of the native condition. Migration and mobility can also be considered as important indicators of the resilience of a community. Individuals who migrate to other areas leaving behind their relatives end up sending remittances to their people in order to help them survive.Looking at how diversity of livelihood strategies affects the resilience of the

study,it is important to in-cooperate the local grass root knowledge to conventional resource management and scientific understanding. This can be achieved for example by taking advantage of the historical experience of the local communities regarding natural resources management. Including the local experiences and perspectives, enable the strategies building resilience to be truly sub stable.

However, the role of institution in increasing social resilience vital asit encompass all social system and determine distribution of asset Adger (2000). Institution can function in providing and enabling environment for the local process that enables resilience. They have the capacity to function and enhancefinancialprogress/steadiness as well as evenhandeddispersal of resources among population, which Adger (2000:354) mention as key factor for increasing resilience. Managing the social ecological system is in fact is an important element increasing their resilience as long as the various stake holders within the system are included as well walker et al (2000) one could think that this works also in the opposite direction a weak institution may impair the capacity of local communities to increase their level of resilience.

There are challenges in handlingcommunaland biological structures. The unpredictability of some of the key drivers of the systems e.g. the environmental change, technological development and the ability of humans to affect the predicted outcomes by their actions makes it difficult to know what the future challenges will be like (Walker *et al.*, 2002). Sapountzaki, (2007) “Resilience for the group of people and for a particular individual are two different things”.Plans to enhance resilience should be geared towards alleviating negative impacts to the entire people affected and not a particular person in the group affected.

3.13.3 Sustainable livelihood approach

While the main theoretical framework of this studywas based on resilience thinking, the sustainable livelihood approach can also offer valuable ideas for assessing the level of resilience and planning strategies for increasing it. The main issue for this purpose is the

concept of assets which is the central idea for this approach. Chronologically, the sustainable livelihood approach preceded resilience thinking. Resilience thinking fills in the gaps left by the sustainable livelihood approach (Marschke & Berkes, 2006). While one part of the definition of sustainable livelihoods mention coping with and recovering from stress/shocks, very few livelihood studies have minimally concentrated on what achieving this would require such as conducting a resilience analysis. Livelihood encompasses the capabilities, assetsas well as deedsessential for waysof survival. A means of support is said to be maintainable so long as shocks, strains are able to be handled and recovered by it, uphold/boostits capabilities and assets, offer sustainable means of support opportunities to the next generation and which contributes short term and long term net benefits locally and worldwideto others (Chambers & Conway, 1992:7).

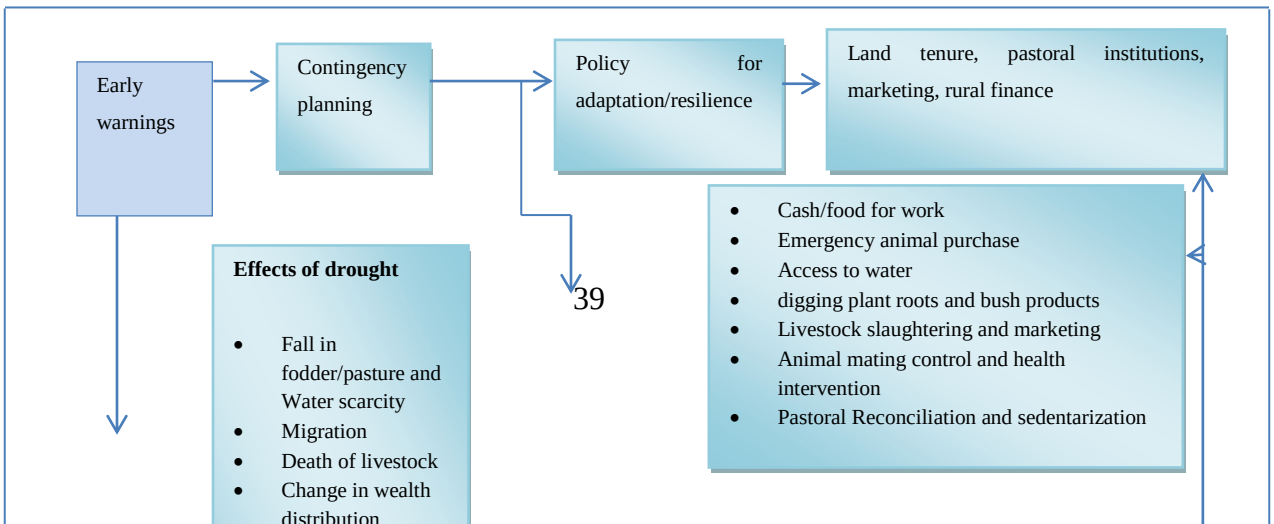
The core objectives of this approach in the DFID guidance sheets include better access to education, technology, infrastructure, financial resources, and social services as well as natural resources including their management for the poor. Improvement in the social and institutional environment and access to competitive markets are also among the main objectives. The ultimate aim of the sustainable livelihood approach is to eliminate poverty (DFID, 2001). This approach places a strong emphasis on the central role of the poor population in development planning. It seeks to include the views of the poor themselves about their own situations and the possible solutions to challenges. The goal is to link the macro-level decision making to the level of the local people (DFID, 2001). This approach helps to understand the importance of considering the impacts of different projects on both the social and ecological systems.

3.13.4 Conceptual framework

The conceptual framework below best explains the natural progression in the study through concepts, empirical knowledge, and important systems in understanding the problem. Notably drought as a key problem surrounding the arid and semi-arid areas is being managed through early warning systems and contingency planning techniques

from different stakeholders including the government and human right organizations. Indeed, this is supplemented by a series of policies and other possible interventions. For example, in March 2017, President Uhuru Kenyatta launched four initiatives aimed at managing drought in Kenya with priority on pastoralists. This includes; livestock insurance payouts where pastoralists were to receive payment for their livestock. At the same time, a new vaccine for livestock disease was to enhance livestock takeoff with the ultimate work done through the cash transfer program. Similarly, The Hunger Safety Net Program works under the same objectives with the Ministry of Water providing the important service of water trucking to 15 counties. Notwithstanding these interventions, the effects of drought normally evade the barriers leading to fall in fodder/pasture and water scarcity, migration, death of livestock, change in wealth distribution, fall in herd productivity, conflict and insecurity, food insecurity, and death of people.

The normal channel of reaction starts with mitigation taking into consideration food for work, emergency animal purchase, digging plant roots and bush products, livestock slaughtering and marketing and pastoral reconciliation and sedentarization. After the mitigation exercise, relief efforts come into force to save face through the provision of food, cash, shelter, human /animal health interventions and debt cancellations to relieve the burden. Thereafter rehabilitation follows to take back the pastoralists lands back to their conditions through restocking, livelihood diversification, distribution of seeds and agricultural credits that may take shape in organized land tenure system, marketing, or rural finance to build capacity. Interestingly, the cycle repeats itself as another drought season approaches hence the need to dissect and brake the malignant barriers of limiting the transition from consistent drought to sustainable pastoralism.



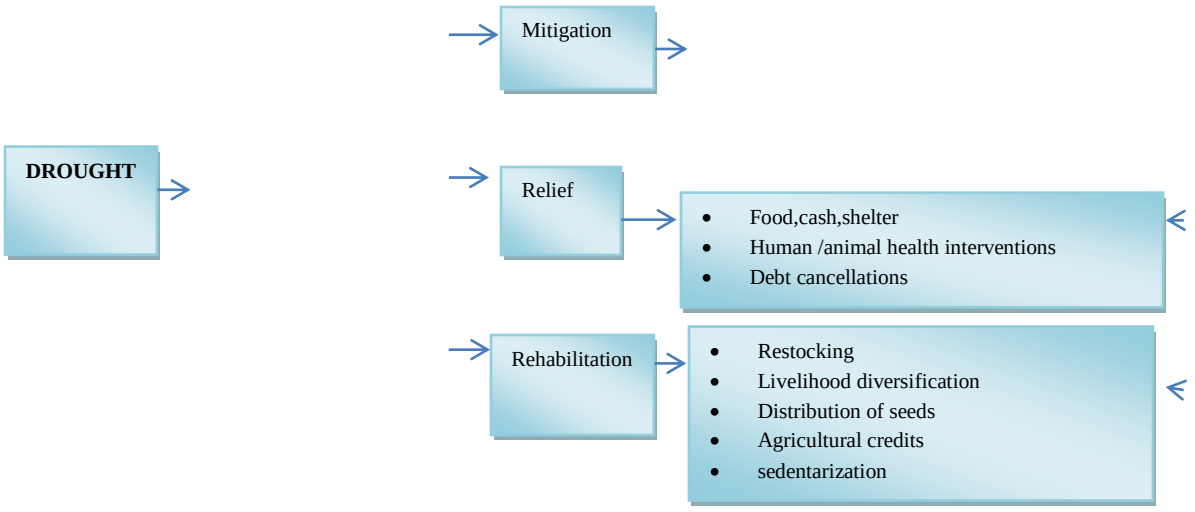


Figure. 3.2 Conceptual framework for Drought management

(Source: Adopted and modified from Barton *et al.*, 2001)

Note: The arrow points to the affected.

CHAPTER FOUR: METHODOLOGY

4.1 Introduction

Techniques employed in doing this research work are given attention/explained in this section. It provides an exhaustive account of study design, target population and sample size, sampling procedures, research authentication, informationgathering and examinationwaysemployed in the study.

4.2 Research Design

The study employed a survey research design where both quantitative and qualitative methods of data collection were used. Quantitative data was collected through the designed questionnaire, key informant interviews as well as observations of the study area. Qualitative methods involved focus group discussion, reviewing previous documented data as per the study objectives. A survey research design was appropriate for this type of study because a wide range of variables on drought effects on assets, livelihood strategies, pastoral shifts and sedentarization, influence of insecurity on stock mobility and border market restriction in the study area were covered (Abdi, 2016).

4.3 Target Population

El-Wak area consists of four wards i.e. four locations. The target population consisted of a pastoral community with a population of 217,220 people organized into 33,064 households (KNBS, 2009).

4.4 The Procedure Used In Sampling

Sampling procedure refers to the method/way of selecting the subject or the cases to be included in the sample. Probability sampling was used and this enabled a reasonable selection of number of subjects, cases or objects that represented the target population in four wards from El-Wak. The population in El-Wak was large and the households were concentrated at specific points (organized in groups/clusters). The large number of household number concentrated in clusters made it difficult to get the sampling frame and therefore cluster sampling was used in selecting the unit of observation from the

intact group (Abdi, 2016). Clusters were chosen using simple random sampling with the help of the area leaders in all the four wards. The arrival at each household included/interviewed was aided by simple random sampling since there was no any list of the households in each ward and also in each cluster. This was applicable in all of the four locations that had been selected.

4.4.1 The Unit of Analysis

This was basically the Garre households where the household heads were the respondents. Whenever the household head (man) was not present, a household representative e.g. wife or son above 18 years was picked as the respondent.

4.4.2 Sample Size

The target population for this study was 33064 households which is much more than 10,000 households. In such a case where the target population is more than 10000, the formula: $n=Z^2 [P (1-P)/L^2]$ is employed in determining or calculating the sample size where;

n = the sample size;

Z = 1.96, the Standard Normal Deviate at the desired Confidence interval, 95%;

p = 0.9 (90%), the assumed proportion (prevalence) of the households who own livestock and engage with the other segments of the value chain;

L = 0.05 (5%), level of significance.

The calculation of the sample size is shown below.

Sample size

$= 1.96^2 [0.9 (1-0.9)/0.05^2]$

$= 3.84 [0.9 (0.1/0.0025)]$

$= 3.84 [0.9 (40)]$

$= 3.84 [36]$

$= 138.24$

Due to insecurity engineered by all-shabab (terrorism) in the study area and Mandera County at large during the time of data collection, only 102 households were interviewed

out of 138 calculated sample.The study was contacted in the four selected locations and the number of cases included in the sample was representative of the total population. However, each ward had different number of households;therefore, the cases included in the sample from each ward were determined by the following formula;

$n_0 = \frac{X*138}{33064}$ where n_0 is the number of cases to be selected from each location, X is the household size of each location, 138 is the total sample size representing 100% and 33064 is the entire household size for the study area.

Table 4.1 Sample frame

LOCATION	HH NO:	TARGETED HH NO:	HH NO: INTERVIEWED
KOTULO	8143	33	33
WARGADUD	7460	31	31
EL-WAK	12277	51	37
SHIMBIRI	5184	21	9
TOTAL	33064	138	102 (73.9% of the total target)

Total number of households interviewed was 102 representing 73.9% of the total target i.e. 138 households.

4.5 Data Collection Procedures

These are different ways in which data wascollected during actual fieldwork.

4.5.1 Type and Source of Data

The use of the questionnaires was employed to gather primary information. The questionnaires composed of both closed and open-endedquestions.They targeted the heads of the Garre households in El -wak area. However, interview guides were also employed to get information from key informants e.g. community elders, government officers and through field observations and photographs.

Secondary data was obtained through reviewing literature on pastoral life, previous research work as well as published and unpublished data. Published data included academic thesis, journals, books, government articles. Unpublished data included newspapers, articles, and research reports. These materials were sourced from Libraries, government records, internet etc.

4.5.2 Primary Data Collection Instrument

The tools employed by the study to gather information were the questionnaires, interviews and observation schedule.

4.5.3 Household Survey

This employed a household survey questionnaire tool to gather the information. A questionnaire has a diverse number of merits e.g. able to gather data over a large sample (Orodho, 2009). A pre-tests exercise of the household survey questionnaires was done during pre-visit to the area. Afterwards, the designed household survey questionnaire was perfected as per the pre-visit experience to ensure they collected the correct and as much information as possible. The semi structured household survey questionnaire was administered to the selected households in English but Somali language was used whenever respondent did not understand English. Respondents were guided by research assistant to fill the household survey questionnaire. During the interview, the researcher and research assistants monitored the processes and asked additional questions for clarifications, emphasis and for corrections as well as to ensure all questions had been answered.

4.5.3.1 Key Informant Interviews

Key informant respondents i.e. chiefs, politicians, school heads, church leaders, clan elders, drought management officials, NGOs officials working/operating in the area among others were identified and interviewed. The researcher had established a friendly relationship with the respondent(s) prior to contacting the interview in order to have maximum cooperation and obtain accurate information

4.5.3.2 Focus Group Discussion

The researcher organized one focus group interview (FGD) of 10 members in an attempt to understand and get more in- depth information on the drought effects on Pastoralism, coping strategies, pastoral production and pastoral household livelihood. The key focus group members included Garre clan elders, religious leaders, officials

from county government, drought management authority official and NGOs dealing with drought effects in the area.

4.5.3.3 Observations

This method was very vital tool in obtaining valuable information i.e. information on grazing land, number of animals, housing structure, water sources etc. especially in areas not expressed by respondents as well as confirming their responses. The researcher made use of surveillance checklist to write/record all seen in the field throughout information gathering period. Information from observation was then recorded by the researcher using a camera after being allowed by the respondents to do so and by note taking.

4.6 Data Organization and Analysis Procedure

Household survey questionnaires were checked for omissions and errors immediately after the data collection before leaving the village for information consistency. After data had been organized, appropriate coding was designed to capture all the information from the questionnaire in a computer by use of SPSS software that enhanced quantitative analysis of the data. Chi-square was employed in hypothesis testing.Frequencies and percentages were used to summarize the information. Tables, charts, graphs, figures, photographs were used to present the information obtained. Qualitative information was analyzed using content analysis procedures.

4.7 Research Work Reliability and Validity

Orodho (2009) refers to the term reliability as "A measure of the degree to which a research instrument yields consistent results or data after repeated trials" while validity as "The accuracy and meaningfulness of inferences which are based on research results, i.e. it is the degree to which results obtained from the analysis of the data actually represent phenomenon under study". Due diligence on ethical research principles were followed where formal approval from relevant authorities were sought, recruitment of local research assistants with at least secondary education level and training them prior to the

data collection. Clear and precise enlightening of the respondents on the reasons for undertaking the research was done before theinterview process in order to remove fear from them free interaction with the researcher. Close supervision of interviewing process through maintaining close contact with the research assistants was done to ensure the envisaged processes obtains reliable and valid data.

4.8 Challenges in Data Collection

There were challenges in data collection in El-wak region mainly due to its vastness and remoteness. This included insecurity (terrorism) engineered by all-shabab, transport network, and harsh climatic condition. However, with competent research assistants, spirited perseverance and determination it was possible to conduct this valuable study though the study did not reach its target (138) sample size but managed 102.

CHAPTER FIVE: RESULTS AND DISCUSSION

5.1 Introduction

This chapter presents research results and findings based on the objectives as well as discusses findings in the light of existing knowledge.

5.2 Characteristics ofthe Sample Households

This section provides the general characteristics of the pastoral households in the study area. The background and profile of respondents help judge and make conclusive decisions. The experiences and life stories easily discussed or remembered helps in justifying various findings. Additionally, key informant information on drought episodes remain critical in coming up with ideal frameworks and not perceptions associatedwith improper research. Drought deteriorates livestock conditions by drying up streams, rivers and hand dug wells. Predetermined socio-economic parameter is necessary for examining indigenous knowledge systems.

5.2.1 Household characteristics

Figure 5.1 shows gender characteristics of the respondents.Majority of the respondents (64.7%) were males while 35.3% were females.

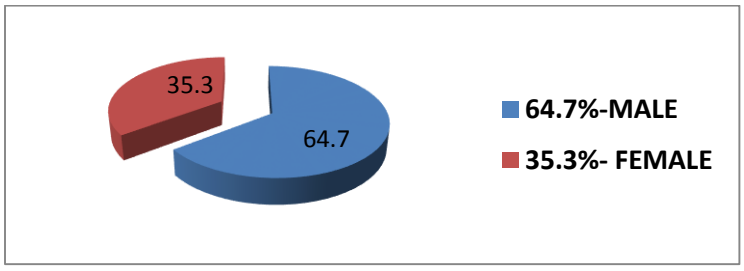


Figure 5.1: Respondent's Gender

Paying particular attention to the composition of the respondents, majority(28.4%) were between the age cohort of 40-49 years, 21.6% between 30-39 years, 16.7% were between 50-59 years, 13.7% were between 60-69 years, 10.8% were between 20-29 years and lastly 1% were above 80 years as shown by figure 5.2.

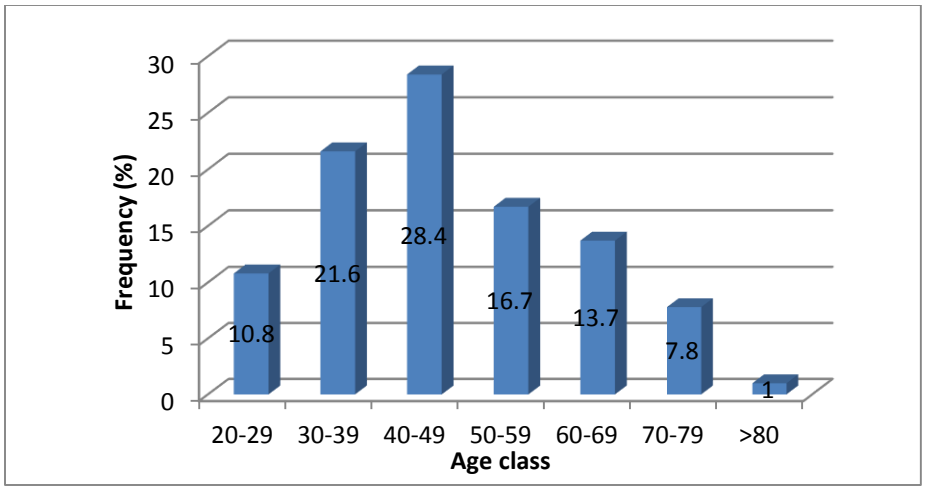


Figure 5.2: Respondent's Age

The research established that a majority of the respondents (40.2%) had household size of 6-10 members. 31.4% had household size of 11-15 members, 16.7% had from 1-5 members, 10.8% had from 16-20 members while 1% had household size of above 20 members as shown by figure 5.3.

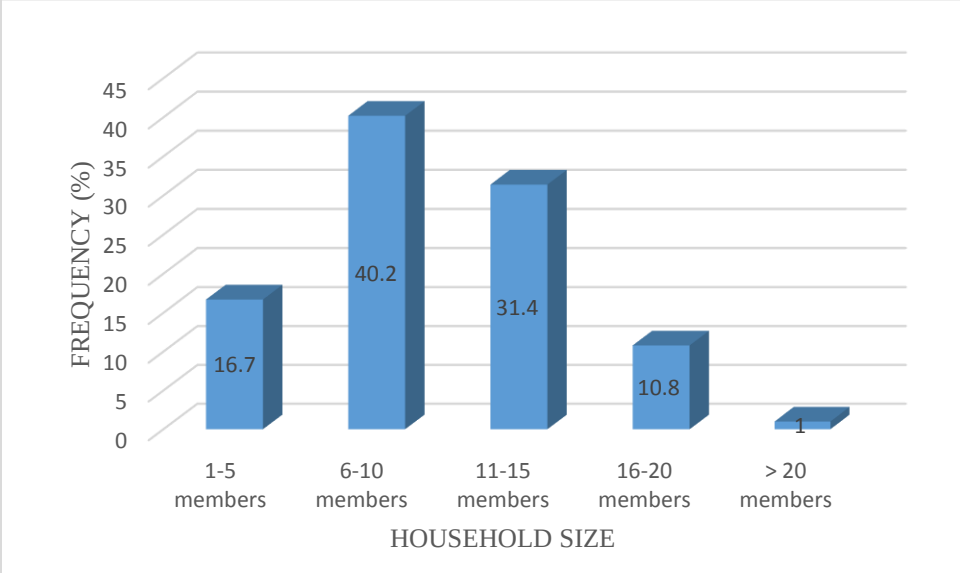


Figure 5.3: Household size

Majority of the respondents (51%) were married polygamous, 44.1% were married monogamous, and 3.9% were widowed while 1% were single as represented by figure 5.4.

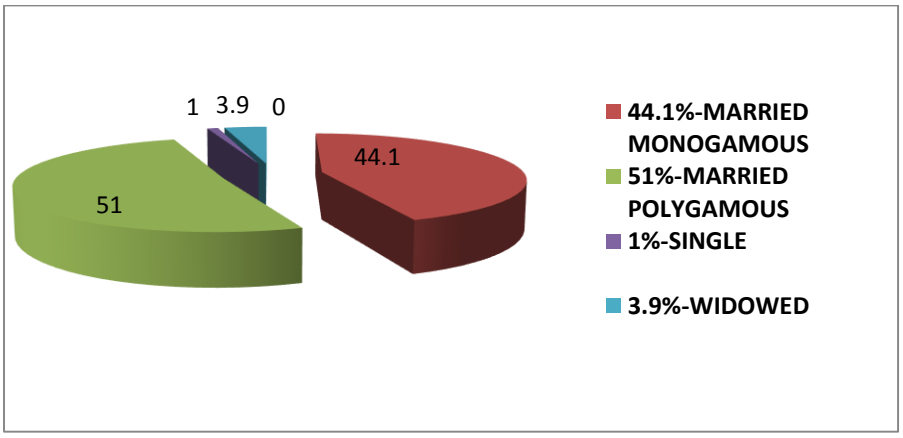


Figure 5.4: Marital Status of the Respondents

All of the respondents were Muslim i.e. 100%. Christianity, Hinduism, and other religion were not present at all in the area of study.

Majority (77.5%) of the people had no education at all, 2% had finished secondary education, 1% joined secondary but did not complete, and 3.9% finished primary education, while 15.7% had others like madrasa as indicated by figure 5.5.

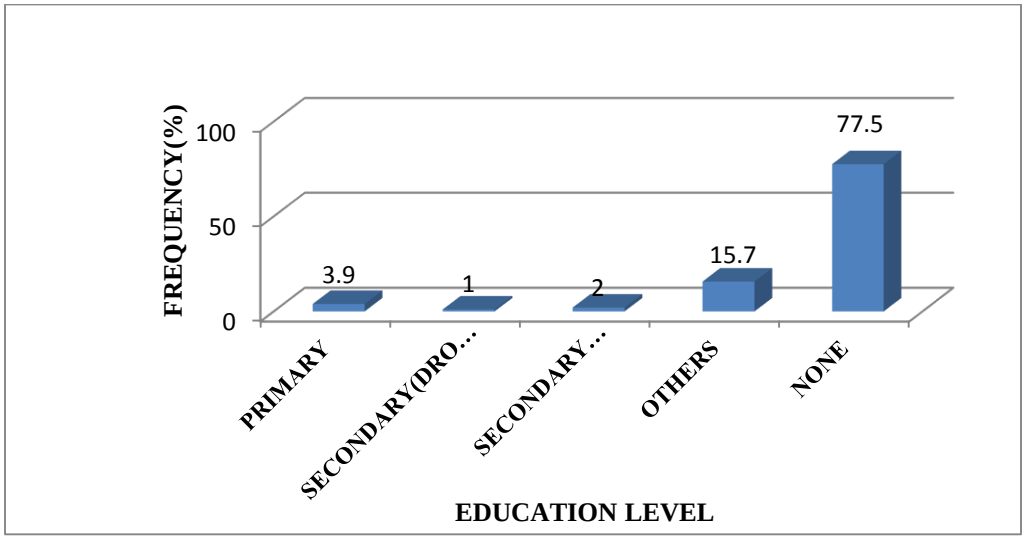


Figure 5.5: Education Level of the Respondents

Table 5.1 indicates that majority of the respondents had permanent settlement (84.3%) while 15.7% were mobile i.e. moving from drought stricken place to places where water and pasture for livestock is available and food.

Table 5.1: Respondents' Settlement Type

SETTLEMENT TYPE	%
PERMANENT	84.3
MOBILE	15.7
TOTAL	100

Majority of the respondents (77%) had traditional huts, 19% had semi-permanent (cariish) huts, 2% had permanent (stone) houses, while 2% had iron sheet roofed huts as indicated by figure 5.6. Most of the respondents who lived in traditional huts settled permanently.

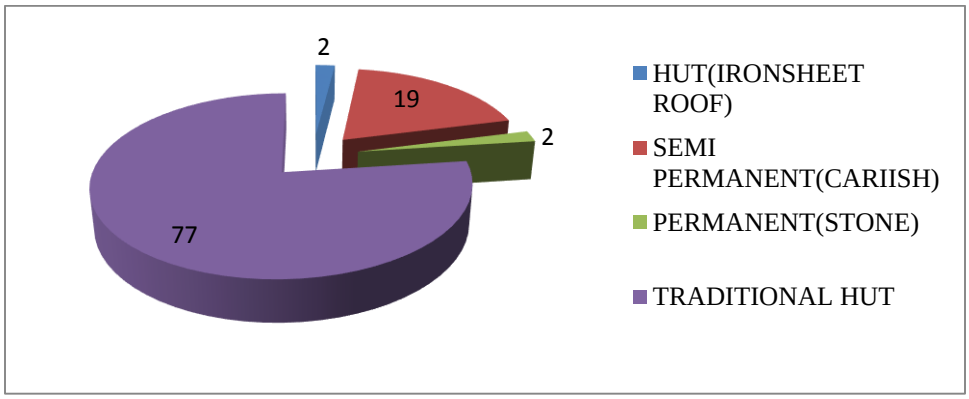


Figure 5.6: Respondents' House Type

Majority (90.2%) of the respondents had stayed in their area of settlement for more than three years. 4.9% had lived the area for 2- 3 years, 3.9% for 1- 2 years while 1% had lived there for less than a year as shown by figure 5.7.

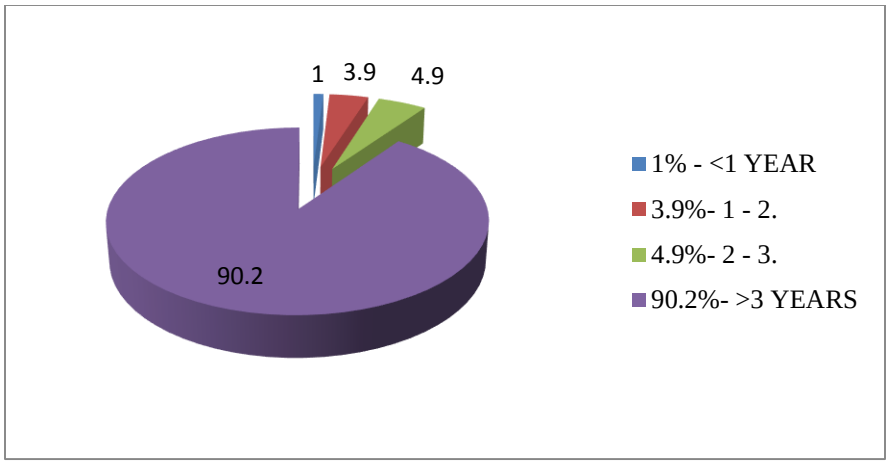


Figure 5.7: Respondent's Time (Years) Spent in the Settlement

Majority (87.3%) of the respondents migrated from other regions to El-wak area while 12.7% were born in El-wak as shown by table 5.2.

Table 5.2: Migrant

Migrant	**%**
Moved here	87.3%
Resident by birth	12.7%

5.3 The Effects of Recurrent Droughts on Pastoralists of El- Wak

The choice of livelihoods holds a plenary role in examining possible present and future characteristics. Drought is one of the issues affecting stability of households' livelihoodsand their decisions in different ways. According to the study, all of the respondents had experienced drought and its effects.

Majority (45.1%) of the respondents had been hit by the drought more than 4 times, 33.3% had been hit 3 times and 12.7% twice while 8.8% had been hit once from 1999 to 2011 as shown by figure 5.8.

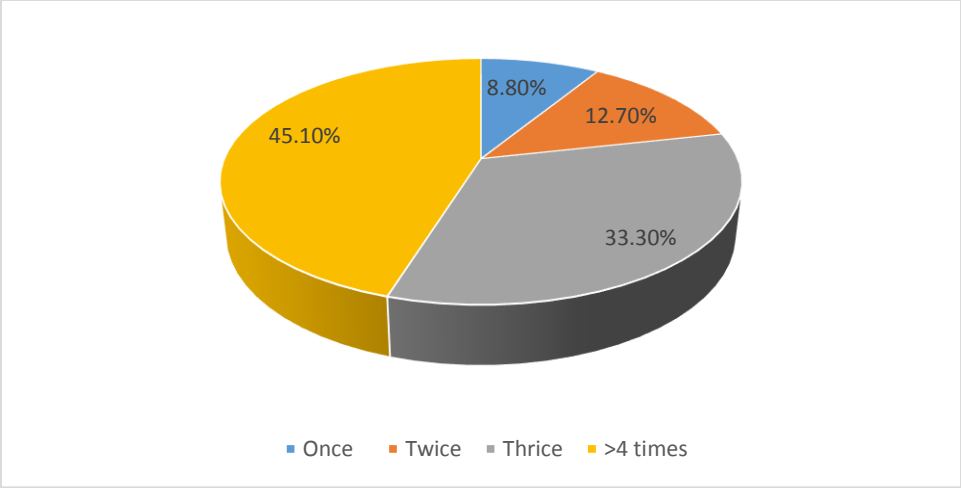


Figure 5.8: Number of times hit by drought from 1999-2011

The drought that was so severe and caused devastating impacts to the people occurred in 2005. Those followed this, which occurred in 2011, 2006, 1999 and 2002 represented by 75.3%, 12.4%, 5.2%, 4.1% and 3.1% respectively as indicated by figure 5.9 below.

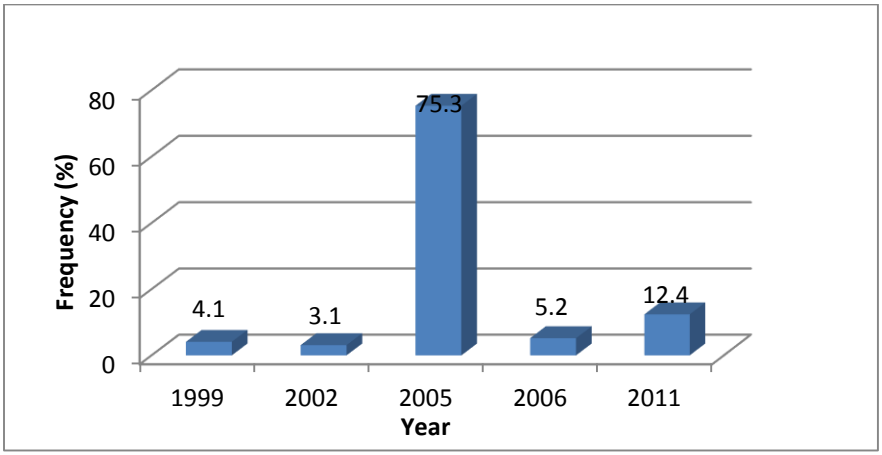


Figure 5.9: The Most Severe Drought from 1999 To 2011

The respondents' Livestock were affected by the drought episodes in a number of ways. However, out of all the respondents, 99% of all had their livestock miscarriage during drought seasons, 98% of all had their livestock experiencing poor conception, 96.1% of all had their livestock reduce their prices, 96.1% had reduced pasture while 95.1% had their livestock decline in health as shown by figure 5.10 below.

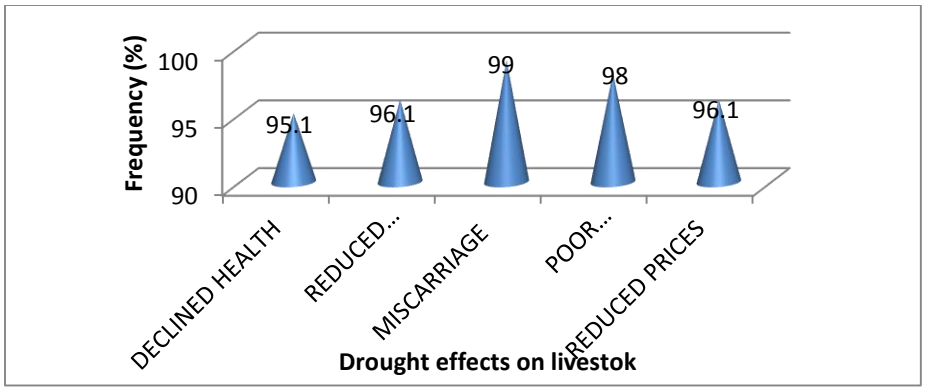


Figure 5.10: Drought Episode Effects on Livestock

Mild drought caused most of water points to dry up forcing pastoralists to move for several miles in search of the water and also drying up of pasture which is also shown by plate 5.1 below leading to pasture scarcity hence declined health of livestock, poor conception, declined price and death**.**

Plate 5.1 Dried up grazing land for livestock caused by mild drought

Source: Researcher

Plate 5.2: Declined health of livestock due to declined water availability and pasture

Plate 5.3: Declined health of livestock due to declined water availability and pasture

Source:Researcher, 2017

Plate 5.4: Total lack of pasture due to severe drought

Source: (Researcher, 2017)

During the severe drought, livestock totally lacks pasture (grass) which makes non-browser livestock to suffer most than the browsers like goats as shown by plate 5.4 above. Herders move with their animals for long distance to animal watering points as shown by plate 5.2.and plate5.3 above. In addition to declined water and pasture, death of animals does also occur especially during severe droughts.The El-wak pastoralist's main economy depend on three main species (Camel, Cattle and Goat/sheep). The effects of the drought episodes affected more on small ruminants (Goat/sheep) directly and indirectly. The number of different species owned at the start of the drought (2011) was 11733 heads on average. However, the level of herd size at the end of the drought dropped down to 8673 heads as shown by table 5.3 – indicating 26 percent below the start of the drought year. This is attributed to higher off-take (sold, died, slaughter, lost etc) by 43.7 percent, due to declined calving and kidding rates during the drought period that would offset the losses.

Table 5.3: 2011 Drought Effects on Herd Dynamics

HERD DYNAMICS	CAMEL	CATTLE	GOATS	SHEEP	TOTAL
No. of livestock owned at the start of the drought	**1256**	**918**	**6398**	**3161**	**11,733**
No. of productive female	685	585	3811	1604	**6,685**
No. of livestock born	384	314	1874	1022	**3,594**
No. livestock sold	110	101	816	269	**1,296**
No. of livestock died	312	372	2172	1086	**3,942**
No. of livestock slaughtered	33	28	295	220	**576**
No. of livestock given out.	32	14	180	61	**287**
No. of livestock received as a gift	2	3	27	21	**53**
No. of livestock lost	79	31	395	148	**653**
No. livestock bought	3	8	28	8	**47**
No. of livestock owned at the end of the drought	**1079**	**697**	**4469**	**2428**	**8673**
%. of livestock owned at the end of the drought	**86%**	**76%**	**60.3%**	**77%**	**74%**

Drought did not only cause devastating impacts to animal health but also to some extent people's health and live. 33.3% of the respondents lost their household members because of drought occurrence while 66.7% did not lose any of their household members.

Majority of the respondents (50%) of the 33.3% of the respondents who lost their household members lost one household member, 23.5% lost 2 members while 26.5% lost three household members as shown by table 5.4**.**

Table 5.4: Number of Respondents' Members Lost Due to Drought Occurrence

NUMBER OF HH MEMBERS LOST	FREQUENCY	%
1	17	50
2	8	23.5
3	9	26.5
TOTAL	34	100

Household members' death was majorly caused by human diseases attributed to malnutrition (58.8%), hunger/diseases and conflicts, each attributed to 11.8% of deaths, hunger only attributed to 8.9% of the deaths while 12.4% of the deaths were caused by other factors as shown by figure 5.11.

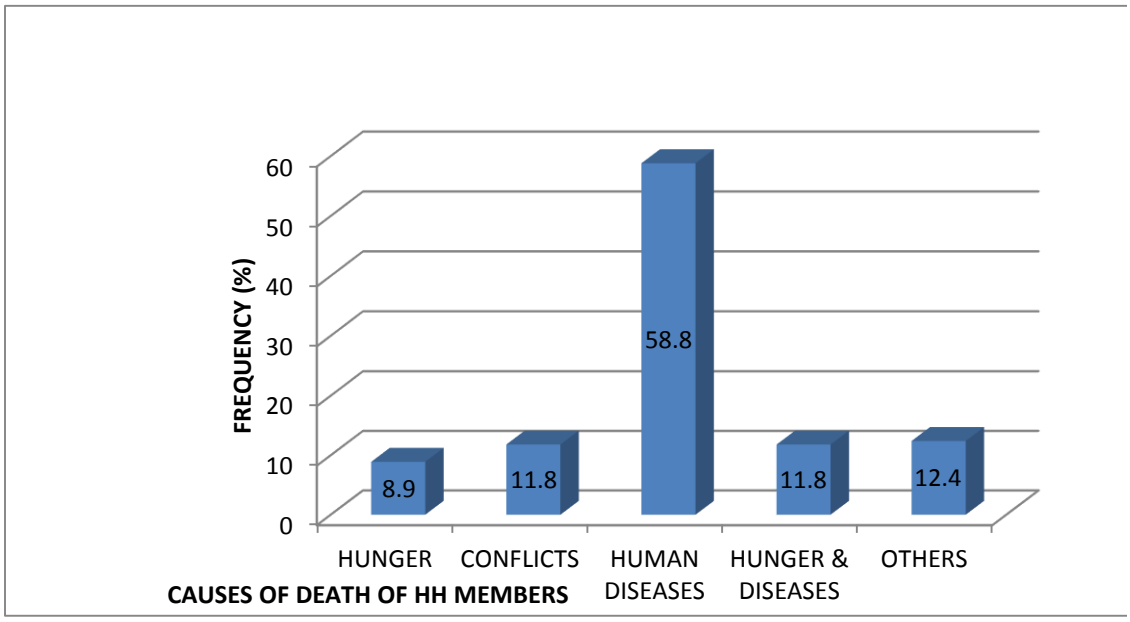


Figure5.11: Causes of death of household members

Table 5.5 shows that majority of the respondents (65.7%) experienced conflicts that were attributed to drought occurrence while 34.4% did not experience any conflict.

Table 5.5: Effect of Drought on Conflict

YES	65.7%
NO	34.3%
TOTAL	100%

Majority (58%) of pastoral households experienced inter-clan conflicts, while the rest experienced cross-border (21%), intra-clan (12%) and others (9%) as shown by figure 5.12.

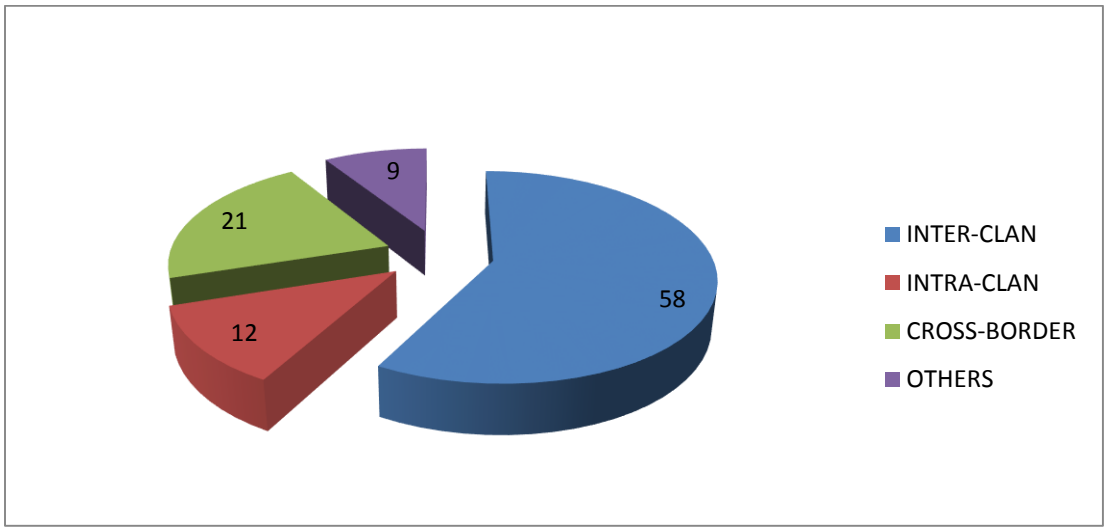


Figure 5.12: Groups involved in the conflicts

Water scarcity was the major cause of the conflicts (34.3%) followed by land ownership issues (26.9%), pasture scarcity (26.9%), animal raid (7.4 %) and lastly clan revenge (4.5%) as shown by figure 5.13.

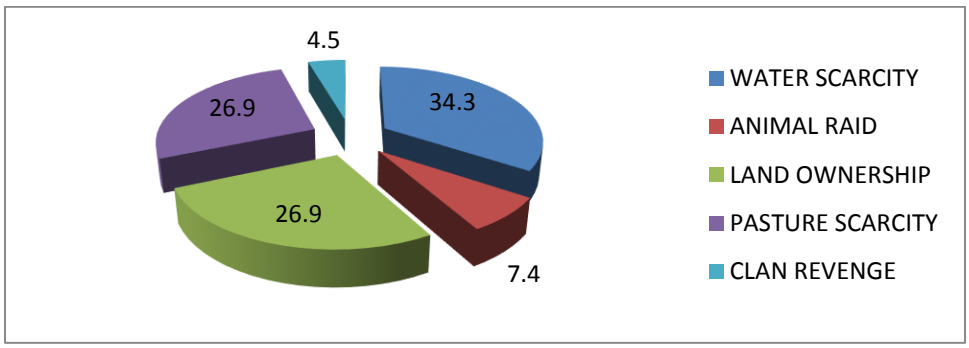


Figure 5.13: Causes of the Conflicts

Majority of the respondents (78.4%), (68.6%) and (67.6%) had mild drought respectively that affected their food availability, income, and household expenditure slightly.However, 20.6%, 30.4% and 30.4% of the respondents' severely affected their main sources of food, income and expenditure respectively. Mild drought did not affect

1% of the respondents' food availability, 1% of the respondent's household income and 2% of the respondents' household expenditure as shown by figure 5.14.

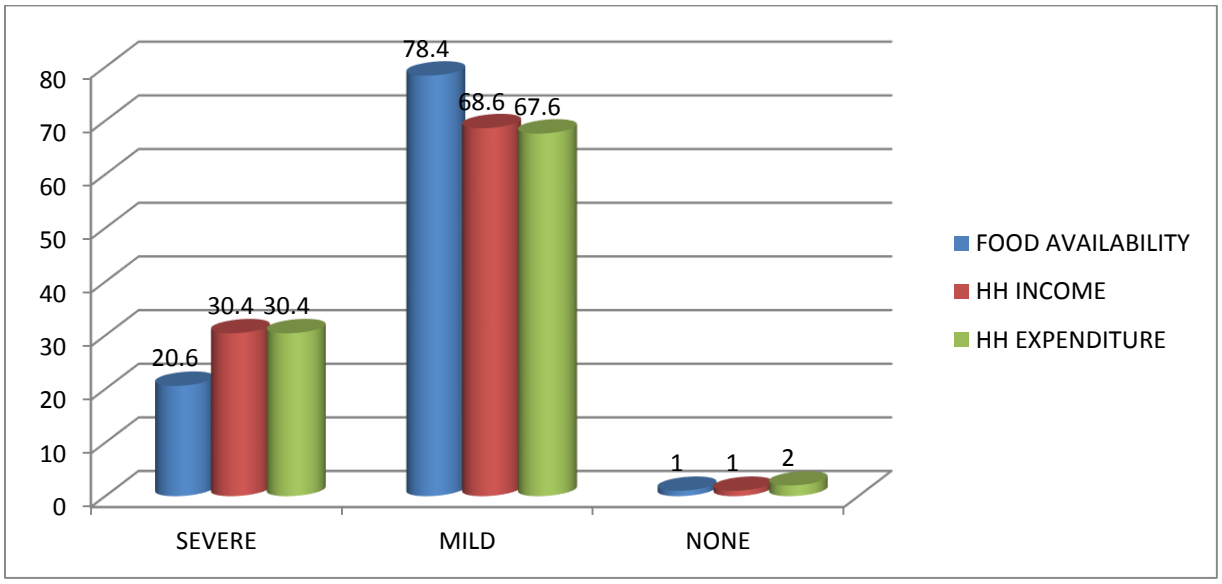


Figure 5.14: Effects of mild drought on HH livelihood

Majority of the respondents' food availability, HH income and expenditure were affected by the severe drought. The percentages stood at 97%, 95% and 96% respectively. Severe drought affected 2%, 4% and 3% of some of the respondents' food availability, HH income and expenditure respectively but mildly. Respondents whose food availability, HH income and HH expenditure were not affected by neither severe drought stood at 1% each as shown by figure 5.15.

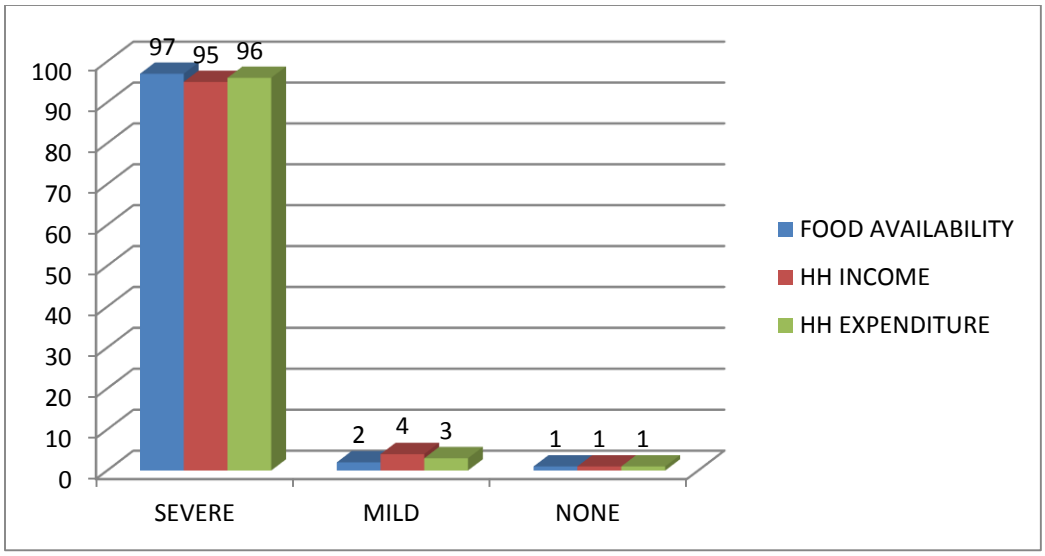


Figure 5.15: Effects of Severe Drought on HH Livelihood

5.4 Strategies Used By Pastoralists of El Wak To Manage Effects of Drought

Coping with drought effects remains one of the difficult adventures. The research, examined different strategies employed by pastoralists to manage the drought effect on pastoral livelihoods of El-wak region.Majority of the animals kept by the respondents were goats. The total number of goats owned by all the respondents stood at 6009 while those kept for other people were 615. This was followed by sheep, which stood at 3030 while those sheep kept for other people stood at 212. Camel took the third position and those owned by all the respondents stood at 1024 while those owned for other people stood at 66. Lastly were cattle owned by the respondents, which stood at 780 while those kept for other people were 12 as shown by figure 5.16. Animals kept for others were given to hardly hit households by the drought by their community/clan members so that they can continue enjoying the products of animals like milk for their survival. Animals that can withstand harsh drought condition are kept in large quantities (browsers-goats) to ensure that not all the animals are lost during the drought episodes.

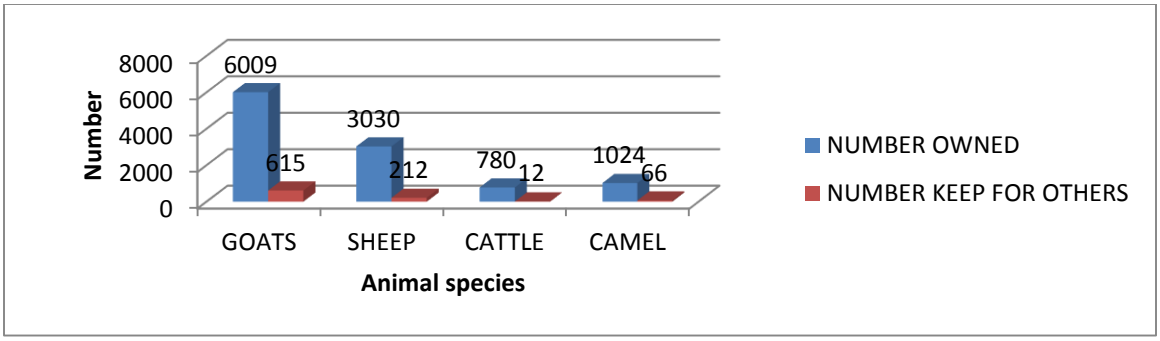


Figure 5.16: Number of Animals Owned by Respondents.

The respondents had animals that were acquired in different ways. 72.5% of all the respondents acquired through inheritance, 47.1% of all the respondents acquired through purchase, 31.4% acquired through gift, 13.7% through bride dowry and 1% acquired their animals through other means. Gifts are given o households that are struggling to survive due to iniquities of livelihood needs. It is a way of rejuvenating someone's source of livelihoods to minimize suffering of his household members. During the onset of drought, some households sell their animals to use money to buy food during the peak of the drought and keep some to buy the animals after the drought (restocking) as shown by table 5.6.

Table 5.6: Animal acquisition ways

WAYS OF ANIMAL	YES	NO
INHERITANCE	72.5%	27.5%
PURCHASE	47.1%	52.9%
BRIDE DOWRY	13.7%	86.3%
GIFT	31.4%	68.6%
OTHERS	1%	99%

One of the other strategies employed to alleviate the effects of drought on households was resolving the conflicts to maintain peace and avoid injuries/ death of household members Conflicts were majorly settled through dialogue (67.6%), government enforcement (17.7%) and other intervention measures (14.7%) as depicted by figure 5.17.

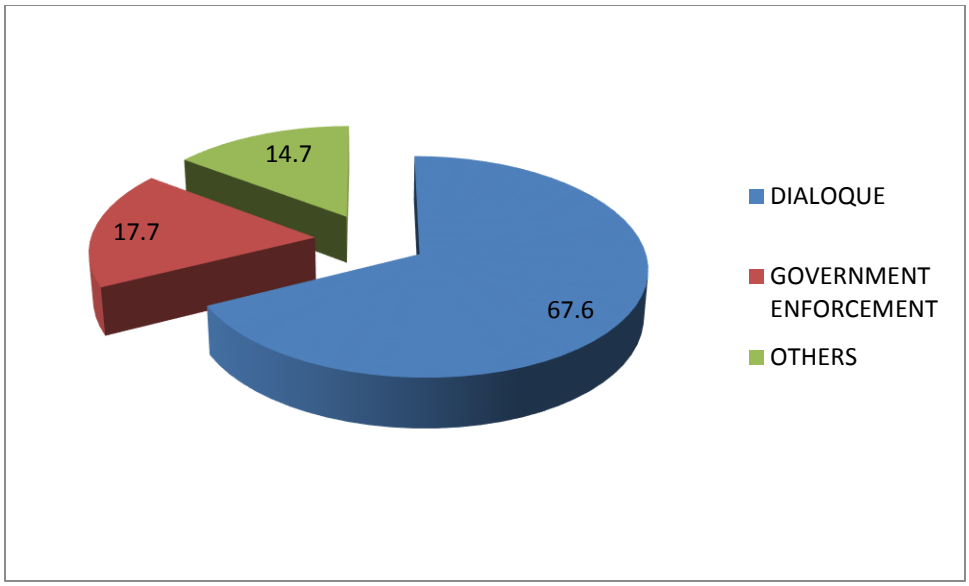


Figure 5.17: Ways of conflicts settlement

The strategies employed in coping with the effects of drought episodes in the study area were based on how mild or severe the drought effects prevailed. Based on the key informant interviews and focused group discussions, severaldiscoveriesas shown in table 5.7were found

Table 5.7Mild and Severe Drought Coping mechanisms

Mild drought coping mechanisms	Severe drought coping mechanisms
→Collect bush products (e.g. gums, firewood, construction poles etc.)	→Selling of productive animals e.g. pregnant, lactating or breeding heads
→Water tracking to rangelands by NGOs and the government	→Digging plant roots and cutting tree branches for animal feed
→Labor migration to urban areas or livestock migration to favorable areas.	→Extensive livestock hand feeding with grains and grasses from distant counties.
→Seeking support from relatives in towns and other villages.	→Selling livestock at a throw price and slaughtering others.
→Increase borrowing of food from friends and client shops	→Cross border migration and Family splitting
→Reduce expenditure on non-food items	→Killing kids/ calves to save mothers (culling)
→Seeking relief food from the government and NGOs	→Migration with animals to pest infested areas (riverine)

A part from the findings from the household survey, key informants also provided some information that supported the findings from the household survey. Key informants were provided discussion sessions using interview guides comprising of question on drought phenomena, the influence of drought management, drought mitigation and response. The key informants were in agreement that the drought occurs frequently and pastoralists are constantly on the move to better ecological zones which affects the herds output, therefore, affecting pastoral societies' livelihood. Prolonged droughts and flooding, severe famine, disease outbreaks, loss of livestock due to degraded pasture and lack of water, human and wildlife conflicts over resources are some of the effects experienced in the El-wak and Mandera County at large due to drought caused by human activities and

climate change. Drought mitigation and response interventions arc implemented by relevant government authority NDMA, and government departments, aid organizations and community participation community contribution also included establishment of community implementation committees and mobilization of community members that provide locally available resources and labour for response and recovery programmes. The community participation was for the formalities since their contribution and support in drought interventions are were never documented and recorded.

This is in consistent with Hesse & Odhiambo (2002) who stated that vulnerability to frequent droughts in pastoral areas can be reduced through harmonization of pastoralist practices and national policies paying attention in particular to pastoral representation and involvement in the policy planning and formulation processes. Inappropriate government policies and development interventions in pastoral areas have increased poverty and vulnerability and have weakened pastoralists systems as well as ways of responding to drought and pressure to the environment. In particular creation of settlements and concentration of water points in dry grazing areas have led to desertification and disruption of pastoralists' migration routes.

5.4.1Have strategies used by pastoralists to manage effects of recurrent droughts been changing from one drought to another?

In this subsection, the study aimed at testing the hypothesis that strategies employed by pastoral households of El- Wak to manage effects of recurring droughts were the same regardless of the drought episode. In order to test this hypothesis, data from droughts of 1999 and 2011 were used.

According to Chi-square tests, the expected count 371 cells representing 100% had less than 5 with a minimum expected value at 0.04. Under the test, a hypothesis only proves to be true or false when the calculated p-value is below or above the tabulated (P-value) respectively. The expected frequency demonstrating the relationship is shown in the case processing Chi-square table below with a validity rate of 73.5%.

Table 5.8: Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	361.116[a]	312	.029
Likelihood Ratio	187.442	312	1.000
N of Valid Cases	75		

a. 371 cells (100.0%) have expected count less than 5.

The calculated p-value from the table 5.11 stands at 0.029, which is lower than the tabulated p-value (3.841), hence we fail to reject the null hypothesis and conclude that pastoralists of El-Wak use the same strategies to manage effects that they are faced with during every episode of drought, its nature or character notwithstanding.

5.5 Possible Interventions to Strengthen Drought Management Capacities Among Pastoralists Of El-Wak

In Kenya, there is an elaborate drought coping mechanism in place to respond to drought situations. Noting that drought comes in cycles, different activities are carried out at different times of the drought cycle. Table 5.8 shows some of the key findings from the focused group discussion for interventions and practices applied by government and other supporting institutions, including NGOs and private sector at different times of the drought cycle to help affected communities to cope with the impacts of drought.

Table 5.9: Evidence based practices put in place to help pastoral households cope with effects of drought

Area of intervention	Normal	Alert	Emergency	Recovery
Water	Promotion of water harvesting and storage, training water user associations, planning for new water sources, deepening wells, desilting pans, planning future interventions	Strategic needs assessment, protection of strategic wells, repairing poorly working boreholes	Implementing contingency plans including water supply, keeping strategic watering points functional, monitoring water availability	Improve water pans and develop new ones through food for work or cash for work
Food Security	Promote animal production & drought resistant crops, improve extension services, develop strategic cereal banks, capacity building	Stock strategic reserves, data sources used to warn and alert donors & government, provide food to most affected	Food relief, activate rapid response teams, diversify income, improved activity for health and nutrition	Replacing assets, providing tools and seeds, strengthen community management structures, cash-for work, food-for-work
Livestock production	With enough pasture & water, building up the herd, capacity building, strengthen social networks, develop livestock markets, conserve & protect pasture using traditional rules & range management approaches	Selecting animals for sale, herd separation & splitting, drying and smoking meat for later use, supplementary feeding, feed storage, alert donors and negotiate grants, control breeding,	Increased sale of animals or barter, migration in search of pasture, stop breeding, provide emergency water & feed esp. for lactating & breeding animals, work-for food/assets	Review damage &Document lessons, restocking traditionally, buying or through assistance, build pasture & water resources, strengthen animal health services, capacity building, vaccinate, deworm, alternative livelihoods
Animal Health	Establish common approach to disease control, vaccinate, deworm, maintain cattle dips	Mass vaccination, deworming, equip drug stores, carry out cross border disease monitoring	Emergency disease control, target drought prone animals (calves, lactating, sick) for special treatment	Document and evaluate lessons learnt, re-stock drug stores, vaccinate and deworm, use feed supplements until animals regain

				their health, capacity building
crops	Identify drought resistant, early maturing crops & indigenous plants that require little water. Capacity building, promote agro-forestry for fruits, fuel, fodder & medicine. Pest and disease control	Promote small scale irrigation, prepare kitchen gardens by drip irrigation, extension services, Irrigation	Irrigation where possible, food relief,	Prepare land for planting, provide tools, seed and other inputs, improve soil fertility, repair irrigation facilities, planting of short term crops soon as it rains, capacity building

Drought effects' management strategies are directly dependent on various factors primarily being financial availability, severity, terrain, and logistics. Among the possible evidence-based interventions noted during the study, include de-stocking, cash incentives from relatives living abroad, fragmentation of communal grazing land. Notwithstanding the accumulated benefits of livestock towards pastoralists' livelihoods in EL-wak, there is a number of ways put at work to help withstand/ cope the adverse effects of drought episodes. Quite a number of undertakings go on during the reoccurrence of droughts. Multiuseplants, e.g. Moringa and Aloe vera agri-business are gradually gaining reception. The residents also talked of using gum tree for wealth generation as a crucial coping strategy. Keeping of bees is a worthwhile and gratifying livelihood sourcesince it hasa number of paybacks encouraged in El-wak. It produces many long live foods; wax, honey, pollen, etc. farming of the bees is very vital in the management and safeguarding of the environment since they play a key role in transfer of pollen grains from male plants to female plants enhancing fertilization.

5.6Discussion of the Findings

Pastoralists salvage their source of livelihood through animals kept and their immediate surroundings. The research aimed at finding the strategies used to manage the effects of past drought episodes on pastoral livelihoods. The critical role in mainstreaming a better life, therefore, must involve the study of pertinent issues, which are directly connected.

The fact that parents fear taking their children to school for the purpose that they may be influenced by the government, was a great concern to the researcher.

Drought imposes social costs by undermining the social standing of pastoral households whose position of honor is gauged through the size of their livestock herds. Drought disrupts local power relationships and damages the social safety networks that are built around lending and borrowing of livestock thus promoting equitable ownership of the only means of livelihood. Drought also increases household vulnerability in event of future climatic shocks and food insecurity. It pushes pastoralists out of their production systems, forcing them to move to urban centers where food distribution, health, sanitation and water supply may be more reliably available.

Male-headed households dominated the area of study in response as compared to the female-headed households. Majority of the household heads fell between 30-49 years of age. The inhabitants in the study area are all Muslims. Majority of the household heads (77.5%) had no education at all and this was accrued to mobile/transit lifestyle they had especially during their young age. This figure conforms to KNBS (2005/06). The high preference for males to head families has made it difficult for women to gain affirmative action and independence. Additionally, the opportunity has limited diversification within families as women solely look at men for consumption adjustment. From this perspective, the research established beyond reasonable doubts that as episodes change, the strategies almost remain the same with only few deviations. The splitting and merging of livestock during different periods is a greater sign.

The study area was dominated by pastoralists whose main occupation was pastoralism (60.8%). Others, particularly poor wealth groups engaged additional tasks in collection and sale of bush products, petty trade, crafting and wage earner. The vast majority of the people (88.8%) in the study area are inhabitants of the Mandera County. Their migration patterns are mainly within the study areas (El-Wak) or from somewhere within the Mandera county. The rest come from either neighboring Counties (e.g. Wajir, Moyale

etc.) or Somalia border (Boru hach /El-wak Somalia). The main driving factors prompted such migration from their place of origin is ascribed to consistent droughts, loss of livelihood (livelihood change) resource conflicts, clan conflicts, and other factors respectively.

Drought that goes beyond the normal duration dries up the pasture and water points leading to the death of livestock even those that are known to adapt to drought harsh conditions like camels, donkeys and goats. Umar (1994) reiterates that pastoralism is a highly flexible system and the practice has evolved over time once the three species are gone, the situation becomes worse for human beings to survive forcing them to seek refuge/move to other places that can be tolerated. Violent conflicts can lead to human beings and animals' loss of life forces some people to move to conflict free areas in order to save their lives as well as their livestock's. Moving away from conflicts aims at protecting the major source of livelihood among the pastoral, as researched by Reid et al. (2008).

All of the households in the study area had experienced drought in their lifetime. Majority of the households (45.1%) had been hit by the drought more than four times from 1999 to 2011. Only 33.3% had been hit only 3 times, 12.7% had been hit twice while 8.8% once. These explain why a drought to one person may not be necessarily a drought to another in the same vicinity. The most devastating drought from 1999 to 2011occurred in 2005 i.e. 75.3% of the households felt its impacts. However, during this year, there was a reduction in pasture and water, which culminated into decline in health of the livestock, miscarriage, and poor conception of the productive livestock and reduced prices of the livestock. Pasture and water are the key things for a healthy and productive livestock. If the drought does not affect the two, then the drought may not have a negative impact in the livestock.

The strategies for coping with drought were similaracross the drought episodes investigated. Conflict for the limited available resources, for instance, remains a common

approach taken by pastoralists' overtime; nevertheless, aspects of education have gained recognition as important milestones in managing drought. The study hypothesis; therefore, has proven from two angles. The fact that key respondents remained adamant is various strategies, which have been used to resolve drought episodes is a proof enough of consistency without solution. On the other hand, pastoralists have consistently recognized aspects of education, urbanization, and change of livelihood. A closer interpretation of the results shows civil servantsand retailers, as part of the change regime within pastoralists. On the same note, territorial and internal conflicts among the emerging social classes within pastoral communities are a point acknowledged by Sandford &Habto (2000).

The coping and adaptation strategies towards the adverse effects of droughts vary from household to household(depend on asset level and Size) but are affected by key factors. For example, majority of the pastoral community members in the study area were married polygamous, with an average household size of eight members (6-10). However, some households had more than 10 members, which made it harder for the household heads to provide for their basic needs especially during prolonged dry spell (drought season). The number of household members that exceeded 10 in a house did not belong to one wife (monogamous) but many wives. These children were put under one roof so as to enable them attend schools as others do take care of the herds and flocks. Interestingly, family planning mechanism have not effectively gained mileage into the community hence instituting a more economic and social burden. There is no income diversification, livestock management, and most respondents admitted to not having preparations for anticipation for drought. The large household members force many families to liquidate productive assets such as livestock to compensate for food. Additionally, the families rely on relief programs in case of adverse drought, a situation that keeps on repeating itself from decade to decade.

The government role in managing and establishing various techniques for protecting pastoral livelihoods is very wide. It includes policies, humanitarian support, security,

aids, and other important fronts, with education subsidy through lunch programs. In fact, the education gap continues to widen especially in conflict-prone communities and settlements. The respondents indicated that education for their children had been disrupted,because of infrastructural damage, displacement of students, and teachers. The failure has made it almost impossible to sensitize a change of livelihood from the livestock.

According to the Republic of Kenya (2007) publication, policiesmade to addresscontrols against drought and its impacts in Kenya should start with trainingsfrom global United Nations Convention to Combat Desertification. However, parties should come up with National Action Programs geared towards giving solutions to issues of desertification, land degradation, and drought. Sessional paper No. 8 of 2012) was also developed to guide Sustainable Development of Northern Kenya and Other Arid Lands by increasing investment and ensuring the use of the resources tallies with the realities. Reid et al (2008), the above policy provisions are in line with the African Union Policy Framework for Pastoralism in Africa approved in January of 2011. Nevertheless, the government is also charged with offering strategic needs assessment, protection of strategic wells, and repairing poorly working boreholes.

The government is mandated to implement contingency plans including water supply using tankers, keeping strategic watering points functional, and monitoring water availability for pastoralists especially during drought emergencies. However, food relief for affected people (children, elderly and mothers), human disease control and treatment, animal feed and supplements (vaccinations)against common diseases and mass treatment should also be provided by the government during drought emergencies. It is estimated that the Government spent seven billion shillings on relief food distribution during the 2006 - 2007 drought, while that of 1999-2001 was 22.5 billion Shillings which included emergency relief, livestock losses, and cost on the Early Warning System.

Non-governmental organizations shelved in various bodies have the primary mandate of ensuring drought has little impact on livelihoods of pastoralists. In any instances, the stakeholders add to policy formulation and run distinct programs motivated by specific needs. They should work with stakeholder such as community leaders to identify specific causes and effects of drought and to identify what is needed to relief people from the negative impacts of droughts. For instance, due to drought pastoralists suffer from failed agriculture, declined production and reduced-calorie consumptioncausingpastoralists' deterioratteddiet nourishment.

Pratt (2010) supports this by accepting that pastoralists practice strategies such as livestock mobility and breeding of animals capable to withstand hard conditions. Drought episodes results into failure of livelihood systems of the people, which in turn disorients customary/old fashioned managing ways. Pastoral lands are mostly flat and this makes them to suffer from floods, run-offs that are experienced during rainy season. Floods create conducive environment for breeding of mosquitoes that spread malaria and snails, which cause bilharzia. In response all these hazardous situations, NGOs are expected to replace assets, provide tools and seeds, strengthen community management structures, and introduce incentives for work e.g. pay. Evaluations of the effects of droughts and floods should be given priorities by the NGOs and documentations done for future planning. Pastoralists should be aide in restocking; vaccinating and deworming of their

herds as well as in the use feed supplements until animals regain their health not forgetting capacity building, which is a critical step towards managing drought. Agricultural NGOs also have the mandate of identifying drought resistant, crops and indigenous plants that require little water and promote agro-forestry for fruits and fodder crops.

They were now embracing permanent settlement, which again dominated the area of study. Those who were educated had undergone madrasa type of education. From the group discussion and one to one interviews with some of the respondents, failure to attend schools was attributed to mobile lifestyle their parents and grandparents embraced as evidenced in Scoones & Wolmer (2006). These could not give them a chance to settle and learn unlike today where some polygamy lifestyle is to curb that such that some families move, while one or two remain permanent to allow children to attend schools.Illiteracy and poor infrastructures hinders pastoral households' access to information to improve their livelihood means for instance getting a white color job or getting the information necessary to improve ways of living to cope the adverse effects of drought.

Majority of the respondents in the study area (77%) had traditional huts though a good number of them settled permanently. This conforms to KNBS (2005/2006) i.e. the main types of houses commonly used are 'manyatta' traditional huts (used by 73.8% of the households) and shanty structures (19.7%). 15.7% of the respondents, who made up the mobile category were mostly those who had the traditional huts. The respondents who had the permanent (carrish), permanent (stone) had settled on permanent basis. Again, something notable was about the polygamous group. A number of the respondents, while being interviewed, asked why they married more than one wife. they said that it was a livelihood strategy such that one family could settle permanently to enhance a number of school going children attend school as mentioned earlier while those not interested or had passed the stage of going to school takes care of the herds and flocks. It is also a catchment for government and humanitarian assistance.

Droughts were given names according to their severity or mild they were. For example, the 1999 drought made the camels lose their eyesight and indicated signs of death, livestock died in large numbers. This drought was named as Arbati Ildun/Arbati loon Rawatan; Lo'leef, which meant massive livestock death, particularly camels and cattle. In 2000 drought made the camels to shed the tears and occurred during the reign of A.M. NOOR, as the Member of Parliament in the region by then. This made the locals to name the drought as the Abaartii Gaali booy and Abaartii Adan M.Noor. The 2002 drought saw the NGO buying as many livestock as possible and burnt them. Many of the camels died and therefore the drought was named Lafete/Korokkokor; Gaali qabanaay. In 2013 drought led to the drying up of all water points, the county government came up with trucking of water to its county residents, and therefore the drought was named Abaartii Dane. Droughts in the study area were given local names that related to the severity of the drought and the happenings during the onset of the drought.

A drought was categorized into mild or severe. The study focused on how mild or severe droughts affected the pastoral livelihood strategies and how they were managed, and different managing approaches employed to react to each category i.e. mild and severe. During the mild drought, the most affected things were the food availability at household level, followed by the household income and lastly the household expenditure. About 78.4% of the respondents mentioned decrease and /or mild effects in household food availability (eg purchase, milk/meat etc); 68.6% household income hit and household expenditure 67.6% of the households in the study area during mild drought.

Severe droughts also affected the households in the same ways as the mild drought only that percentages of the households affected were high as compared to those affected during the mild drought food availability hit 97% of the households; household income hit 95% and household expenditure 96% of the households. This is an indication of pastoral vulnerability to the shocks, due to frequent effects of the droughts and lack of

recovery space between the drought episodes; compounded by drastic reduction of the livestock assets and other diversified options.

However, during the mild drought, 20.6% of the households who were affected by the food availability felt that it was a severe drought while 1% felt that there was no drought at all. 30.4%, of the households who were affected in terms of income and expenditure each felt that it was severe. Again, during the severe drought, 2%, 4% and 3% who were hit in terms of food availability, income and expenditure felt that the drought was severe. 1% of the households in each category i.e. food availability, income and expenditure felt no impact hence no drought to them.

The County population largely depended on general food distribution by WFP, supplementary school feeding program from WFP, as well as therapeutic and supplementary feeding programs supported by UNICEF through various NGOs, targeting children below five years and pregnant and lactating women. Relief food aid was the main source of food for the internally displaced people. All the respondents had received food donations, though the quantities were not adequate. Before the crisis, the affected communities had ability to purchase with insurance coping mechanism. However, droughts weaken most households' access to food – hence led to engage crisis/distress coping responses for survival. It was reported that sometimes, households had to go without food for a number of days and survive on black tea. Pregnant women and children are the most affected within the displaced population. Most families were skipping meals; going for cheap and less preferred foods and selling livestock at very low prices as a means of coping with food scarcity.

The number of livestock owned at the start of the drought indicated that goats were the largely kept animal species by the household heads followed by sheep then camel and lastly cattle. Animals in the area of study were acquired in different ways. Inheritance was the most way through which people acquired livestock (animals were passed on from fathers to their sons). Purchase especially after losing the livestock due to severe drought

was the second way of acquisition, pride dowry also played a major role in acquisition of livestock then gift from relatives and friends was the fourth way) etc.

The size of the livestock before the onset of the drought is crucial in evaluating the livestock lose during and after the dry spell, since it necessitates comparisons.Pastoralists accumulate lots of herds during good seasons to mitigate impacts on the people and herds as well during the drought episodes. “A herder will attempt to enter the period of drought with enough animals to enable him to provide for subsistence needs during the crisis despite animal death”. This pattern broken by frequent droughts experienced in the study areas.

The study findings in the El- wak prior the 2005 drought revealed thatthe average number of the herd size per household was 115 i.e. 12 camels, 9 cattle, 63 goats and 31 sheep. This figurewaslowerthan the minimum livestock unit required by pastoral societies to withstand drought episode effects. This low figure made the residents of the study area to be susceptible to drought effects.The households had less stock prior to the 2005 drought and in addition, the female productive stock was much less due to failure of the stock to recover from the previous drought that had just occurred before 2005. At the endof 2005 drought, each household had an average of 81 animals, i.e. Camel (10), cattle (7), goats (44) and sheep (20). This is 29.6% decline in the total animals they had before the onset of the 2005 drought. This decline in the number of livestock devastated their livelihood in terms of food and money.

The greatest decline was in the number of sheep (36.9%), goats (29.5%), cattle (22.8%) and camel (17.1%) respectively. When milking animals die due to drought or decline in production of milk, household members turn to goats and sheep for food. The greatest decline in the sheep and goats made food condition worse. Browsing animals can be depended upon financially as the rangelands are covered with bushes and trees. The loss in sheep and goats could be interpreted to mean that the dry condition was severe.

Respondents explained that camels survived the harsh condition unlike other animals because camels are able to endure without water for long.

At the onset of the drought, only 6,685 gave birth i.e. reduced conception (assuming that all sheep and goats gave birth to only one at a time) out of 11,733 productive female animals. This indicates that 5048 remained unproductive i.e. 43% of the total productive animals. Apart from reduced conception during the drought, a number of livestock is sold so as to avoid total loss especially when they die. The findings for this study show that 1296 animals were sold during the drought. Others are given out as an obligatory gifts(zakat) and for normal social support (Sadaqa) to the poorest and more affected relatives (256 animals were given out in this study); while others are slaughtered to provide food to the household members since most of the pastoral communities in the world depend on meat, milk and for food (576 animals were slaughtered to provide food to the household members in this study). After the drought, some people are given animals as a gift from relatives and well-wishers while others do buy so as to allow breeding and enhance their livelihood.

Conflicts in the study area were also evident and were associated with the occurrence of droughts as echoed by Abdi (2016). Prolonged droughts do withers pasture and also dries up water points. This then forces the pastoralists to move to other areas where pasture and water are available. This movement involves people from the same clan (intra-clan), other clans but same county/other counties (inter clan), as well as other countries (cross-border). Due to the limited resources/scarce resources, clans/communities fight over the scarce water and pasture resources. Land ownership could also cause conflicts as people who are not the natives of the place come and claim for the land ownership forcing the natives to fight back as they try to kick them (foreigners) from their land. However, some conflicts arise from revenge mission whereby one group engaged in a fight/quarrel with the other group and now the other group retaliates back.

As supported by Leach (2008), the study noted that conflicts among the clans were settled through dialogue i.e. elder members on both conflicting sides. The elders are highest in the hierarchy and for this reason they deal with the conflicts within the community. The elders are the most powerful in the conflict resolution process in the study area; they call key community elders and religious members to discuss the conflict and come up with their collective decisions. They meet and look into the issue involving the two conflicting sides, find the group that has wronged the other and decide on the fine to be imposed i.e. either pay money, cattle or restriction on resource utilization (water, pasture). The government may also intervene when the conflict is serious and has taken long without a solution. However, the government cannot operate without the help of the elders in such a case. Governmental officials (the area assistant chief, chief, county commissioners etc.) meet with the area leaders on both sides because these leaders are the link between conflicting groups and the government then mediation process in order to find a resolution kicks off. Other ways like involving religious leaders were involved in resolving the conflicts.

However, from the organized group discussion on conflict management, it was revealed that the threat of fierce misunderstanding between pastoral communities can easily escalate into civil strife and war thus destabilizing pastoralist livelihoods since it discouragespastoralists from investing resources in the management of other prevailing risks. Clan conflict is a periodic hazard in Mandera County that displaces households, destroys property, causes injuries and death, restricts livestock movement and disrupts markets resulting in high poverty levels among people. The Persistent clan conflicts have had serious consequences on the county and have negatively affected socio-economic activities, education, business activities and livestock movement. Innocent human lives have been lost; while others injured and displaced from their original homes. This conforms to KIRA report July 2013 where violence resulted in an estimated displacement of 7,385 households, 95 deaths and over 100 injuries.

Conflict management encompasses both conflict prevention and conflict resolution to mitigate effects of conflict. Traditionally, the response to conflict was fixed on resolution. However, the policy paradigm is now shifting and there is a growing recognition that conflict prevention strategies are probably more effective than resolution-oriented strategies in the study area.

The group also said that the Conflicts can be prevented through the establishment and enforcement of rules over natural-resource use, collective acceptance of such rules, and continuous negotiation of diverging demands. The regulation of access to natural resources should aim both to prevent degradation and violent conflict. Community-based natural resource management including all user groups in the negotiation process about the rules of access is a promising option for conflict prevention between conservationists, pastoralists and farmers. The model of key-site management by community-based organizations is a promising option for sustainable range management, which can prevent conflict among pastoralists as well as between pastoralists and farmers.

Pastoralists are particularly vulnerable to droughts. The lack of rainfall reduces water and forage availability on the rangelands, which creates an imbalance between the number of livestock and available fodder. Animals become emaciated and die or have to be sold preemptively. Although herders are equally exposed to the risk of drought as droughts are a regional and even interregional meteorological phenomenon, the effects of a drought are not identical across households, but are conditioned by the initial household wealth status.

Poorer pastoralist households, owning small herds, are more vulnerable to drought than wealthier households with larger herds. While a loss of half of the herd would certainly represent a serious loss to a family owning a herd of 100, the same proportional loss would have devastating effects for a family making a living off a herd of 10 animals, potentially locking the latter household in a low-income equilibrium, from which it will be difficult to escape after the drought. In addition to the fact that the possession of a larger pre-drought herd ensures a reasonable post-drought herd size, Hogg (1997) points

out that wealthier herders get through a drought better than poorer ones because they may also enjoy more political influence and thus preferential access to grazing, water, credit, and veterinary services. Also, wealthier pastoralist households are better equipped to diversify during drought, for example by engaging in petty trade and by migration, which also enhances their capacity to recover post-drought

In the questionnaires, the 102 household heads were asked to give a number of all the members of the household (if any) who died from recent drought impacts and only 33.3% responded yes. However, not all the households lost equal number household members but the number varied from household to household. On further interviews, it was noted that it was not the scorching sun that led to the death of their household members but cumulative impacts of drought i.e. hunger which is caused by inability of the soil to support vegetation growth (crops and pasture for livestock), conflicts over scarce resources between clans/communities e.g. pasture and water for both domestic and livestock, diseases e.g. kwashiorkor and marasmus caused by lack of adequate food and also balanced diet, dysentery and typhoid that are associated with dirty water (during dry season, people do travel for long distances in search of water and they drink in the same water points with animals which makes them vulnerable to water borne diseases). Lack of adequate food (grains, meat, milk, etc.) made their body system weak to an extent that any minor disease made them vulnerable to death.

During the time of hardship, diversification of livelihood strategies was key by household heads/members to cope with climate change and climate variability. However, livestock are the main livelihood resource of pastoralists performing multiple roles to satisfy economic, social and ecological needs, a point supported by NEPAD (New Partnership for African Development) (2005). The main functions of livestock in pastoral households are provision of cash through sales of milk, live animals and other animal products; provision of subsistence products (milk and meat); building social alliances (bride price, stock alliances, and stock patronages) and storage of wealth. The number of livestock a household owns is usually the most significant asset determining its wealth. Niamir-

Fuller (1998) estimated that the minimum number of livestock unitsbelow which a typical pastoral household is unable to resist drought cycles is 50 in arid areas and 30 in semi-arid areas. The number of livestock needed to sustain a pastoral household also depends on the extent to which;

- Pastoralists can make use of trade to buy cheaper food in exchange for livestock and their products;
- Pastoralists have diversified their economic activities and consequently receive wages or other forms of incomes as well as remittances.

Household members, involvement in so many activities as source of livelihood signifies stress in the pastoral system. Examples of alternative strategies adopted among the households in the study area (El-Wak) included remittances from relatives/children who lived either abroad or in urban areas doing white-collar jobs or other wage-earning jobs. It was noted that poor households sent their family members in urban areas in order to earn additional income to support the family members and they mostly depended on remittances. One of the village leaders said that he had two sons who work abroad and they sent him money on monthly basis for him to manage the household members he had been left with in El-Wak-Kenya. Additionally, poorer households have to resort to putting labour of family members at the disposal of rich herders, who engage them through contract herding schemes for money or food.

Transformation of pastoralists into agro-pastoralists, especially in areas situated next to water sources was the other strategy employed by the respondents to diversify their livelihoods. This was majorly practiced by people who had sedentarized their homes and lived near water bodies as well as people who were polygamous but had one family settled permanently while the others moved from place to place in search of pasture and water for livestock. The remaining family was to ensure that school going children attend schools on daily basis as well as planting crops when it rained.

Sale of animals during severe drought and keep money in order to buy other stock at the end to avoid letting them all die that could make them lose the whole livestock (the sale

was majorly to the government but at a fixed figure for every animal) and animal products, seeking employment (mostly casual labor), engaging in businesses, for example, selling firewood, charcoal, selling local alcohol brew. Mobility is prevalent form of coping with drought, however, emerging conflicts over use of resources is restricting the freedom of mobility, thereby enhancing vulnerability.

Note: pastoralists employed similar strategies to cope with or manage drought effects in El-wak area regardless of the drought episode.

CHAPTER SIX: SUMMARY OF THE KEY FINDINGS, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter concisely looks at the key issues of the study indicated at the beginning in relation to the findings of the study. It does also discuss the implications of the study findings at both theoretical and practical levels and outlines directions for future research on drought episodes and their effects on pastoralism community dry areas of Kenya.

6.2 Summary of the Key Findings

The study did investigate the features of pastoralism and effects of severe drought on pastoral in El-wak, Mandera County. It observed that majority of the pastoral community were illiterate and had high number of household members. Most of them had not attended any school at all. This large number was to help especially in taking care of the herd. A significant portion of the residents lived in huts, (traditional huts) and survived majorly on livestock.

A significant relationship between drought and deterioration in pasture and water as well as livestock health, price and conception was eminent. Drought episodes have made the pastoral community mobile so as to look for pasture and water. This movement made school going children not to attend to school though a fraction of household heads who were polygamous left one family behind to attend to school while the others proceeded to take care of herds at far places.

Severe drought contributed to high death rate of the herds that made the pastoral to lack adequate food. This in turn let to malnutrition among the households in the study area. Insufficient water also let to water borne diseases e.g. dysentery. Movements of the pastoralists from one place to another contributed to conflicts that also had devastating impacts to the people. The pastoral community had ways of settling conflicts whenever they arose i.e. they employed the religious leaders, elders, governments etc. so as to have peace. To reduce the impacts of drought, the household heads had to sell the herds at a

very low price than normal so as at least to get something, they also moved their part of herds to relatives and friends where there was some pasture so as to have some surviving at the end of the drought.

There was stress among the households evidenced by involvement of different household members in sourcing for livelihood e.g. some members were involved in wage jobs, others had their children in urban areas or abroad and were tasked by sending remittances to their family members during hard times. The study observed that lack proper roads, good social amenities e.g. schools, hospitals etc. has even made the situation worse to the people apart from the recurring droughts. As much as drought episodes hit pastoral households in El-wak, the strategies employed by the households to cope with or manage the effects of recurring droughts were similar regardless of the drought episode.

6.3 Conclusion

The study made various conclusions based on the strategies used to manage the effects of past drought episodes on pastoral livelihoods vary based on the research. In essence, strategies employed by pastoralists of El-wak to manage effects of drought are the same regardless of the drought episode. Recurring droughts in the North-Eastern region of Kenya (Mandera) have severely affected the people of Mandera though the response to the effects is almost similar. There has been death of animals, people and declining health of both people and animals. Droughts make animals to be sold at a very low cost due to declined health. Animals do not conceive during drought season and this reduces the re-productivity of animals as well as livelihood of people. People practice nomadic lifestyle in the area of study so as to save some livestock. They move to other regions looking for pasture, water, food and security. Livestock is the main source of livelihood as food i.e. milk and meat is produced by livestock. They mainly get money from livestock sale and sell of livestock products like hides.

Concurrently, strategies employed by pastoralists of El-wak to manage effects of drought were similar regardless of drought episodes. Majority of the people in the study area were illiterate and this was attributed to the fact that pastoralists never settle at one point but are transhumance. This had taken a different turn among the few households in the study area. Some household heads had one family taking care of young children in terms of attending schools while the rest moved from place to place in search of pasture and water during drought season. This was aimed at reducing dropouts and improving education in the region.

Nomadism was the key cause of conflicts in the study area. This was attributed to the limited resources i.e. pasture and water. Whenever conflicts arose, government officials, religious leaders, elders among others looked for the solutions to ease the situation. Hunger in the study area was attributed to drought since during this time, food availability dwindles, animals die, and their health and prices goes down which impacts on food access. Malnutrition and water borne diseases also affects the people during drought and due to lack of proper social amenities, people die. There are quite a number of NGOs that donate/supply water and food to people during drought to alleviate the situation.

Sometimes the government also intervenes to ease the situation but the problem is under development in the region in terms of infrastructure and social amenities. People living along the rivers had shown interest of planting crops along the rivers through irrigation during the short time of rains. Different livelihood sourcing strategies were in place among the people so as to ease the situation during drought season e.g. selling of animals at a throw a way price to avoid total lose, sending some of the children/household members in town to work so as they wouldsend remittances to their families and also sending them abroad for remittance reasons.

6.4 Recommendations

Recommendations for policy makers

In order to offset the drastic loss of the pastoralists' livelihoods, the government of Kenya, the NGOs and the pastoral community at large should support the poor households in asset building and to create income diversification options through:

Strengthening rural education and health programs in El-wak by the national and County government.

Formulation of the twin-truck policy: Establish safety net programs that increases poor pastoralists' income in short-term and promote investments in the human capital of the poor in the long –term thus breaking the inter-generational cycle of the poverty.

Drought early warning system: To enhance drought early warning system for early action by the county and national government.

There is need for the government and the NGOs to initiate rainwater harvesting programs in the region for both livestock and human consumption

Recommendations for pastoralist communities:

Community mobilization on drought awareness and act on provided early warning messages.

Women are extremely skilled at finding ways to ensure household access to food and water for basic survival, this should be considered in times of stress.

To stop and /or minimize use of distress coping on natural resource exploitation (e.g. Charcoal burning, cutting trees, digging plant roots etc.) for livestock feeding.

Recommendations for further research

There is need for further research on possibilities of agro pastoral production and livelihood diversification

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APPENDICES

Appendix 1: Household survey questionnaire

I am Mohamed Ahmed, a student at the University of Nairobi undertaking Masters of Arts in Environmental Planning and Management. I am undertaking fieldwork/ research on *Managing Effects of Drought on Pastoral Livelihoods in border regions*: *The Case of El-Wak in Mandera County, Kenya* as part of the requirement for the degree program. I would like to request for your participation in this academic research by filling in these questionnaires or helping me fill them. The information obtained, will be used solely for the academic purposes and will be handled with the utmost confidentiality.

Thank you and you are highly welcome!

MANAGING DROUGHT EFFECTS ON PASTORAL LIVELIHOOD IN BORDER REGIONS: THE CASE OF EL-WAK, MANDERA COUNTY, KENYA
HOUSEHOLD SURVEY QUESTINNAIRE

Date: *I……I……..I* 2014

Demographic information

1. Name of the respondent…….....
2. Gender : [1] Male [2] Female
3. Age of the respondent…….....
4. Location of residence……
5. Marital status of the respondent:
   [1] Married monogamous, [2] married polygamous, [3] Single, [4] Divorced, [5] Widowed, [6] Separated
6. Religion…….
7. Number of children if not single……
8. Type of settlement, [1] permanent settlement, [2] mobile (on transit or a move),

9. A. Did you come here through migration? [1] Yes [No]

   b. If yes, when? ----------

   c. If yes why? ----------

10. Type of a house: [1] hut (thatched roof), [2] semi-permanent, [3] permanent, [4] Manyatta, [5] others, specify…….

11. How long did your household live in this settlement?

    a. < 1 year [1]

    b. 1-2 years [2]

    c. > 2 years [3]

12. Education level of the household head: [1] Primary, [2] secondary dropout, [3] secondary completed [4] tertiary colleges, [5] None.

Economic information of the household head

13. Occupation of the household head: [1] white color job, [2] blue color job, [3] farmer (livestock/poultry keeping), [4] farmer (crop farming), [5] Agro pastoralist, [6] business man.

14. What are the types of livestock your household rare?

    a. [1] Camel [2] Cattle [3] Shoat [4] Others (specify_____)

    b. [1] camel & Shoat [2] camel & cattle [3] cattle & shoat.

    c. [1] camel, cattle & shoat [2] others_____

15. How many livestock does your household own? (*Include your animals raised by others or animals you are keeping for others)*

Shoats(sheep/goat)	Cattle	Camel	Donkeys	Chicken

16. How did you own these livestock/poultry: [1] inheritance, [2] purchase, [3] partly inheritance and partly purchase, [4] bride wealth, gift[5], [6] loan, [7] others, specify……

17. Do you have a piece of land?

18. If yes, how many acreages ……

19. How did you acquire it: [1] inheritance, [2] purchase, [3] partly inheritance and partly purchase, [4] bride wealth, gift[5], [6] loan, [7] others, specify……

Information on drought events in the region and there effects to peoples livelihoods

20. Do you describe drought when the area experiences:
    [1] One season of rain failure [2] Two consecutive seasons of rain failure [3] More
21. From the year 1999 to 2013, had your location been invaded by drought: [1] yes. [2] no
22. If yes, how many times did it occur …….. And specifically when did it occur……
    Year:
23. Out of the drought events mentioned above, when was it so severe……
24. When do you call the drought severe……
    ……
25. Do you give the droughts name: [1] yes, [2] no
26. If yes, how do you give names to droughts……..
    ……..
27. What names did you give to the above mentioned drought episodes:
    Year
    Name
27. How were you impacted on by the above mentioned drought episodes: [1] death of my livestock, [2] , lack of purchasing power [3] hunger, [4] reduction of livestock production, [5] poor livestock prices [5] death of household members, [6] others, specify…….
28. If in case drought lead to the death of your household member(s), how many have you lost from 1999 to 2013……
29. What was the major cause of death to your household members: [1] hunger, [2]war as a result of mobility that emerged due to conflict, [3] hunger and war, [4]

others,

specify……

…….

30. If in case drought episodes lead to reduced livestock/ crop production, in which ways did it occur: [1] reduced price of animals (sell at a throw away price since there is no otherwise), [2] reduced pasture and drying up of water bodies (lack of water) reduced milk production, and blood from animals, [3] crop withering leading to reduction/failure in production, [4] the first two, [5] all of the above, [6] others, specify……
31. If in case the droughts lead to the death of livestock, approximately how many animals did you lose in the above-mentioned drought episodes:

	Year….	Year…	Year...	Year.	Year...
Type of livestock	No. died	No. died	No. died	No. died	No. died
Cattles					
Shoats					
Chicken					
Camels					
Donkeys					
Total					

32. How do the occurrence of normal droughts affect your household's:
    a. Food availability: [1] severe, [2] mild, [3] none
    b. Household income: [1] severe, [2] mild, [3] none
    c. Household expenditure: [1] severe, [2] mild, [3] none
33. How do the occurrence of severe droughts affect your household livelihood's:
    a. Food availability: [1] severe, [2] mild, [3] none
    b. Household income: [1] severe, [2] mild, [3] none
    c. Household expenditure: [1] severe, [2] mild, [3] none
34. If normal drought occurrences negatively affected your household well-being, list the coping strategies that your household has been employing to alleviate the stress/shock……

……

……

……

……
……

35. If severe drought occurrences negatively affected your household well - being, list the coping strategies that your household has been employing to alleviate the stress/shock……
……
……
……
……

36. What were the turning points in the coping strategies……...
……
37. What are the migration patterns during the normal season? ----------
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38. What are the migration patterns during the drought season? ----------
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39. Did you move alone or with the entire household and the livestock?
40. During your movement, did you experience any conflict: [1] yes, [2] No
41. If yes, what was the cause of the conflict:
[1] invading other peoples pasture and water (pasture/water issues), [2] encroaching into other communities land (land issues), [3] cattle raiding, [4] religious issues, [5]pasture/water and land, [6] others, specify.....
42. What were the impacts of these conflict to your household: [1] death of my household members, [2] lose /death of my livestock, [3] further migration, [4] others, specify.....

43. 60. How were these conflicts settled.....
44. What has changed in the way drought influences stock mobility in the light of new challenges such as insecurity and radicalization?

[1] reduced cross-border grazing mobility and migration, [2]Stopped cross-border markets, [3] Both, [4]No Change

When did the most recent drought occur in your location?----------

45. Indicate how did the recent drought affected your Household's Livestock?

Herd Dynamics	Camel		Cattle		Sheep/goats	
	Droug	Normal	Drough	Norm	Drough	Norm
Number of livestock owned at						
Number of Productive female						
Number of livestock born						
Number of livestock sold						
Number of livestock died						
Number of livestock slaughtered						
Number of livestock given out						
Number of livestock received						
Number of livestock lost						
Number of livestock bought						
Number owned at the end of						

46. How do the drought impact on the environment:

[1]death of animals/people, [2] drying up of vegetation exposing the soil to the agents of erosion (wind), [3]drying up of water channels i.e. rivers, streams and boreholes, [4] all of the above, [5] others, specify.....

47. What roles have the following parties played in drought effect alleviation to your household

a. Government of kenya----------

---

b. Non-governmental organization (NGO,s)----------

---

c. Community leaders----------

---

d. Religious leaders ----------

---

48. In your opinion, suggest evidence based drought intervention that can strengthen drought effect management capacities in El-Wak region----------

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Thank you for your responses and time.

Appendix II: Key Informant Interview Schedules

Appendix IIa: Key Informant Interview schedule for Garre clan Elders

a. Naming of the drought episodes.
b. Drought effects on the households' livelihoods
c. Conflicts and conflicts resolution ways.
d. Role played by the NGOs, County and National government towards managing drought effects to the El-Wak households' livelihoods.
e. Role played by the community members towards managing drought effects.
f. Coping strategies adopted by the El-Wak households to drought effects
g. Possible suggestions towards managing drought effects.

Appendix IIb: Key Informant Interview Schedule for Officials of the Drought Management Authority

a. Documented statistics on effects of drought on livestock and people (deaths).
b. Roles played by the drought officials towards managing drought effects on the pastoral households in El-Wak.
c. Effectiveness of drought officials' roles/ways of managing drought effects on the households' livelihoods.
d. Conflicts resolution ways.

Appendix IIc: Key Informant Interview Schedule for County Government officials

a. Roles played by the county and national government towards managing drought effects on the El-Wak households' livelihoods.
b. Effective of their roles towards drought effects to the people.
c. Long life intervention towards drought effects to the households' livelihoods.

Appendix IId: Key Informant Interview Schedule for NGOs Officials

a. Role played by the NGOs towards managing drought effects on the El-Wak households' livelihoods.
b. Strengths and weaknesses (obstacles) in playing out the roles towards managing drought effects.
c. Possible suggestions towards managing drought effects in El-Wak.

Appendix III: Focus Group Discussion Topic Guide

a. The magnitude (intensity), severity, and local nomenclature of drought episodes in El-Wak region of Mandera County in between 1999-2009 (in the last 15 years)
b. Effects of drought on a
c. Asset, human, and environment
d. Impact of drought episodes on the livelihood strategies (sources of food, income and , expenditure) of pastoral households in El-Wak region of Mandera County;
e. Coping strategies used by households in El-Wak region to cope with drought episodes, and;
f. Possible evidence-based interventions to drought in the El-Wak region.

Appendix IV: Observation Schedule

a. Living condition
b. Household assets (number and type of animals, land)
c. Biophysical environment (trees, pasture and arable lands, water points, topography and soil type)
d. Infrastructural facilities (social amenities and transport and communication networks)

Appendix V: Operational Definitions

In this study, the following concepts will be operationalized as stated:

Drought: -Smith-Sebasto, & Cavern (2006)defines drought as "The temporary reduction in water or moisture availability significantly below the normal or expected normal amount for a specified period".

Coping strategy:- Kebebew (2001) defines coping strategy as "the collection of people's responses to declining food availability and entitlements in abnormal seasons or years"

Dry land: according to the Oxford advanced Learners Dictionary, 7th Edition,

"Dry land is a tract of land which is deficient in soil moisture and where rainfall is totally unreliable and highly variable in space and time".

Frequency: - Drought frequency is defined as the number of drought events occurred

Severity: -Fratkin & Roth (2006) "Drought severity as the sum of the integral area below zero of each event. Because drought is mainly driven by rainfall deficits, we chose the Standardized Precipitation Index (SPI) as the base indicator to derive drought-related quantities".

Nomenclature: -"Local names given to the events (negative/positive) that reflect the magnitude, severity, widespread and effects of droughts, which has different contextual meanings according to nature of the events (Homann et al., 2008).

Livelihood: - Chambers & Conway (1992) "Livelihood comprises the capabilities, assets (including both material and social) and activities required for a means of living".

Zakat: - Is an Islamic religious obligatory tax taken from the middle and better-off wealth groups to the poor people and other groups stated in the Quran versions. The

exact amount levied on those able to pay, depends on the form of ‘wealth’ and is levied either in currency in case of livestock, Gold and cash trade, or in kind in case of crop (Quran 4: 29).