

**DROUGHT COPING MECHANISMS AMONG NOMADIC PASTORALISTS  
IN MANDERA EAST SUB-COUNTY, KENYA**

**BY**

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## DECLARATION

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**DEDICATION**

I dedicate this research thesis to my lovely family, especially my dear wife Fatuma, and our children who were by my side through thick and thin.

## **ACKNOWLEDGEMENT**

I sincerely acknowledge the efforts of all those who contributed diligently towards the completion of this thesis in one way or another. Special thanks go to Prof. Leonard Mulongo and Dr Pacifica Mining whose advice at different levels has made this thesis a reality. I thank them for always being there to offer guidance even when so busy with other tasks.

## ABSTRACT

Frequently occurring drought and other climatic shocks that threaten nomadic pastoralist livelihoods in Kenya have prompted rural communities to adopt innovative coping mechanisms. Decades long of improper national policies have restricted the nomadic pastoralists access to significant grazing lands and water points leading to intensifying climate shocks such as drought and resource-based conflicts thus undermining their resilience. This study sought to assess the drought coping mechanisms among nomadic pastoralists in Mandera East Sub-County, Kenya. The study's specific objectives were to evaluate the home level effects of the drought on nomadic pastoralists in Mandera East Sub-County, to establish the traditional drought coping mechanisms among nomadic pastoralists in Mandera East Sub-County and to suggest better ways which the existing coping mechanisms can help in improving the lives of nomadic pastoralists during drought. This study used phenomenological research design and targeted the 25,904 household heads in Mandera East Sub-County. Purposive sampling method was applied to sample a size of 75 participants from whom data was collected using FGDs, in-depth interviews, and key informant interviews. Document analysis was applied in the gathering of secondary data. The study was guided by cultural ecology theory. The collected data was divided into topics, and then it was analyzed using content analysis. Findings show that drought had devastating effects on nomadic pastoralists in Mandera East Sub-County at household levels by reducing and at times depleting their herd, making some of them abandon their rural life, while businesses that depend on livestock sector faced existential threats. The study has documented various coping mechanisms deployed by nomadic pastoralists in Mandera East Sub-County, namely migration to neighboring counties and countries, selling part of the herd to get money needed for the drought period and moving livestock closer to water points. The study also found out that there are better ways the existing drought coping mechanism can be improved mainly by setting up an adequate drought mitigation plan at county level especially drought early warning system. Nomadic households are in dire need of effective national policies that are helpful at times of drought, mainly those that concern provision of water and pasture to their livestock. Water tracking and distribution of fodder are ways that the existing coping mechanism can be improved. The study concluded that drought is affecting nomadic pastoralist in Mandera East Sub-County more frequently apparently due to climate change. The coping mechanisms among nomadic pastoralists are partially helpful but need to be strengthened by the county and national governments.

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**ABBREVIATIONS AND ACRONYMS**

<b>ASAL</b>	Arid and Semi-Arid Land
<b>EWS</b>	Early Warning Systems
<b>FAO</b>	Food and Agriculture Organization (of the United Nations)
<b>FEWSN</b>	Famine Early Warning Systems Network
<b>FGD</b>	Focus Group Discussions
<b>FSNAU</b>	Food Security and Nutritional Analysis Unit
<b>GDP</b>	Gross Domestic Product
<b>GoK</b>	Government of Kenya
<b>IBLI</b>	Index-Based Livestock Insurance
<b>ICPAC</b>	IGAD Climate Prediction and Application Centre
<b>IDPs</b>	Internally Displaced Persons
<b>ILRI</b>	International Livestock Research Institute
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>KFSSG</b>	Kenya Food Security Steering Group
<b>KII</b>	Key Informant Interview
<b>KNBS</b>	Kenya National Bureau of Statistics
<b>LEWS</b>	Livestock Early Warning System
<b>LPPELD</b>	League for Pastoral Peoples and Endogenous Livestock Development
<b>MCA</b>	Members of County Assembly
<b>MP:</b>	Members of Parliament
<b>MPs</b>	Member of Parliament
<b>NDMC</b>	National Drought Mitigation Centre
<b>NGO</b>	Non-Governmental Organization
<b>TLU</b>	Tropical Livestock Unit

**UNDP** United Nations Development Program

**UNDP** United Nations Development Program

**US** United States (of America)

**WHO** World Health organization

## OPERATIONAL DEFINITION OF TERMS

**Coping mechanisms:** Coping mechanisms are referred to as the pastoralists' response to declining water and pasture availability during periods of rain shortage. They can be short term to avert a current drought or long term to learn how to live with such climatic shocks (Ibrahim, 2016).

**Drought:** A period of minimal precipitation sustained over a period of time. It also implies a duration of two or more successive years during which the amount of rainfall received is below 75% of the long-term average (Famine Early Warning Systems Network (FEWSN), 2021).

**Livelihood:** A means through which a household attains the desired goals or is able to sustain its members (UNDP, 2013).

**Nomad:** A person who moves from one place to another looking for forage and water for their livestock (Tugjamba, Walkerden, & Miller, 2021).

**Nomadic pastoralist:** Is a form of pastoralism where the herders move with their livestock from place to place in search of pasture and water. In this study, the livestock include camels, donkeys, cattle, goats and sheep (Tugjamba *et al.*, 2021).

**Pastoralism:** A kind of livestock husbandry where the animals are allowed to graze openly over a large area. Often the grazing area has a waterpoint near (Mengistu & Haji, 2015).

## **CHAPTER ONE: INTRODUCTION**

### **1.0 Overview**

This chapter introduces the study variables which are detailed in the background section. After the background, the chapter presents a definition of the existing problem the researcher addresses and the specific objectives that will ensure the address of the problem. The chapter then presents the research questions, the study justification, significance, scope and limitations.

### **1.1 Background of the Study**

Globally, droughts have been a frequent environmental occurrence that threatens the normal lifestyle of people (Getachew, Tilahun, & Teshager, 2014; Mengistu & Haji, 2015; Drees, Liehr, Batbuyan, Marg, & Mehring, 2022). Frequent droughts and other climatic shocks that threaten nomadic pastoralist livelihoods in Kenya have prompted rural communities to adopt innovative coping mechanisms. Nomadic pastoralists and livestock traders are changing the way they operate to cope with the drought challenges. Selling part of the livestock to cater for human and animal needs during drought period as well as migrating with herds to areas with pasture and water have become coping strategies for many nomadic pastoralists in Mandera East Sub-County (Guyo, 2013).

According to English Oxford dictionary, drought is a prolonged timeframe characterized by inadequate or lack of rainfall. The definition of drought varies depending on the context it is used, but generally it is expressed as a long timeframe (whether several months or years) characterized by lower rainfall than the per-annum average which causes a serious shortage of water (Orimoloye, Belle, Orimoloye, Olusola, & Ololade, 2022).

In Kenya, the Somali community, normally live in the landscapes that are commonly ASAL, with large herds of livestock. There are limited forage areas in regions inhabited by these communities yet many natural resources (including grazing fields) are under community ownership hence are perceived as a property for all (Belayneh, Adamowski, Khalil, & Quilty, 2016). Grazing fields under this ownership are therefore for everyone which challenges conservational usage.

Pastoralism is, generally, the main livelihood source among Somali ethnic groups living in Northern Kenya. Traditionally, the Somali, Gabra, Rendile, and the Borana were recognized as native pastoralists who had acquired unique methods of managing natural resources (Eyasu, 2008). The livestock sector is a lifeline for the Somali community across East Africa and is estimated to engaged about 65% of the region's Somali population (FAO, 2016). The base for Somali livestock sector is mainly pastoral, with animals such as camels, cows, goats and sheep making up the herd. Cows are not that popular among the Somali community as they are weak to droughts.

According to FAO's Food Security and Nutritional Analysis Unit (FSNAU) (2016), the port of Berbera in the self-declared republic of Somaliland exported nearly four million animals in the year 2014, with goats making over 70% of that figure. The main market for those animals – which were only male ones – was the Oman, United Arab Emirates, Saudi Arabia, as well as other Arab countries of Egypt and Yemen. The peak season for animal export is the Holy month of Hajj, where Muslims are encouraged to slaughter livestock as a means of sacrifice. In the Somali habitat region, rainfall data records from 1896 to 2010 show that "short droughts" are expected generally every three years and "long droughts" every ten years (Crane, Roncoli, & Hoogenboom, 2011).



According to the Government of Kenya (GoK, 2015), climate change is severely impacting the country's economy and development hence threatens Vision 2030. This is mainly because Kenya's economy largely depends on environment-sensitive segments such as tourism, energy, and agriculture. Frequently occurring droughts and floods have affected agricultural and pastoral households who make up a significant population of Kenya's population.

A study by Huho and Mugalavai (2010) informs that there is a surge in the cases of drought reported in Kenya. The study shows that in the 1990s, droughts occurred once after two or three years but as the 21<sup>st</sup> century began, the frequency of droughts increased while becoming highly unpredictable. The Intergovernmental Panel on Climate Change (IPCC, 2012) predicts that by 2050 a high drought frequency in East Africa will be significantly evidenced if something is not done to avert the current trend. This will put pressure on climate sensitive economic sectors.

In Kenya, drought-related policies and programs have not emphasized on mitigation and preparedness but focused on dealing with the marks it has left on the society. Mandera County is among the counties that are prone to severe droughts, where water points dry up and pasture becomes very scarce. The effect of drought is experienced in town set-ups in terms of milk and meat shortage. Businesses are affected as most of them directly rely on nomadic pastoralists (Ibrahim, 2016).

Evaluation of the effects of drought demands that one understands the historical context together with how early people in that area behaved during its occurrences (Naumann & Lausch, 2014). According to Mandera County Government (2014), 91,292 families depended on pastoralism to survive. By then that figure translated into 89% of the County's population.

Since drought is likely to occur more frequently in ASAL areas of Kenya, it is essential to highlight the coping mechanisms applied locally to mitigate the risks brought by severe droughts. The ability of nomadic pastoralists in Mandera to counter droughts is compromised because of the high drought occurrence frequency, population growth, declining natural resources, conflicts, and disease outbreaks (Ibrahim, 2016). According to Zamani, Gorgievski and Zarafshani (2006), the poor or lack of early warning system to allow pastoralists prepare for predicted droughts have made the situation worse. The government and development agencies ought to work together on this and improve the awareness of pastoralist communities. Nevertheless, recent climate changes have brought some challenges in terms of forecast particularly in ASAL areas.

According to Landolt (2007) reared animals are a source of coping with food insecurity and vulnerability in ASAL areas of East Africa which explains the large livestock keeping among nomadic pastoralist population in the region. Even though this knowledge is common across the globe, a persistent naivety still prevails among policy creators, external donors, officers of the national government, and development communities concerning the livestock segment. The stakeholders lack the knowledge and awareness of how diverse livestock rearing communities are, their daily coping mechanisms, and how they use each species of the animals they keep. Thus, it is important that when analyzing the coping mechanisms livestock herders undertake, one must appreciate how livestock keeping influences those coping mechanisms. This study aimed at prioritizing the positive drought coping mechanisms in Mandera East Sub-County.

## **1.2 Statement of the Problem**

Harsh climate areas in Kenya especially in ASALs experience significant impact due to persistent drought. This type of climate contributes to wearying of animals, increased

outbreak of certain diseases, and reduction in number of livestock which collapses the livestock markets and alter herd structure (Speranza, 2010). Pastoralism is a significant socio-economic activity among the people of Northeastern areas of Kenya as a whole and Mandera County in particular. Water and pasture scarcity is often the most limiting factor for nomadic pastoralists in Mandera County in general and particularly Mandera East Sub-County.

According to Ibrahim (2016), pastoralists coping mechanisms in Mandera have changed with time to acclimatize to the hot and dry weather characterized with low or no rainfall. Sometimes they cross over to Somalia and Ethiopia to look for good forage and water resources for their flock. The devastating drought that hit East Africa between July 2011 and mid 2012 had huge impact on Mandera pastoralists who lost between 40% and 70% of their livestock. Within six months into the drought, the price of cattle had fallen by 38% while goats and sheep were similarly affected (Lewis & Serna, 2011). Additionally, droughts are a costly affair to the country—for instance the Kenya incurred a loss of 12.1 billion US dollars arising from the losses and damages of the drought that hit the country from 2008 to 2011 (Republic of Kenya, 2012).

With respect to past droughts, the government instituted national policies<sup>1</sup> to provide coping mechanisms to pastoralists but these measures have not borne fruit. Instead, they have led to restricted patronage of significant resources like forage and water points, hence, contributing to resource-based conflicts in the area. As such, successive droughts have continued to cause harm to the people of Mandera county in general and Mandera East sub-county in specific. Research on the drought coping mechanisms have not been specific to this sub-county (e.g., Mureithi (2012); Lekapana (2013); Melle (2016); Mutu

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and Edome (2022) have concentrated on other areas different from Madera East sub-county), which creates a deficiency in knowledge of the applicable coping mechanisms that can enable the people of this sub-county to cope with and survive successive droughts.

It is in this light that this study endeavors to assess the drought coping mechanisms among the nomadic pastoralists with a focus on whether the populations of Mandera East Sub-County have any traditional drought coping mechanisms, and/or suggest ways in which the existing coping mechanisms if any can help in improving the lives of residents of Mandera East Sub-County so as to enable them overcome future droughts.

### **1.3 Study Objectives**

#### **1.3.1 Main Objective**

This study's main goal was to assess the drought coping mechanisms among the nomadic pastoralists on Mandera East Sub-County.

#### **1.3.2 Specific Objectives**

The specific objectives investigated in this study include:

- i. To assess the effects of drought on nomadic pastoralists in Mandera East Sub-County at the household level
- ii. Establish the drought coping mechanisms among nomadic pastoralists in Mandera East Sub-County
- iii. To suggest new ways which the contemporary coping mechanisms can help in improving the lives of nomadic pastoralists during drought

#### **1.4 Research Questions**

- i) To what extent have the recent past droughts affected the lives of nomadic pastoralists in Mandera East Sub-County at household level?
- ii) How effective are the existing drought coping mechanisms among nomadic pastoralists in Mandera East Sub-County?
- iii) What other drought coping mechanisms would help in improving the lives of nomadic pastoralists?

#### **1.5 Justification of the Study**

Drought and other climate changes such as global warming have significantly shaped the way of life of nomadic pastoralists in Mandera East Sub-County. Drought kills livestock and sometimes human beings, depriving pastoralists their livelihood and forcing those who lose everything to migrate to urban areas or become internally displaced persons (IDPs). The effect of drought is mostly severe for poorer pastoralists with smaller herds and has less access to reliefs.

Learning from the patterns of previous droughts and the coping mechanisms adopted by the pastoralists gives us an insight on how best to prepare for future ones. Drought preparedness programs can help various stakeholders to react quickly to early warning signs (EWS) of disasters and undertake coordinated responses.

The recommendations of this study allow the national and county governments and development agencies institute measures to support nomadic pastoralists in Mandera East Sub-County to cope with drought. The benefits of such support will be greater resilience among pastoralists, enhanced pastoral productivity, and economic progression for Mandera County as a whole. The money saved from drought relief would enable development agencies and government to invest it in alternative

development projects like health and education to empower communities and achieving components of Kenya Vision 2030.

### **1.6 Significance of the Study**

Decisions affecting pastoralist communities may rely on the findings of this research to draw up policies for mitigating drought impact in Mandera East Sub-County. Given the impact drought has had on Kenyans, this study will inform the national and county governments on the appropriate coping mechanisms that ought to be up taken to mitigate against drought in future. The government through Members of County Assemblies (MCAs) and members of the parliament (MPs) can understand the magnitude of droughts and put in place necessary policy measures to fight it. Besides policy legislation, the study will inform the relevant government arms tasked with fighting drought and its effects of the relevant operational decisions and policy implementations that should take place to ensure enhanced coping with drought. Non-government organizations and other advocacy groups against drought will also apply the study in instituting and implementing NGO-funded projects that will ensure the advancement of coping mechanisms against drought among the nomadic pastoralists.

The study will be useful to pastoralists as it informs them of the appropriate coping strategies which when implemented will enable them overcome the undesirable impacts droughts pose hence improve their lifestyles. The study is also significant to future researchers who will apply this study's findings as a foundation for other researches in future.

### **1.7 Scope of the Study**

This research focused on assessing drought coping mechanisms among nomadic pastoralism in the sub-county of Mandera East. The study was investigating effects of

drought; drought coping strategies in place; and suggest new coping mechanisms that help in improving the lives of nomadic pastoralists. Other factors beyond these variables are beyond this study's scope. Additionally, the scope is defined by the areas of study—the five wards of Arabia, Bur Abor, Fino, Lafey and Libahia of Mandera East Sub-County in the County of Mandera and the time of study—between January and March 2021. Phenomenological research design and qualitative data collection methods were applied.

### **1.8 Limitation of the Study**

Low literacy levels among nomadic pastoralists in Mandera East Sub-County affected how respondents understood questions asked. However, the researcher translated the communication in Somali language to enable them comprehend well and then answer the questions as best as they could.

Movement of nomadic pastoralists between far located grazelands also hindered the accessibility of some target populations when required. To go past this hurdle, the researcher sought the assistance of local elders to reach out to those groups.

The study also faced logistical problems given the vastness of the area, harsh weather as well as security threat from armed insurgents such as Al-Shabab. These conditions hindered getting access to some respondents that could have given reliable information about their coping mechanisms during droughts. To counter these difficulties, the researcher hired two locals as research assistants to get the data needed for the study from those living far and could not be accessed by the researcher personally. The researcher also visited pastoralist gatherings such as prayer sessions and water points to meet with them. On the insecurity issue, the researcher visited only areas, which are safe from Al-Shabab attacks.

## CHAPTER TWO: LITERATURE REVIEW

### 2.0 Overview

In chapter two, the reviewed literatures are presented. The review was from documented sources including journals, books, theses and dissertations, electronic documents among others studies. The reviewed literatures were biased towards the subject of study and the study variables. The chapter further discusses the themes pointed out on the research questions. Theoretical framework is also highlighted.

### 2.1 Review of Relevant Concepts

A drought is an extended period of low rainfall reception to an area. In pastoralist societies, this period is often successive two years or more where the recorded rainfall is lower than 75% of the annual average over a long time (FEWSN, 2021). Drought is a natural climate occurrence that is variable with time and place (Altman, 2013). Drought occurrences are slow over time and its cumulative impacts are serious to individuals, communities and nations. As such, droughts are devastating yet least understood environmental change (Opiyo *et al.*, 2015).

In the history of human beings, drought was viewed as a catastrophic phenomenon due to the impact on food security and strength of livestock. People have always tried to explain drought as a natural calamity caused by higher powers as explained in the Bible in the story of the Exodus from the ancient Egypt. Among the followers of Islam, Christianity, and Judaism as well as other religions, there are rituals practiced averting drought in form of prayers and dances. Sacrifice is made to God to help those affected by drought and give them rain (Salite, 2019).

Drought and its effects are not a reserve of certain countries in the world because any country can encounter drought although some countries are more susceptible than



others. An approximated human population of 55 million across the world face droughts annually. The consequences of drought are dire on domesticated animals and crops (WHO, 2023) and since these two resources are paramount for the survival of humans, it is critical that significant concern be directed towards the evading or management of droughts and its effects. One of the ways through which people deal with droughts is by devising and applying coping mechanisms.

Coping mechanisms are referred to as the pastoralists' response to declining water and pasture availability during periods of rain shortage. They can be short term to avert a current drought or long term to learn how to live with such climatic shocks (Ibrahim, 2016). Blaikie, Cannon, Davis, and Wisner (1994) describe coping mechanism as ways that human beings apply in utilizing available resources to achieve their various needs. This means that coping mechanisms invoke temporary adjustments in reaction to livelihood stresses and shocks (Eriksen *et al.*, 2005). However, according to Brooks *et al.* (2005), people have different coping mechanisms based on their household needs and the nature of the regions they live in. This also depends on the available support systems that mitigate shocks and improve resilience of affected individuals.

Nomadic pastoralism concerns rearing livestock where the livestock keeper is in constant movement to search for grazelands and water for the animals. Often the animals kept include goats, donkeys, sheep, cattle and camels (Ibrahim, 2016). Seasonal movement is part of nomadic pastoralist's' cultural tradition and a defining feature of their lifestyle.

World over, nomadic pastoralism plays an important function in the ecosystem. In Mongolia, for instance, Drees *et al.* (2022) submit that nomadic pastoralism provides and maintains functions of the ecosystem by promoting dispersal of seeds, distribution

of nutrients to other areas as well as plays a cultural and social role. The study also reveals that nomadic pastoralism is projected to progress despite globalization and technological advancements. The main challenge to this continuity is the youth's preference to relocate to cities to hunt for work as opposed to staying in rural areas.

In another study from Mongolia, Tugjamba, Walkerden, and Miller (2021) inform that Mongolian nomadic herders traditionally used herd management practices, innovative pasture management, knowledge on drought, and mobility to cope with drought. However, these methods were traditional and, although some are still useful, current methods have also been employed to adapt to the current unprecedented environmental risks that are a threat to the livelihood of these herders. Seasonal migration is one modern coping method that has been inherited from the traditional ones. Other current coping methods adopted by the Mongolian herders include adoption of insurance specific for livestock, reforestation, improved management of water sources, and management of grazelands. Tugjamba et al. (2021) informs that these methods have proved effective in enabling Mongolian nomads cope with the changing climate and the shocks associated with the change.

In Africa, herders have also applied various methods of coping with droughts in order to overcome the associated risks. Nguimalet (2018) identifies changed livelihood activities and dependence of relief as coping mechanisms applied in Central African Republic and Kenya. In Ethiopia, Mengistu and Haji (2015) submit that practicing agro-pastoralism, planting trees and engaging in non-pastoral and non-agro-pastoral activities were additional coping mechanisms to those presented by Tugjamba et al. (2021).

Kenya is home to dozens of nomadic pastoralist tribes including Somalis, Turkana, Samburu, Pokot and Maasai. There is lack of up-to-date census data on the number of pastoralists in Kenya. According to The League for Pastoral Peoples and Endogenous Livestock Development (LPPELD), Kenya's nomadic pastoralist community is approximately 4 million. Their net worth is said to be more than US \$1 billion indicating their social and economic significance to the country (Yusuf, 2020).

## **2.2 Empirical Review**

Among the natural environmental hazards, drought stands out as one of the severest on African countries (Sabuni, 2020). When it strikes, it usually triggers situation that needs urgent action and the impact it leaves on the people is what normally shapes the response. The consequences of drought lead to many interlinked factors such as poverty, population increase, inadequate economic development and at times conflict over scarce resources (Ibrahim, 2016). Mendelsohn (2001) argues that less developed areas are more vulnerable to climatic shocks since the locals can hardly acclimatize or recuperate from the effect of those natural phenomena such as drought. So, by studying the coping mechanisms of the most affected and improving them will help in adaptive mechanism and reduce the impact of drought.

Wakhungu (2013) posits that due to the frequent occurrence of droughts, nomadic pastoralists have no time to restock and recover well before another one hits; thus, population of livestock becomes weaker and vulnerable to other climatic shocks. AghaKouchak (2015) suggests that drought has adversely affected all sectors of the Kenyan economy and its citizens. Further, the author found that among the impacts of drought on nomadic pastoralism were: scarcity of pasture and water for animals, death of livestock, malnutrition and starvation for people as well as collapse of animal market.

These effects do not only affect the economic state of the affected people but also their social status as well as the countries social and economic stability. According to the Republic of Kenya (2012), the cost of the damage and losses droughts cause is high. In fact, concerning the Kenyan drought that took place between 2008 and 2011, the country lost an estimated US\$ 1.2 billion. This raises the concern on how to lower the negative consequences drought poses besides exposing the necessity of instituting appropriate coping measures as is the aim of this study.

A study by Opiyo, Wasonga, Nyangito, Schilling, and Munang (2015) revealed that vulnerability for drought in the Kenyan ASAL is not just caused by the phenomenon but also man-made disasters such as conflict, insecurity, and poor infrastructure due to political and economic marginalization. They accept that drought has severe consequences on both its victims and those helping thus claiming that it is by far the costliest occurrence to the society. According to Ibrahim (2016), early warning systems are generally weak at local and district level in Mandera East Sub-County and so are assessments on the ground. The author argues that even though the early warning systems are quite good at national level, they tend to serve government and donor agencies rather than the actual people who bear the brunt. Therefore, the usefulness of these tools is questionable, and their effectiveness tends to be backward looking. This study will fill this gap by indicating how useful it would be to the local people if the warning systems were shared directly to the locals.

Mainlay and Tan (2012) study revealed that one of the problems that ASAL areas faced for years is that the responders to the drought (mainly government and donor agencies) tend to wait for concrete evidence on the existence of drought rather than act on the early warning information and assessment reports. By the time the agencies begin to

act, they find themselves reacting to damages already caused. The focus, therefore, should be acting proactively. Drought management is a good starting point, but it is unable to substitute the requirement for longstanding development. It is established that NGOs that have their own funds for emergency responses can act on time than those agencies, which do not have such funds ready.

Besides the negative effects of drought mentioned by the reviewed works (e.g., Mendelsohn (2001); Republic of Kenya (2012); Wakhungu (2013); AghaKouchak (2015); Opiyo *et al.* (2015); Ibrahim (2016); Sabuni (2020)), there are positive effects associated with the onset of droughts. According to Swift (2001) diversification of economic activities is one such effect. Swift (2001) informs that just like other nomadic communities, Somali pastoralists in the general Mandera county and across the region of East Africa have traditionally coped with drought situations by moving their domesticated animals to places with quality forage and water, selling part of their flocks, using index-based insurance schemes that is specially tailored for the pastoralists affected by the drought, and expanding economic activities to accommodate activities like beekeeping and agriculture. (These factors are described in detail under the subtopic on traditional coping mechanisms to drought situations). This finding shows that droughts can also trigger the adoption of alternative lifestyles. As to whether this has also taken place to the people of Mandera East sub-county remains to be revealed in the findings of this study.

### **2.2.1 Effects of Drought on Nomadic Pastoralism**

In the past 25 years, incidences of drought in Mandera County have gone up in quadruplets. The droughts of 2011 to 2017 caused the loss of many livestock to the tune of 60% of the households retaining pastoralism requiring external assistance to recover.

Their surviving herds were too small to support them (UNEP & GOK, 2020). Thus, although the immediate direct effect of drought was loss of livestock, the indirect effect arising from this loss was dependence of external assistance (aid). Julius and Kosonei (2014) add that the worst drought experienced in Kenya in the last century was the 2011 one. This drought caused the death of 60-70% of livestock, serious environmental degradation, loss of products and services, water points drying up, extensive withering and failure of crop agriculture, and overdependence on relief support to survive.

In the ASALs, water is primarily derived from surface and sub-surface sources. During wet seasons, livestock and people get water from open surface water in natural watercourses and ponds; during the dry seasons, they rely on hand-dug wells that reach as deep as 20 meters (Bake, 1989). The effect of drought on water points can be viewed in relation to water volume, time spent searching for water, competition over water resources and water quality. Drought has the impact of reducing water volume in the surface and sub-surface water sources that agropastoral depend on (UNEP & GOK, 2000). UNEP & GOK (2000) further indicates that drought causes serious competition over water resources that commonly escalates into conflicts. In ASAL areas, the shortage of water coupled with the shortage of pasture, fueled conflict between rival groups. In terms of water quality, drought leads pastoral people to share the scarce water sources with their animals and in case of pools of water, this usually result in water contamination which is a likely source of water-borne diseases and ailments.

Drought often exacerbates social and economic problems. In most dry lands that also form the base of pastoralism in Kenya, drought leads to loss of livestock, loss of crops (in areas of agro-pastoralism) disruption of normal life and as is most cases it leads to famine and starvation that leaves children malnourished and sometimes resulting into

severe effects like loss of life. In the past, drought has had an almost crippling effect on Kenya's economy. For instance, during the 1999-2000-drought period, the rate of progress of the national GDP declined to 0.7% in 2000 from 1.4% in 1999 for the same period in 2000 (UNEP & GOK, 2000). In the recent drought in Kenya, over 3.5 million people from ASAL areas were faced with food insecurity with many of them facing starvation which enhanced the risk of malnourishment and diseases (Reliefweb, 2022). Even though the statistics of human deaths associated with drought are not clear, this study endeavors to clarify whether there arose any drought-related human deaths in Manderu East subcounty.

In the understanding and knowledge of the public, the impact of drought on nomadic pastoralists in northeastern Kenya attracts undesirable implication. This is justified to the extent that drought attracts several harmful impacts in the pastoralist livelihoods. According to Ahmed, Azeze, Babiker, and Tsegaye, (2002), drought should be analyzed as a function of the production system onto which producer inputs are hinged, drawing organizational avenues and methods to be used. Thus, the analysis of drought as an external occurrence foreign to the operation and experience of pastoralist economy should not be given attention.

According to FAO (2002), conflicts and droughts are significant contributors to the challenges of food production, dispersal, and access in a constrained environment of delicate ecosystems, poor governance and restrained economic growth. FAO (2002) identifies two major processes that hinder pastoralists in drought situations and seriously dent the ability of the pastoralists being independent and effectively rearing the least number of livestock that can adequately support their households.

First is the dwindling herd productivity levels arising from the high number of livestock deaths, low milk production, low reproduction levels, and animal emaciation which lower the associated value. Ahmed *et al.* (2002, p. 39) quoting Coppock (1994), informed that during the drought occurring in 1983-84 in Oromia, Ethiopia recorded diminished cow numbers by 60% resulting from the death of 42%, forceful sale of 14% and the slaughter of 4% of the cattle. Milk production also decreased significantly by 92%.

Secondly, in drought seasons, trade changes often hit pastoralists which significantly impacts the buying power attached to their livestock. This happens because droughts also affect the agricultural sector by lowering agricultural produce to be sold. Consequently, farmers need of livestock products also reduces due to the low agricultural performance, poor animal condition, reduced incomes, and diminished demand for animals' products like meat and milk in comparison to agricultural produce.

The effects of drought, thus, are hinged on how severe the drought is as determined meteorologically or ecologically, the historical data on droughts, and the fundamental adaptations pastoralists have. The appropriate analysis of the source effects of droughts is critical for effective planning to enhance adaptation to droughts and advance drought management.

### **2.2.2 Drought Coping Mechanisms among Nomadic Pastoralists**

Karavitis (1999) defined drought as “*the state of adverse and widespread hydrological, environmental, social and economic impacts due to less than anticipated rainfall quantities.*” Comparing with other definitions of drought, it is clear that the mutual factor in these descriptions is that, in drought seasons, there is insufficiency in rainfall



causing antagonistic consequences to the community and particularly nomadic pastoralists.

The ASALs in Kenya are prone to droughts hence highly vulnerable to the consequences of drought. The pastoralist economy in this region offers 95% of household revenue, 90% of job chances as well as gives families a source of livelihood (Kenya ASAL Policy, 2012). Therefore, to mitigate the effects of droughts, pastoralists in these regions have to cope with this natural phenomenon to reduce vulnerability.

Davies (1993) states that coping strategies are engaged once the principal source of production has failed to meet expected levels. Droughts are hard to predict and when they hit, they last longer than expected. That is why scholars like Mishra and Singh (2010) call it the creeping disaster. It starts slowly and eventually has a devastating impact on all aspects of society that chiefly depends on pastoralism-whether directly or indirectly. Theoretically, drought forecasting gears can be applied to inform on development trends in time to allow decision makers in the government and development agencies prepare for the phenomenon before it hits. This approach can act as a mitigation process and at most, helps reduce the impact of drought on nomadic pastoralists. This study attempts to establish whether this is practiced in Madera East.

The effectiveness and sustainability of societies' coping mechanisms during the period of drought is something that governments, their international partners as well as development agencies strive to build and work on. According to Sivakumar (2011), such actions require cooperation between all stakeholders to enhance the coping mechanisms and improve on them. Opiyo et al. (2015) submit that pastoralists' coping mechanisms concerning drought and other environmental conditions have been studied for many years. However, since the livelihood of nomadic pastoralists in Mandera has

evolved over the years to adapt to climatic conditions in the harsh environment, it is critical to establish whether this evolution has caused an evolution in the coping mechanisms as well.

Opiyo *et al.* (2015) indicate that pastoralist mobility and reduction in herd numbers were effective traditional coping mechanisms that enabled pastoralists resist drought and, as such, can lead to generation of income and economic growth among nomadic pastoral communities regardless of the drought (Opiyo *et al.*, 2015). However, with the increased commercialization of land coupled with increased population and community scramble for grazing fields and watering spots, the effectiveness of these measures, particularly the migration of pastoralists to escape drought, is questionable. This study will empirically establish the applicability of this mechanism among nomadic pastoralists of Mandera East sub-county.

The nomadic pastoralists in Mandera have for many years known which area to migrate to during drought seasons and according to Notenbaert *et al.* (2012) such knowledge helps them to both benefit from areas with enough pasture and water, saving their livestock from dying in the drought. A study by Barton (2001) also concurred with migration as a coping mechanism. The researcher adds that in drought seasons nomadic pastoralists migrate in an organized manner according to the knowledge about available grazing areas and watering points. Such movement emanates from the local drought-stricken area and advances regionally and sometimes even nationally and internationally for nomads living near international borders.

According to Schilling, Opiyo, and Scheffran (2012) understanding how pastoralists cope with climatic conditions, especially droughts is essential for nomadic pastoralists in Northeastern Kenya as they face different forms of marginalization.

According to Brokensha (1977), some nomadic herders keep a large number of livestock which are difficult to manage in resource scarcity. As such, herders are advised to destock or sell a number of their livestock in drought seasons to minimize competition for food and water hence minimize the risk of the drought on the animals. Contrastingly, many nomadic pastoralists prefer keeping large herds for cultural, traditional and prestige issues which sometimes draws negative impact.

Before the onset of drought, experts advise nomadic pastoralists to sell the weak and vulnerable animals in their herds to save them from the jaws of the drought. Some of the herders are reluctant to do so, but majority – after getting advice from local entrepreneurs and family members in urban areas – reluctantly sell their livestock almost at throwaway prices (Watson & van Binsbergen, 2006). Noteworthy, Orindi, Nyong, and Herrero (2007) informs that drought complicates pastoral investments by lowering its viability hence challenging the ability of pastoral households to effectively cater for their requirements. This justifies the need to sell animals (destock) when they are still healthy, an act that can be well implemented if meteorological predictions can be precise and timely communicated to herders.

In recent years, index-based insurance, which covers livestock, has ventured into the Kenyan market. This type of insurance is popular in countries such as Mongolia and India. Nevertheless, some researchers such as Mude et.al (2016) argue that this kind of short-term solution creates what they call “poverty trap” a scenario like that when farmers consume or sell all their harvest instead of leaving some for planting.

To enhance the benefits of such insurance, Mude *et al.* (2016) came up with ways of creating geographical maps that show where this method would be feasible, based on livestock population, aridity, and other calculated measures. When pastoralists receive

their payouts from insurance companies, most of them go back to the market and buy species that resist droughts comprising camels and donkeys since they have been seen to cope better with the frequently occurring droughts.

According to Dror *et al.* (2015) the government of Kenya in co-operation with other associates like as ILRI, World Bank, and others, has in 2014 launched IBLI with the aim of protecting pastoralists vulnerable to changes in climate. Its focus was to improve systems for managing drought with the aim of attending to pastoralists who entirely depended on livestock rearing. Although the positive impact of this system has been evidenced, its scale of adoption is low as many pastoralists are affected by premium issues (Mude *et al.*, 2016).

Livestock insurance programs use satellite data to generate indices for the grazing conditions and then pay insured pastoralists in the early phase of the drought so that they can mitigate the impact of the phenomenon. The scheme attracted global attention and is hailed as an appropriate way of bettering the lives of pastoralists (Banerjee, Mwaura, & Bashuna, 2019).

Index-based insurance has been successful in many other areas in combating the effect of drought among pastoralists. In Ethiopia, Amare, Simane, Nyangaga, Defisa, Hamza, and Gurmessa (2019) also investigated the effectiveness of IBLI among drought-stricken pastoralists and found that although the uptake of the insurance was low, it cushioned those pastoralists who bought it against the effects of drought. Farmers with this insurance were compensated in poor weather and the funds used to purchase food for the remaining animals among other uses. This study proposed an increased uptake of this insurance as a mitigation measure against the risk of drought. Locally, McPeak, Chantarat, and Mude (2010) investigated how IBLI could benefit the people of northern

Kenya who were predominantly pastoralists and found that this instance could help pastoralists escape poverty by compensating them for dry weather.

Mude, Barrett, Carter, Chantarat, Ikegami, and McPeak (2009) give an example of how IBLI premiums are calculated. They show that if the policy requires the farmer to pay a premium of Ksh. 10,000 per livestock and that the payment level is determined at 15% mortality rate (when the weather index is unfavorable), and the predicted mortality rate is calculated to be 25% in a drought period, the farmer will be paid Ksh. 10,000 x (25%-15%) x Number of animals insured. This payment then is used by the farmer to mitigate against the risk of drought in whatever way the farmer finds suitable. Given the success of the IBLI in various areas across the world, it is expected that its application to the case of Mandera East sub-county could also be beneficial. However, this study investigates the applicability of this coping mechanism.

For decades, the practice of keeping mixed herds has been well known among nomadic pastoralists in Mandera County, helping them make use of different types of pasture such as grass, shrubs and leaves. This also works as a drought mitigation strategy because not all animals will be affected in the same way by the dry season. Another coping mechanism that is practiced by the nomadic pastoralists of Mandera is to lend or take part of their herds to their kin and friends living in regions free from drought or even urban areas. These animals later become useful when the drought subsides because pastoralists can quickly restock and recover from the impact of drought.

Communal land and its proper management are essential to nomadic pastoralists as it allows them to freely migrate to areas with pasture and water during drought seasons. The migration of nomads to places with better vegetative coverage is beneficial as it discourages overexploitation of a less vegetated area (Opiyo *et al.*, 2015). Even though

nomadic pastoralists in Mandera have developed successful coping mechanisms to droughts which are aimed at minimizing losses of livestock and fast-tracking recovery after drought, many of these mechanisms are likely to become inefficient in the case of frequently occurring droughts and the hard-hitting climate changes. According to Ibrahim (2016), the past actions aimed at drought mitigation was largely focused on ex-post, while existing mitigation plans in northern Kenya are mostly ad hoc with little or no input from local communities affected by the drought. Thus, there is need to change this approach and adapt one that originates from local communities and taking the bottom-up approach.

### **2.2.3 Ways the Existing Coping Mechanisms Improve Lives of Nomadic Pastoralists**

The pastoral communities of northern Kenya including those in Mandera East Sub County live in tough and highly challenging environment and barely survive (Huho, Ngaira, and Ogindo, 2011). Despite the harsh conditions, pastoral societies have adapted to environmental changes by applying various long and short-term measures that enable them cope with the frequent drought episodes (Ouma, Obando, & Koech, 2012).

Downing, Gitu, and Kamau (1989) points out a key component of the pastoralists' drought coping strategy as the ability to move herds to make the best possible usage of vegetation reserves, water points and sporadic rainfall. Some other strategies that pastoralists rely on include but are not limited to herd diversification, digging of shallow wells along dry riverbeds, sale of livestock during drought and restock in wet season and livelihood diversification.

### **2.2.3.1 Diversification**

Diversification is one of the ways of dealing with harsh climatic conditions that affect nomad pastoralists. According to Mengistu and Haji (2015) diversification can occur in various ways including herd diversification where the herd is diversified in various ways including herd splitting, changing the type of livestock, destocking, livestock transfer and rotational grazing. The other type of diversification mentioned is crop-livestock diversification where pastoralism is practiced besides planting resistant crops. In both diversifications, the need to overcome harsh climatic conditions is paramount. In Ethiopia, for instance, herd diversification is commonly adopted among pastoralists although crop diversification is being introduced slowly (Mengistu & Haji, 2015). However, in Kenya, crop diversification is highly fronted as a drought mitigation measure although calls for destocking and herd splitting are also common (Opiyo *et al.*, 2015).

Getachew *et al.* (2014) also informs that in order to ensure a wide range of resilience towards harsh climate, Ethiopian herders diversify in tree planting activities, non-rainfed irrigation and engagement in non-agricultural activities. What is more, Little (2001) posits that diversification minimizes, and sometimes scraps off the risk of harsh climatic conditions on pastoralists. However, class differentiates the purpose and model of diversification adopted. For instance, while the wealthiest will diversify to spread risk, the poor will diversify to ensure survival (Little, 2001). In the case of the current study, this study will investigate which of these diversification methods is common and its validity in ensuring nomadic pastoralists of Mandera East sub-county cope with the drought menace.

### **2.2.3.2 Donating Livestock to affected Households**

According to Roth (1996), pastoralists also rely on the strategy of reciprocity to help their next of kin or members of their social network who because of drought have lost all or majority of their livestock stay viable. This is normally achieved by way of the less impacted members of the social network donating a proportion of their herd to those members who have experienced complete or near complete loss to ensure that they can continue to support their families. This strategy often succeeds when the donating pastoralists have not been affected by the drought and that by the time of donating, the receiving family has pasture/water which they will use to feed the donated livestock. Otherwise, the donated animals would still succumb making the whole idea of reciprocity futile.

### **2.2.3.3 Migrating livestock to graze/watering lands**

Movement of people and their livestock in the northern arid lands of Kenya has been going on for the longest time. As Handley (2012), points out during colonial times such movements were restricted by regulations that required people to register and reside in certain places reserved for local African population. In these periods coping with drought through livestock mobility, meant that pastoralists had to seek grazing permission from colonial administrative officers to move into areas with relative abundance of pasture and water resources but in which they were not registered to reside. Livestock mobility remains a key strategy for pastoral communities that inhabit the ASAL parts of Kenya (Handley, 2012).

### **2.2.3.4 Early Warning System**

According to Angeluccetti, Demarchi, and Perez (2014), a significant relationship exists between the effectiveness of early warning system and the management of



drought. There is also good link between education, training and collaboration between agencies in mitigating drought in Kenya. An effective drought management system is one where early warning mechanisms are activated timely to guarantee timely mitigation of the impact of droughts.

In 2016, the National Drought Management Authority of Kenya and FAO instituted an Early Warning Early Action mechanism created to utilize cautions on drought to activate first-hand response so as to mitigate its impact on communities (FAO, 2016). However, that system is hardly used by nomadic pastoralists in Mandera East Sub-County since it needs other supporting factors that are not available to them now. In late 2016, that early warning system enabled FAO to release nearly half a million-dollar funds to different parts of Kenya as a drought mitigation program. The UN agency provided emergency feed rations for livestock, which were disseminated to counties in great need. The program focused on ensuring survival of the livestock and thriving even in scarcity of fodder associated with limited rainfall (FAO, 2017).

#### **2.2.3.5 Destocking**

Nomadic pastoralists have a profound desire for keeping large herds of animals since wealth is determined by the number of livestock one owns (Sandford & Ashley, 2003). Therefore, the income from livestock is primarily in the form of their products namely milk and meat; as such they are likely to be kept until they fail to produce and cease to serve the prestige required by their owners. Some pastoralists do sell their livestock (destock) to avoid complete loss during drought period and then use the money to restock when conditions are favorable. However, most of the time such sale of livestock takes place when drought has greatly weakened the animals and thus, they do not usually fetch a good price at the markets (Watson & van Binsbergen, 2006).

Emergency livestock purchasing is seen as the most important drought mitigation factor tried in this decade (Aklilu & Wekesa, 2001). Some aid organizations and government agencies directly buy fragile animals at good price helping the pastoralists' cash in their weak animals that could otherwise have died in the drought. The animals are then slaughtered, and their meat distributed among the needy.

Destocking has several benefits. First, it allows pastoralists to cash in some of their assets (livestock) before the drought kills them. This means an increase in the purchasing power of the pastoralists (Behnke & Kerven, 2004). According to Oxfam (2002), this process produces dual kinds of receivers: those selling their weak livestock to the mitigation project at a good price as well as those taking advantage of the increased market charges due to the additional demand created by the destocking project.

After selling the weaker animals, the herders can remain with and take care of the strong ones preserving them for post drought recovery. The manageable stock of animals enables pastoralists to set aside some of the money obtained from selling the weak animals for other uses including school fees and other developmental issues.

#### **2.2.3.6 Supplementary feeding**

According to Blench & Marriage (1998), supplementary feeding was not popular among nomadic pastoralists in East Africa, but due to the persistent drought, it has become one of the methods of managing the effects of drought. The supply of hays, molasses and oil-seed cakes is beginning to alter the impact of drought on livestock. Researchers such as Sandford and Habatu (2001), state that nomadic pastoralist later adapted the measure and even started moving their animals where such feed rations were provided.

In their analysis of the efficiency of supplement feeding, Aklilu (2006) concluded that the intervention was commendable and had positive impact on lactating animals in the recovery period. However, Oxfam (2007) suggests that the supplementary feeds are better to be produced by private commercial manufacturers instead of going through community-managed programs or aid agencies. The feed is said to have better mineral combination than the normal fodder, thus strengthening the body of the animal that feeds on them. But there are challenges associated with the provision including high cost and logistical problems such as transportation and storage (Oxfam, 2007). In the absence of supplementary feed for livestock, some pastoralists in Mandera East Sub-County are known to have used relief food to feed animals (especially grains) meant for human consumption.

To take full advantage of supplementary feeds during drought seasons, Stewart, Dyer, Silcox, Rossi, and Stewart (2017) advise against rearing or keeping lactating cows as they require 30% more feeds than non-lactating animals. This means that it is straining to keep lactating livestock during drought seasons and as such destocking such breeds could appear as a coping mechanism. Andrade, Cunha, Galvão, and Rufino (2017) add that lactating cows are the most vulnerable when droughts strike hence beef cattle are more resilient and preferred. This study investigated whether this mechanism is adopted among the people of Mandera East sub-county.

#### **2.2.3.7 Change in Water Management**

Using a case of Senegal, Assane and Waoundé (2022) look at droughts as limiters to access to water resources and therefore believe that one of the ways of coping with droughts is by having access to water resources which can be enhanced by changing how water resources have been managed as well as storing animal feeds for use during

droughts. Although ASAL areas receive some rainfall, the high tropical temperatures characteristic of this areas evaporates the little available water resources and dry up the ground quicklier than expected. The heavy wind storms make things worse as they propel the run-off of water while eroding the top-soil. These threaten the availability of pasture and water expected to feed livestock (Simel, 2009 cited in Assane & Waoundé, 2022, p. 4). However, as submitted by the study by Assane and Waoundé (2022); Mengistu and Haji (2015), a change in how the water resources are managed in ASALs is the key to coping with the harsh drought seasons. When managed well, the water will be available to water animals and plant during the dry seasons hence ensure adequate coping with the drought.

## **2.3 Theoretical Framework**

### **2.3.1 Cultural Ecology Theory**

The theory of cultural ecology makes an effort to explain how cultural similarities and differences relate to the environment. Julian Steward originated this theory in the 1950s by conceiving of cultural ecology theory as a paradigm for comprehending how people adapt to a wide range of contexts. This theory examines cultures to identify the variables that affect cultural development or adaptations that are comparable across cultures (Hirst, 2018).

Cultural ecology, according to Sutton and Anderson (2013), describes the processes via which environmental adaptation leads to cultural change. A fundamental tenet of this theory is that any adaptation by humans incorporates innovations, knowledge and practices that enable humans to reside in a given ecosystem. The notion contends that people's responses to their environment (culture) are influenced by the environment in which they live. This indicates that, in this case, the environment impacts but does not

define the nature of human adaptation. In doing so, Steward shrewdly distinguished between the whims of ecosystem and the internal operations of a culture that existed in particular context.

When seen in the long-run, this implies that culture and the environment are following different evolutionary paths and that the strength of the relationship between them depends on how each is organized. Since it implies a degree of environmental determinism over human actions, which some social scientists (especially those writing from a Marxist perspective) find problematic, this claim that the physical and biological environment influences culture has proven to be contentious (Francisconi, n.d.; Hirst, 2018). Cultural ecology acknowledges that a region's ecological setting significantly influences its cultures. For example, communities in areas with abundant rainfall will be persuaded to practice agriculture rather than alternative types of land use (Sutton & Anderson, 2013).

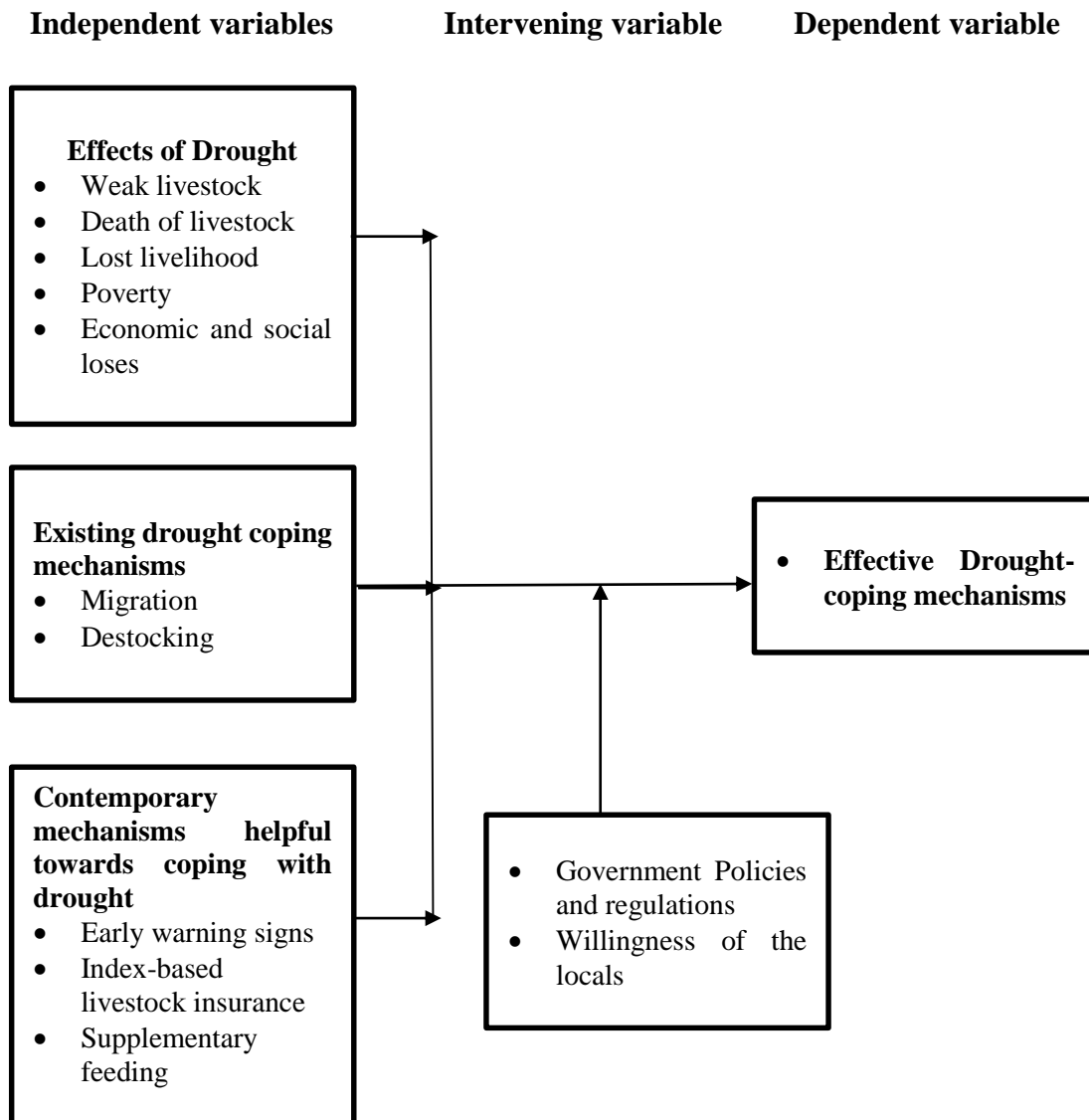
One of the main principles and motivating forces in the growth of social sciences in the 1960s was cultural ecology. The theory unites the various cultures of knowledge that have developed throughout history and that have been divided into ever-more-specialized disciplines and sub-disciplines in the development of modern science, as understood from the perspective of social science through the framework of technology and its effects on environmental adaptation (Finke & Bublak, 2005). Cultural ecology holds that rather than seeing human culture as something distinct, it is interdependent with and infused by ecological processes and natural energy cycles. It also acknowledges the self-reflexive dynamics and relative independence of cultural processes (Hirst, 2018).

The concepts of cultural ecology and systems theory are combined (Finke, 2007). Finke (2007) refers to society's different divisions and subsystems as "cultural ecosystems," each of which has its own mechanisms for producing, consuming, and reducing energy (both material and immaterial). These cultural ecologists were interested in the choices that different human societies made regarding how they used the environment. They focused on the issue of agricultural intensification and improved the rival models proposed by Thomas Malthus and Boserup. However, cultural ecology has come under fire for omitting the links between the systems at the local scale they examined and the world political economy. However, political ecology, land change science, and sustainability science have incorporated and expanded upon concepts from cultural ecology.

This study's use of cultural ecology helps it address how people can create more agreeable cultural relationships with the environment. In order to create a new environmental perception and combat the severity of drought, it looks for lessons from the traditional coping techniques used by pastoralists who live in nomadic communities. Thus, this theory aids in the study's attempt to understand how Mandera East Sub County residents have evolved and still need to evolve appropriate behavioral responses that will enable them to interact positively with the drought-affected environment and weather.

## 2.4 Conceptual Framework

This study's conceptual framework was as shown in figure 2.1. It depicts the relationship of variables under study.



**Figure 2.1: Conceptual Framework**

Source: Author (2023).

The conceptual framework in figure 2.1 shows that the effects of droughts, the existing drought coping mechanisms and the contemporary coping mechanisms determine the effective drought coping mechanisms that should be adopted by the people of Mandera East subcounty in order to overcome the impact of droughts. This relationship is

however influenced by the kind of government policies and regulations put in place to manage droughts and how willing the locals are to uptake and implement the proposed coping mechanisms.



## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.0 Overview**

The research methodology chapter presents the research design, the population targeted and the size chosen, the sampling design employed, data collection methods and procedures, and the method of analyzing data. Primary data was sourced through key informant and in-depth interviews and focus group discussions (FGD). It also contains the description of the study area, trustworthiness of the collected data, and the observed ethical considerations.

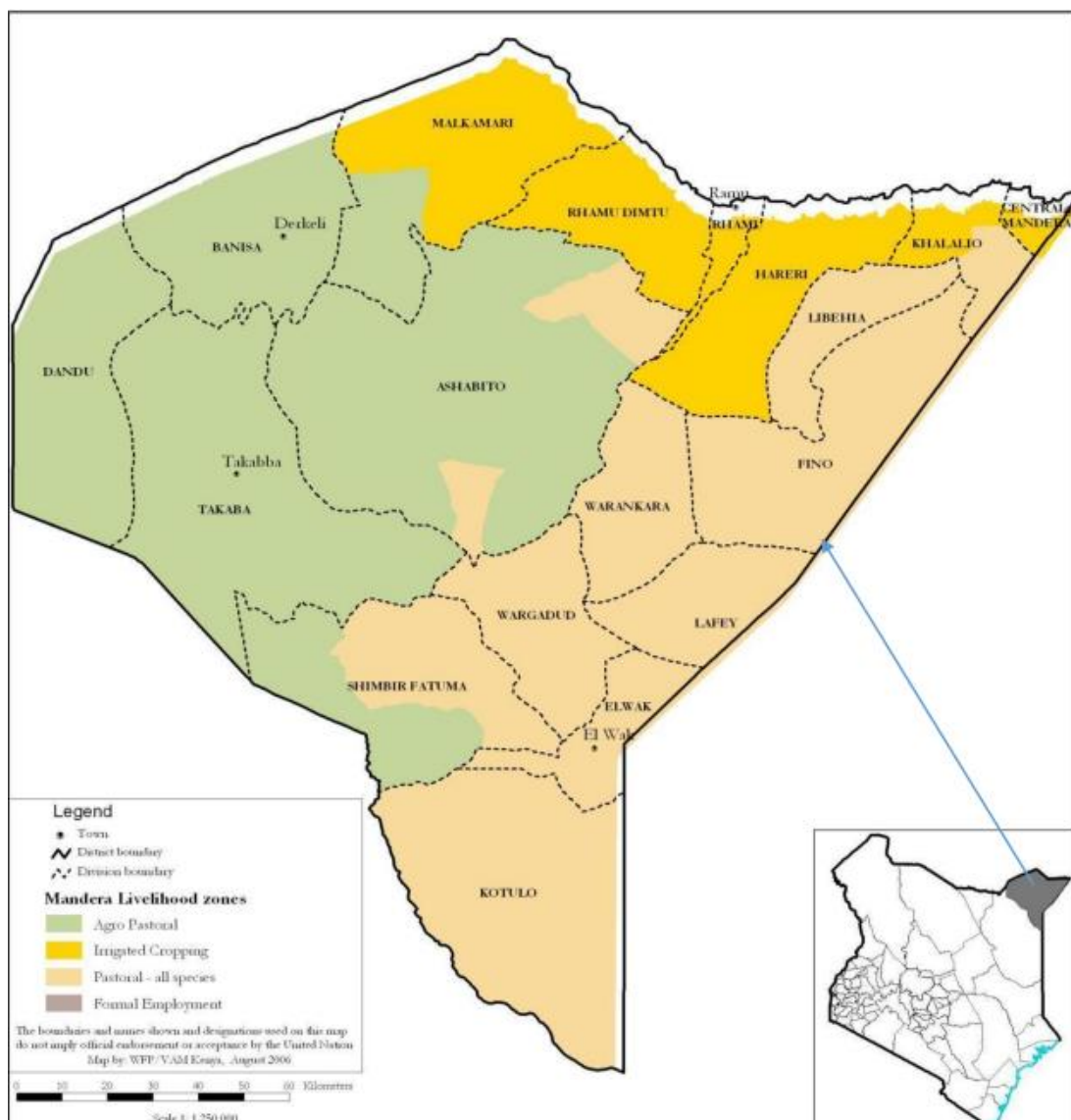
### **3.1 Site Description**

Mandera East Sub-County is one of five sub-counties of Mandera County, which is in Northeastern region of Kenya. The county shares a boundary with Somalia republic (Eastwards), Wajir County (southwards) and Ethiopia (Northwards). Ninety five percent of Mandera County is Arid or semi-arid with thorny shrubs and Mathenge plants comprising majority of its vegetative cover. The County's hottest months are February and March at 42<sup>0</sup> C while July is the coldest at 24<sup>0</sup> C. The county receives scanty and unreliable rainfall with an annual average of 191.7 mm. April and May are the months when the county experiences long rains (169.1 mm pa) while short-rains (122 mm pa) are experienced in October through to November (Mandera County, 2020).

Mandera East Sub-County covers 2,797 KM<sup>2</sup> that is mainly arid and semi-arid land with low to moderate rainfall throughout the year. The 2019 census shows Mandera East Sub-County had a population of 159,638 people (KNBS, 2019). The notable livelihood source in the sub-county is pastoralism, whose revenue generates is about

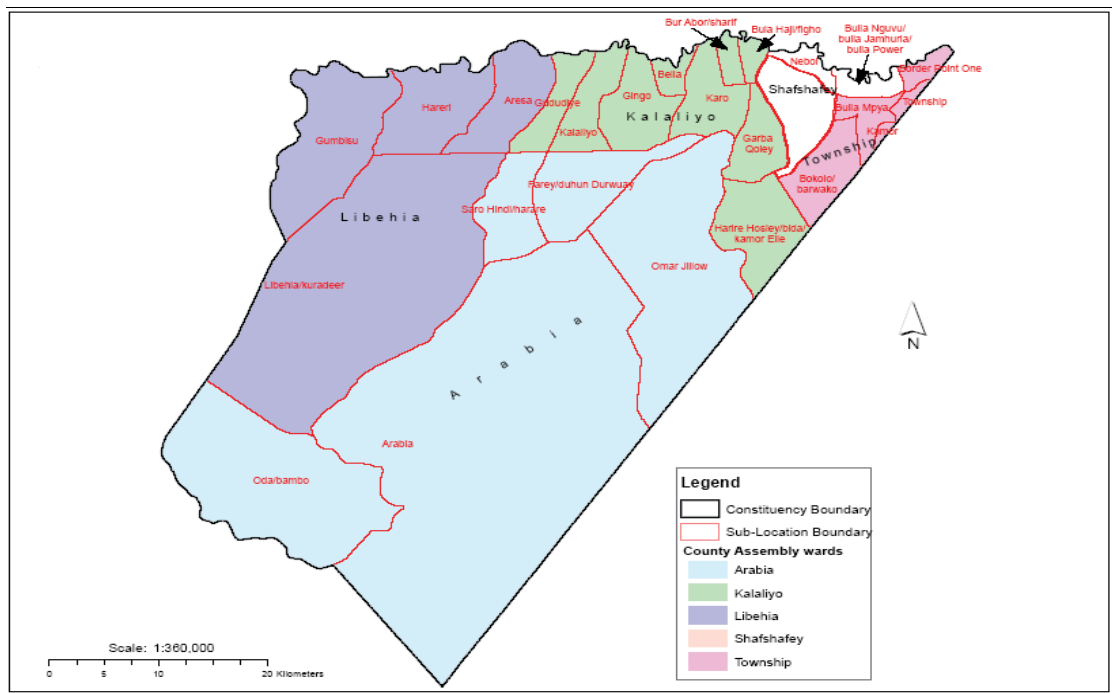
72% of the total household income (Mandera County, 2020) while goats, camels, sheep, cattle, donkeys, and chicken are the animals reared.

The study site was chosen because the nomadic pastoralists in the area have lived there for centuries and practiced pastoralism as their main livelihood and that they have adapted to the climatic changes of the area over the years. This makes the research area suitable for study. The study area is as shown in map 3.1 a and b.



**Figure 3.1a: Map of Mandera County in Relation to Kenya**

Source: KFSSG and Mandera County Steering Group (2022).



**Figure 3.1b: Map of Mandera East Sub-County, Kenya**

*Source: Kenyamaps.org 2021*

### 3.2 Research Design

Kirshenblatt-Gimblett (2006) considers a research design as a structure and plan that links all components of the study to guarantee that the gathered information adequately answers the study questions. In this study, phenomenological research design was used and it is aimed at exposing the lived experiences of things. According to Rodriguez, and Smith (2018), phenomenological designs investigate what the experience is like, the meaning of the experience, and how the participant and researcher perceive the lived world. Basically, this design aimed to reveal the lived experiences participants have about their natural environment by adopting an in-depth probe of meanings people attach to their experiences. As such, the adoption of this research design enabled the researcher assess how nomadic pastoralists in Mandera East Sub-County cope with persistent droughts that they are exposed to year-in-year-out.

### **3.3 Unit of Analysis**

The researcher used the nomadic pastoralists as the unit of analysis, which were the inhabitants of the five wards in Mandera East Sub-County. According to Mandera (2014) nomadic pastoralists constitute 89% of its population. The study's unit of observation comprised heads of the nomadic households. According to Haviland (2003), a household comprises of people living under one roof and dine together. It can make up single family or a group of people from different families.

### **3.4 Nature and Sources of Data**

This study used qualitative method to expand its evidence base by using qualitative data. Primary data from subjects and secondary data from government as well as NGO records was relied upon in this study, although the primary data was more extensive compared to the secondary one. In-depth interviews, interview guides for key informants (KI) and focus group dialogues gathered primary information from the respondents who are largely the nomadic pastoralists of Mandera East Sub-County.

### **3.5 Target Population**

Target population, as posited by Willie (2022), is the whole set of objects or individuals to which a study generalizes its conclusions. According to Mugenda & Mugenda (2003), a target population comprises people of things from which the study intends to gather data for a study. This study generalized its findings to the target population based on the collection of data from all cases that meet predetermined set of requirements. This study's target population was nomadic pastoralist in the sub-county of Mandera East. The population of the county of Mandera is organized into households which are led by a household head who is often the eldest or respectable member of the family/household. The household head is culturally mandated to speak on behalf of the family hence very important target to this study. Each household comprises an average

of 6 family members. This study targeted these household heads. Statistics show that Mandera East Sub-County had 25,904 households (KNBS, 2019) who made up the target population studied in this study.

### **3.6 Sample Size and Sampling Procedures**

#### **3.6.1 Sample Size Determination**

It is impractical for a researcher to study the whole population hence the relevance of sampling and sample size determination. According to Ravikiran (2023), a sample size comprises the count of sources of data chosen from the targeted population for interviewing and from whom the findings and conclusions made are generalized to the entire population. In line with the chosen design, this research used sample size identification methods commensurate with the qualitative approach. According to Haithar (2022), qualitative studies lack a generally acceptable sample size determination formula but Given (2016) submits that the saturation method is used to determine an appropriate sample size for qualitative studies. Saturation is the level of data collection at which adding new participants does not bring forth new information. Marshall *et al.* (2013) indicated that samples of 15-20 are adequate to achieve the saturation level as well as offer in-depth data collection. As such, this study applied this principle in determining sample size.

For the FGDs, the study chose a sample of 4 participants from each ward totalling to a size of 20 as per Marshall *et al.*'s (2013) advised. The study also interviewed one household head from each ward who held a senior position in the community as a key informant. The study also sampled a size of 10 participants from each ward who were aware of how people in their villages and homes dealt with drought issues. As such, the total sample size chosen was 75 broken down as presented in table 3.1.

**Table 3.1: Sample Size**

Ward	Sample		
	Household heads	Household heads well informed (specialized) on drought issues	Household heads with leadership role in community
Arabia	10	1	4
Khalalio	10	1	4
Neboi	10	1	4
Township	10	1	4
Libehia	10	1	4
<b>Total</b>	<b>50</b>	<b>5</b>	<b>20</b>

### 3.6.2 Sampling Procedure

Sampling is the mechanism by which participants to be interviewed are chosen among those targeted such that the chosen participants represent the entire target population and have information that will enable the study to address its objectives (Mugenda & Mugenda, 2003). Sampling is important because it ensures a representative group of subjects, which give a researcher adequate and valid data that can be used to address the questions at hand. In line with the research design used, this study applied purposive sampling to find the study's respondents. Purposive sampling was applied by the researcher to arrive to participants rich in information of interest to the study (Mugenda & Mugenda, 2003).

Critical Case Sampling was used while choosing the Focus Group Discussion participants and heads of pastoralist households. "Critical case sampling is where you collect samples that are most likely to give you the information you're looking for. They are particularly important cases or ones that highlight vital information." (Strewig & Stead, 2001). This approach identified respondents holding leadership roles in the

sampled areas. Additionally, expert sampling was used while selecting key informants. This is a kind of purposive sampling method applied when a researcher intends to glean data from experts. The researcher selected key informants according to the information they could give concerning their lived experiences in Mandera East Sub County.

### **3.7 Methods of Data Collection**

Data collection methods are the techniques or tools that the researcher employed to gather data from the research area. Primary data from sampled respondents were among the information gathered. In-depth interviews, targeted group discussions, and key informant interviews were used to accomplish this. In advance, a questionnaire based on the study's goals was created. The researcher employed a variety of books by diverse authors, journals, and reports (document analysis) to gather secondary data. The data collection methods used are further explained in succeeding paragraphs:

#### **3.7.1 In-depth Interviews**

Interviews are one of the most significant sources of data in qualitative research (Jwan & Ongondo, 2011). This is because interviews provide respondents or participants the opportunity to respond and share their stories, opinions, and insights because qualitative research deals with actual human concerns in their social context. When there are few respondents and they can be reached easily, interviews are advised in qualitative research.

In depth interviews were appreciated in this study because they elicited data on how nomadic pastoralists adopted the coping mechanisms during the drought in the region. Interviews form an important method for collecting data in qualitative research (Jwan & Ongondo, 2011). This is because interviews provide respondents the chance to react and share their stories, feelings, and insights since qualitative research deals with actual

human concerns in their social context. When there are few respondents and they can be reached easily, interviews are advised in qualitative research.

The interviews employed in this research extracted information on the coping methods that the nomadic pastoralists in the area chose during the drought. The interview allowed the researcher to probe using follow-up enquiries for the purpose of gaining a clearer comprehension of the facts presented. This method was applied on the 50 household heads who were purposively identified. The interviews took place at the location and time chosen and agreed upon between the interviewer and respondent and were implemented using face-to-face strategy by the chosen research assistants. The interview session took a maximum of 90 minutes (1½ hours). The questions asked were open ended and intended to address all the research questions under study as annexed herein in Appendix II.

The interview questions were designed to elicit answers according to the study objectives under investigation. Data from the respondents was gathered through in-depth interviews up till saturation point (Kothari, 2008). In these interviews, answers to pre-defined questions were recorded using a digital recorder.

Through this method, the study was able to investigate the extent the recent past droughts affected the live of nomadic pastoralists, how effective are the existing traditional drought coping mechanisms among nomadic pastoralists and what better ways can the existing drought coping mechanisms help in improving the lives of nomadic pastoralists.

### **3.7.2 Focus Group Discussions (FGD)**

Focus groups are a type of discussions held among a group of people that are primarily intended to expose human attitudes, reasoning, and feelings toward a specific topic



(Jwan & Ongondo 2011). The primary goal of the FGD was to understand the respondents' feelings and thoughts on a certain circumstance. This method combined elements of interviewing and observing non-spoken messages from respondents while asking follow-up (probe) questions to gain a deeper understanding of issues (Jwan & Ongondo 2011, Casey & Krueger, 2000).

The FGD was used to collect data from household heads who were purposively chosen and occupied leadership positions in the community. Four participants were chosen from each ward to make up a sum of 20 participants who participated in the FGD. The researcher conducted five different discussions with each discussion containing four members. The five discussions took place at community halls or religious centers at the ward headquarters in each of the sub-county's wards.

The researcher and 1 assistant moderated the FGDs which were done on different dates. Each FGD session took at most one-and-half an hour. Participants were allowed to contribute to the matter in question as per the research questions under study in an orderly manner that allowed discussions. The discussion addressed all the study research questions and was conducted in a community hall at the Mandera East sub-county offices. (Participants were facilitated transport allowance to enable them arrive at the discussion place).

To ensure good and timely attendance and participation in the FGD, members were informed of the time and location of the exercise in advance through a formal invite. Both men and women participated in the discussions. To deal with cultural believes against women and men engaging in a debate, the researcher educated the chosen participants and advised them to stick to the agenda of the discussion and always address the researcher and no other participants. By combining interviewing and

observation skills, this method brought out participants' reactions impulsively and allowed the researchers comprehend group dynamics. A sample of the guiding questions used are as annexed in Appendix IV.

### **3.7.3 Key Informant Interviews**

Key informant interviews (KII) offer an in-depth data collection method applied to participants well knowledgeable and comprehending issues on the area of interest (Mahmud & Prowse, 2012). Thus, this method was implemented to gather in-depth data from participants with deeper understanding of nomadic pastoralism and drought in Mandera East Sub County. The four key informants interviewed were a long-term staffer of National Drought Management Authority (Mandera branch), a retired officer of the Mandera department of livestock, a traditional elder who witnessed droughts that hit the region since 1950s, and a retired chief of one of the wards in the target area.

One Key informant was interviewed from each ward using this method; thus, this method collected data from a sum of five well-informed interviewees. Similar to the previously stated methods, the KII gathered data on all objectives under investigation as annexed in Appendix III. Similar to the other in-depth interviews, the KII were done at the place and time convenience of the interviewee and took no more than 90 minutes to protect the participants from tiredness and boredom. The KII were administered face-to-face by the researcher.

### **3.7.4 Document Analysis**

Document analysis reviews secondary sources of data to help the study offer context and sense to a particular research issue. According to Bowen (2009), a variety of papers is preferable as long as they are pertinent to the research issue. The author's subjectivity, the document's aim in relation to the research question, and the document's latent

content are all things to take into account before starting a document analysis, according to Bowen (2009). By examining the documents whose content was pertinent to this study and using a theme classification method, the researcher started a document analysis based on the research objectives.

The researcher coded the materials utilized, such as the strategy manuscripts, books, journals, and laws/policies among other publications and then summarized and paraphrased them. To ensure accurate results, a thorough planning procedure was followed by the researcher prior to the actual document analysis (O'Leary, 2014). This approach was taken since there were many sources of literature and scholarly publications on the area of interest to the study, which includes the policies and passed laws/legislations that were utilized in this investigation.

### **3.8 Data Collection Procedures**

Data collection exercise was preceded with the researcher appointing and training 5 research helpers who offered assistance in the collection of data. The researcher also engaged participant education forum where the purpose of the study and expectation from participants were made clear. All ethical considerations to be considered were also elucidated and respondents given pseudo names to use in the study. Dates for conducting the actual study were set and communicated appropriately.

While gathering data, the researcher and/or his helpers introduced themselves to participants, gave an introduction of the agenda of the day and rules to be adhered to, did an ice-breaker before rolling the discussions. The researcher or his assistants (in the researcher's absence) moderated all data collection sessions. All data was recorded by a digital recorder while the researcher or his assistants made short notes for the same.

### 3.8.1 Trustworthiness of Data

Trustworthiness concerns the extent to which the collected qualitative data is checked to ensure it is reliable and valid (Pilot & Beck, 2014). For this study, trustworthiness was determined through conformability, credibility, dependability, and transferability. Bengtsson (2016) explains credibility as the process of ensuring all relevant information collected are analysed and used to make conclusions. To guarantee this, the data collection methods were interactive to allow the researcher seek for clarifications where unclear information was presented. Additionally, the researcher together with 2 research assistants independently transcribed and analysed the data and thereafter shared the results and came to a unified conclusion (Graneheim & Lundman, 2004). The researcher also engaged services of a seasoned (neutral) researcher to do member checks where the analyses and findings drawn from the recorded data were checked against the raw data and uncaptured information flagged for inclusion in the analysis while fabricated information was flagged for expunging. Raw data from the three data collection methods used was also compared to ensure unclear information is clarified (Birt, Scott, Cavers, Campbell, & Walter, 2016).

Concerning dependability, the seasoned (neutral) contracted researcher audited the findings of this study by counterchecking them against the raw data from the recordings done during data collection. This audit revealed whether what is captured in the analyses was what was said by respondents. The auditor also checked for neutrality of the analysis, free from subjectivity and fabrication to guarantee conformability of the findings (Korstjens & Moser, 2018).

Transferability, the ease with which qualitative results of one study can be applied to another by generalisation (Birt *et al.*, 2016), was achieved by thick description method where the researcher detailed the ambience of the environment and the body language

of the respondent when data was being collected so as to inform readers the exact setups where they can apply the study's generalisations.

### **3.8.2 Methods of Data Analysis**

According to Cooper and Schindler (2014), the analysis of data concerns organizing, editing, and condensing raw data into smaller units that are manageable while creating from these units, summaries, and identifying the arising patterns into which sense is put by linking the summaries and patterns to the purpose of study. Thus, the analysis of data is a process and not a one activity thing. Different from quantitative data analyses where statistical analyses are applied, in qualitative data analyses a different approach is applied. In this study, thematic and content analyses were used to analyze the data.

After gathering qualitative data, the researcher performed data transcribing where the recorded data changed to written form for easy of analyzing. The researcher used the Microsoft office 365 software to effect the transcription. Data cleaning, which involved identifying incomplete or erroneous responses and removing or correcting them was then done. Data was reviewed severally to ensure all facts recorded were captured in the written form. The data was then arranged in relation to the source and established the demographic details and key themes arising from each source. The researcher then read through the data several times while identifying the arising themes and grouping the data as per these themes.

After grouping data as per the themes, the researcher used content analysis where specific findings that addressed given topics were organized topically. The researcher used narrations and where possible offered verbatim quotes of the findings. Findings from the three sources (household interviews, KII, and FGD) were triangulated to ensure a robust presentation of facts under investigation.

### **3.9 Ethical Consideration**

Several ethical issues were considered in this study. After getting an acceptance to proceed with data collection from the graduate school, the researcher sought approval from National Commission for Science, Technology, and Innovation (NACOSTI) to be allowed to conduct the study. A permit to conduct the research was then issued as annexed in Appendix VI. The researcher then identified and educated respondents on the objective of the research and the expected involvement of respondents so as to ensure informed consent. Respondents were also educated on the confidentiality clause where all that they shared together with their identity would be kept confidential. To ensure this, respondents were discouraged from using their actual names in favor of pseudo names which were random numbers given to them. Additionally, the findings collected would be kept under lock and key while the soft copy data preserved using passwords to prevent unauthorized access hence maintain confidentiality. Additionally, respondents were informed about the sole academic use of the collected data. Finally, the researcher adhered to laws pertaining to authorship by shunning from plagiarism and fabrication of information. Due recognition was offered (by appropriate citation and referencing) where information sourced elsewhere was used.

## **CHAPTER FOUR: RESULTS AND DISCUSSIONS**

### **4.0 Overview**

This chapter avails results from collected data, interpretations, and discussions of the results as per the research objectives. The purpose of this study was to assess drought coping mechanisms among nomadic pastoralists in Mandera East Sub-County using the following specific objectives:

- i. To assess the effects of drought on nomadic pastoralists in Mandera East Sub-County at the household level
- ii. To establish traditional drought coping mechanisms among nomadic pastoralists in Mandera East Sub-County
- iii. To suggest new ways which the existing coping mechanisms can help in improving the lives of nomadic pastoralists during drought

### **4.1 Demographic Characteristics of the Respondents**

This section avails results on the socio-demographic features, respondent's information return rate, Marital status, Age distribution of respondents (years), Sex (Gender) of respondents, Household size, and education attainment of respondents. Out of the 75 participants sampled for the study, findings from 70 were well presented and adequate for analysis. Three participants cancelled their participation prematurely while two withdrew from the study at an advanced time where their replacements could not be sought.

The researcher encountered some difficulty in ensuring gender equality among the respondents due to cultural issues. Few women were willing to sit in Focus Group Discussions attended by men. However, the researcher educated the population on the importance of their involvement in the study regardless of the cultural beliefs held

which lead to the involvement of both genders. The collected demographic data about respondents were as shown in table 4.1.

**Table 4.1: Respondents' Demographic Characteristics**

<b>Characteristic</b>	<b>Frequency (n=70)</b>	<b>Percentage (100%)</b>
<b>Marital status</b>		
Married (monogamous)	58	83%
Married (polygamous)	07	10%
Widowed	05	07%
<b>Age (years)</b>		
20-35	22	31%
36-55	42	60%
Over 55	06	09%
<b>Gender</b>		
Male	56	80%
Female	14	20%
<b>Household size</b>		
1-6	10	14%
7-10	40	57%
Above 10	20	29%
<b>Education Level</b>		
Informal (Madrassa)	42	60%
Primary level	28	40%

*Source: author, 2021*

#### **4.1.1 Distribution of Respondents by Marital Status**

Most (83%) of the respondents were married in a monogamous relationship, minority were polygamous representing 10% and only 7% were widowed. This finding shows that majority of those partaking of this study were mature, cautious and could not indulge in large families due to harsh condition caused by drought in the area.

#### **4.1.2 Age of Respondents**

Respondents aged between 36-55 years totaled to 60%. This age distribution comprised of most of the respondents. This indicated that majority of family members are within the productive age. However, 31% were aged between 20 and 35 which is the age of the youth in Kenya. This therefore shows that labor is less likely to limit livestock supervision and interpositions with the coping mechanisms. This age bracket is required



to be in the job market and or in tertiary institution but due to economic challenges, they are herding the livestock. Minority of the respondents representing 9% were aged 55 and above.

#### **4.1.3 Respondents Gender**

As shown in Table 4.1 men (80%) were the dominant gender in the study than women (20%). Since the study used purposive sampling method, fewer women were qualified to participate compared to men due to cultural sensitivity and illiteracy. The finding that few female pastoralists are engaged in nomadic activities is true to a study by Niamir- Fuller (1994), who argues that the significant roles women play in pastoralism have been disregarded by pastoral policies. This includes making decisions and working to raise children, maintain the home, treat illnesses, care for animals, manage water resources, and provide resources like building materials and fuel wood. As a result, women's experience is frequently excluded from the decision-making process.

#### **4.1.4 The Household Size**

The household size of 57% of respondents interviewed was 7-10 persons while 29% of the respondents' households had over 10 members while 14% of the respondents had an average of below 6 persons. This is a mean household size was 6.8. This finding reveals that the household size in terms of number is above a mean of 6.1 persons, recorded in the 2019 census by KNBS (2019) indicating that since then, households have grown (determined by the number of people per household). Factors like family health, migration poverty and or illiteracy could be the causes of the variation.

#### **4.1.5 Respondent Education Level**

Results show that 60% of the respondents had informal education meaning Islamic education such as Madrasa, while 40% had been educated up to the primary level. None

of the interviewed respondents had secondary school certification, a sign that there is need for government to ensure formal education penetration to this region. Despite the fact that 60% of the participants had completed informal education, they were nevertheless aware of the drought and reported experiencing it on a regular basis. The findings also showed that most people were aware of what causes droughts, how to recognize them, and what steps may be taken to lessen their effects when they do.

Although respondents have experiential knowledge, their lack of formal education may be pre-disposing them to inadequate comprehension of modern ways of dealing with the threat of climate change that is a major cause of drought. Thus, formal education is needful to these people.

According to Bray (1999), an increase in education heightens people's awareness and fosters positive attitudes and values, which may motivate them to manage natural resources sustainably. In addition, talents and education in natural resource management increase work efficiency and output. Additionally, research by Adell (2009) shows that education is essential for reducing poverty and achieving full political participation. However, pastoralists are falling behind in education, despite the need for skill acquisition in the modern world, with females being particularly vulnerable. In the absence of education, higher productivity in pastoralism and economic diversification are inaccessible, preventing pastoralists from escaping destitution. The absence of education exacerbates gender disparities in society as a whole.

#### **4.2 Themes Arising from the Collected Data**

Table 4.2 shows the themes arising from the collected data, which the rest of the chapter explains in-depth.

**Table 4.2: Key themes from pastoralist respondents in Mandera Sub County**

<b>Effects of drought</b>	<b>Coping mechanisms</b>	<b>Improvements</b>
<ol style="list-style-type: none"> <li>1. Loss of animals</li> <li>2. Food insecurity</li> <li>3. Increase in poverty levels</li> <li>4. Diseases</li> </ol>	<ol style="list-style-type: none"> <li>1. Keeping more female animals</li> <li>2. Migration with animals</li> <li>3. Herd diversification</li> <li>4. Livelihood diversification</li> </ol>	<ol style="list-style-type: none"> <li>1. Provision of water</li> <li>2. Early warning system</li> <li>3. Destocking</li> <li>4. Livestock insurance</li> </ol>

*Source: author, 2021*

#### **4.2.1 Effects of Drought on Nomadic Pastoralists**

This was the first objective.

##### **4.2.1.1 Scarcity of Important Resources**

All the respondents stated that goats, sheep, and camel made the biggest share of their household assets. According to 85% of them, the 2011 drought was the worst they ever witnessed in their lifetime. Majority of the respondents were of the view that the devastating effects of drought were touching on every resident.

One notable effect of the drought was shortage of water for livestock which resulted in the herders travelling long distances in search of this important survival resource for their livestock. A respondent from FGD1 detailed:

*“Livestock were kept away from water for a much longer period than during a normal dry season, and distance to water is substantially increased for all livestock species. Depending on the distance moved (69-80km for camels, 30-40km for cattle, and 20-30km for small stock),” (FGD 1).*

This information was also corroborated by a KI who submitted that pasture and water for livestock as well as water for human consumption was unavailable during the drought season. The ripple effect was starvation of livestock leading to many pastoralists to migrate to far areas like Ethiopia in search of these resources.

Besides the long distances travelled in search for water and pasture which was tiring to the livestock and humans, the keeping of large herds of animals also posed a challenge because much more was needed to feed all of them. A household head interviewed noted that:

*“Distance makes large herds unable to survive drought-induced periods due to low forage production. However, the nomads believe that large numbers of stock are essential to get through the drought years,”* (HHs).

Another nomadic pastoralist had this to say:

*“If the livestock must camp for a night between the base camp and the water source, the pastoralists must establish grazing zone for each livestock class, based on the livestock’s effective walking distance and forage availability,”* (FGD 3).

This holds true for Brokensha's (1977) study, which suggested that nomads retain far too many animals than the range resources can sustain. Large herds are then unable to endure periods of low feed supply brought on by drought. On the other hand, nomads feel that having a big number of animals will help them survive the years of drought.

#### **4.2.1.2 Death and starvation of livestock and people**

The key informants were of the view that majority of the pastoralist perceived drought to be lack of water for their livestock. In the FGDs majority of the group were of similar view and said that water sustains life and lack of it therefore means loss of life for animals and sometimes human beings.

Majority of the respondents were of similar view. A member from FGD had this to say:

*“Severe drought subjects us to both social and economic problems. Most areas of Mandera East are base of pastoralist, drought leads to loss of livestock, loss of crops for agro-pastoralists, it affects normal life, and it leads to famine, which affects women and children the most,”* (FGD 4).

Another interviewee stated that drought caused loss of human life through starvation or weakened immunity resulting from malnourishment which makes the body an easy target of diseases. The interviewee said:

*“Sometimes this thing (meaning drought) results in loss of human life. Droughts are tough to predict; they creep in slowly and last longest,”*  
(HHs).

Members of the FGD 3 also confirmed this by giving an instance of death of a child that was caused by eating wild fruits. The family of this child had no food as a result of the ravaging drought. The key informants and majority of the FGDs were of similar sentiments that the unswerving effects of drought on nomadic pastoralist are many and include exhaustion of water resources and forage, and decrease of crops, affects the health of domesticated animals, lowers the production of milk and ultimately livelihood security for nomadic pastoralist that mainly survive on livestock and livestock products. Drought also results to increased death rates, low milk generation, decreased reproduction rates, high susceptibility to diseases and ailments, and poor body health/weak animals.

This finding is in line with the study by Julius and Kosonei (2014), who documented that past drought had an almost crippling effect on Kenya’s society and economy as they decreased GDP growth rate, caused significant death of livestock, loss of water sources, crop failure, environmental degradation and loss of goods and services. Similarly, the findings also corroborate the one presented by Republic of Kenya (2012) that droughts had severe social and economic implication on Kenya. This is a clear indication that the impact of drought on nomadic pastoralist in northeastern Kenya and especially in Mandera East Sub County has an undesirable implication in the thoughts and understanding of the residents. Although low calving was not supported by past literatures as an effect of the drought, this study found it to be new knowledge arising

from constrained food and water supply which slow the growth rate of livestock hence leading to the low calving.

#### **4.2.1.3 Unviability of pastoralism**

The study found that drought made pastoralism less viable as it compromised the health of this activity. This supported the research by Orindi *et al.* (2007), who found that drought reduces the viability of pastoral investments and renders pastoral households unable to meet their demands. According to Sommer (1998), cattle body and health conditions are negatively impacted by the direct effects of drought on pastoral people' livelihoods and the limited availability of water supplies and pasture as a result of the drought. A household head from FGD 2 had this to say:

*“Among us there are those who were wealthy in terms of livestock but after the drought period, we only had few animals left. So, there is a popular saying here that the riches of pastoralists are easy to disappear,”* (FGD 2).

A key informant supported this statement by asserting:

*“During rainy seasons when there are pasture locals here are wealthy: Wait until a drought comes in. Many lose their flock to drought. You will only find a few camels surviving,”* (KII 2).

The findings show that droughts affected the wealthiness of the people of Mandera East in the negative manner. These findings show the action of ecological theory as the environmental change determined the way of life of people where people reduced the number of livestock, they kept to suit the drought season. As a result, the people had a similar fundamental acquired pattern of behavior as well as similar values, opinions, languages, and identities. The representatives of each culture are aware of their unique identity and how it differs from other cultures. People, especially young ones, easily switch between cultures because cultures interact and learn from one another. Although it is currently common in the media, the idea that cultures or ethnic groups are steel-

walled, distinct universes is completely false. Cultures may blend completely or they may stay distinct while absorbing a lot from their neighbors. This is true of the culture of nomadic pastoralists, who imitate their Somali and Ethiopian neighbors' coping skills.

#### **4.2.2 Drought Coping Mechanisms among Nomadic Pastoralists**

According to Wambua (2014), the season of drought is characterized by persistent water scarcity that is below normal average or below predetermined threshold levels. The most sensitive and prone to drought areas in Kenya are the arid and semiarid lands (ASAL). Ninety percent of all employment options, 95% of family income, and 100% of livelihood security are accounted for by the pastoralist economy in these areas (Kenya ASAL Policy, 2012). With this understanding, and to protect the livelihood of pastoralists in the target area as well as mitigate against the risk of drought, the study found the coping measures in the succeeding subtopics as the ones presented by the people in Mandera East sub-county.

##### **4.2.2.1 Nomadism**

The researcher established that drought coping measures applied by nomadic pastoralists were mainly variable. The measures were instituted based on historical data on droughts, the type of animals reared, and the resources present for use. Generally, the study found out that the concept of nomadism was largely a drought coping mechanism that was adapted to overcome the highly variable livestock resources just as was submitted by Tugjamba *et al.* (2021). One key informant asserted that:

*“Rainfed agriculture cannot survive the drought in these areas hence the reason why many residents do nomadic pastoralism,”* (KII 3).

The finding that nomadism prevailed due to limited resources is also a sign of the cultural ecology theory in action as it shows that nomadism arose as a result of the

environmental resource shortage occasioned by drought. Through the nomadic lifestyle, pastoralists are able to escape drought by migrating to areas without drought or with less severe effects of drought. The locals would not be able to escape the drought if they have other forms of livelihood, like agriculture. This is made feasible in part by nomads' capacity to sustain a variety of livestock herds, including camels, cattle, sheep, and goats, as well as their geographic mobility. Therefore, the adopted drought coping mechanisms to mitigate the impact of drought and/or reduce vulnerability among Mandera East Sub-County's nomadic pastoralists vary widely.

Another form of drought coping mechanism adopted by nomads was concentrating livestock at one water point even though this did not bring a meaningful change on the livelihood of the nomadic pastoralist because this measure was not long-lasting. One key informant opined that such mechanism enables the nomadic pastoralist not to trek long distances in search of watering points, the weak animals will get water ready at the nearest possible points and that the water points also have pasture. One of the Key Informants affirmed this:

*“This coping mechanism will not disrupt the functioning of a society if it is near the homestead. As the nomadic pastoralist will not travel far and wide. The livelihood of the nomadic pastoralist depends on the access to pasture, water, animal health services, markets, credit, and education. The livelihoods framework also sets the welfare of pastoralists in the dynamic context of risks, seasonal and long-term trends which affect assets and livelihood strategies and determine the level of vulnerability,” (KII 1).*

This is in concurrence with the study of Dercon (2001), who stated that it is easier to identify the dynamics and causes of pastoralist poverty when looking at the wellbeing of pastoralists utilizing components of the sustainable livelihoods framework. He continued by stating that the livelihoods framework emphasizes the need for admittance to resources like markets, water, animal health services, and pasture, as well as the



environment where the stated resources are mixed for production and consumption, i.e. the political, organizational, and institutional infrastructure.

#### **4.2.2.2 Dependence on relief food and fodder**

The study found that when droughts hit hard and all the available coping mechanisms are not working, the people of Mandera East seek and depend on relief aid for survival just as Julius and Kosonei's (2014) study established. One member of an FGD indicated that:

*“Often when we are hard hit, through our village leaders and media we call for support from government because we are the government's people,”* (FGD 5).

The study further found that when relief is given, it is often given to people but recently donors have also considered feeding their animals as well although this is to a limited scale. However, one KII indicated that the people of the Mandera East sub-county do not count on aid as a coping mechanism but rather it is brought to them to prevent starvation to death. The informant indicated that it is government's responsibility to ensure the safety of its people and that is why government gives relief food to drought-stricken areas.

The KII was quoted verbatim:

*“It is not us who call for donations so we do not look at it as a coping mechanism. Donations are given by government because it is their responsibility to feed us when droughts take long to end,”* (KII 1).

What is more, members from FGD 1 submitted that the relief food offered to the people of Mandera East during droughts are never enough and are unsustainable because one cannot be dependent of aid forever. They were enthusiastic that government can come up with new measures to cushion their people from harsh effects of drought.

*“I pray that government, particularly our county government, will address this issue of drought once and for all. Already we have seen NGOs doing something by drilling boreholes in some areas, we hope government will also support them,” (FGD 1).*

#### **4.2.2.3 Recovery Mechanisms**

In this study, coping mechanisms are the responses of individuals, organizations, or societies to drought-induced food stress situations. These mechanisms either mitigate the risk associated with drought in Manderu East Sub County or prevent the loss of life and/or livestock. Before pastoralists recuperate from drought, they must first deal with its impacts. Certain coping mechanisms are also utilized during the recovery phase, rendering the coping and recovery measures interconnected and interdependent. Adaptation measures during the dearth phase are crucial if recovery is to occur. The post-drought recovery stage occurs amidst the drought period and the high-density phase in the inter-drought cycle. During the recuperation period, the availability of pasture and water in the region is sufficient to support animals. Sheep and goat are treated as the same species among the Somalis (have a common name called Ari).

This study discovered that the local community faces enhanced production of milk due to the enhanced practice of keeping female herds, advantageous and resourceful production benefits being presented by households looking for quick rebuilders to their livestock, large scale regaining of the forage layers from previous substantial grazing, the degree of recapture being reliant on rainfall, increased milk sales, and a need for grain to cover large deficiency. The stocking rates are low, especially for large ruminants, and pastoral households have a strong demand for breeding stock in the post-drought recovery season.

Some of the primary sources claimed that pastoralists and outsiders react to the circumstance in various ways. As a result of losing the majority of their money due to

the drought and having a significant dependence on outside forces, the poorer community members experience a more difficult recovery time. The recovery is not as difficult for the wealthier members since they can afford to refill with money they have saved in the bank or cattle they lent to others during the drought.

In reaction to a disaster-caused drop in food supply and entitlements during irregular seasons or years, pastoralists implement coping mechanisms (Ahmed et al., 2002). Populations living in less secure circumstances are far more likely to be able to handle times of food stress than those living in more secure environments, according to (KII, 2). This is due to the fact that pastoral households are accustomed to surviving each year throughout the protracted dry season on very little food for months at a time. Majority of the respondents concurred with this opinion.

To support, one of the respondents affirmed as follows:

*“Human and material or environmental losses sometimes exceeds the ability of the affected society to cope using its own resources. In these situations, un-usual measure or external interventions are required to support people’s ability to cope with the specific vulnerability,”* (KII, 3).

#### **4.2.2.4 Keeping more lactating animals**

Respondents identified the keeping of lactating animals as a traditional coping mechanism contrary to the findings by Stewart *et al.* (2017) whose study informed that keeping lactating livestock was costlier compared to keeping non-lactating animals. Keeping lactating livestock at a household level compared to rearing non-lactating livestock offered households higher incomes attained through the sale of milk. Households that had extra income attained from lactating animals were able to afford food reserves for their households as well as for their livestock which reduced the risk

of drought to such households compared to families that did not have lactating animals.

However, a KI informed that

*“...Although lactating livestock offered households higher income than what non-lactating animals offered through the sale of milk, this advantage was short lived since drought affected all kinds of livestock. Once the drought struck, the milk production reduced and the lactating animals faced similar risk to that non-lactating livestock faced,”* (KII 4).

The rearing of lactating animals was therefore a short-term coping mechanism as its leverage was short-lived. However, animals that keep milking livestock in the period preceding a drought have the advantage of selling the milk and depositing the extra incomes into savings accounts. This income can then be used in future when droughts hit. In this way, the lactating animals form a mechanism through which locals can cope with the effects of drought hence the finding.

Different from coping strategies, adaptation methods encompass an irreversible change on how food requirements and external shocks are dealt with (Barton, 2001). Members of FGD (5) and KII (4) were of similar view that, coping mechanisms undertaken by nomadic pastoralist in a drought season are a strategy to recover from the crisis previously experienced. Majority of the respondents believed it is not easy to differentiate between adaptation and coping mechanisms when considering the way pastoralists react to events of drought. One of the respondents had this to say:

*“There are so many adverse effects of drought we are subjected to. However, we were born, bred, and raised here, so we are used to such condition. These conditions are dependent on household’s income, family structure, gender, social and cultural factors,”* (FGD, 2).

This is true with study by Siegel and Jorgensen (2001) that the level with which families are vulnerable to the negative consequences of drought varies on a number of

characteristics, including family structure, income, gender, cultural influences, social class, and health.

#### **4.2.2.4 Migration and Mobility**

The study found that migration and flock mobility to areas with pasture and watering points was a reaction to diminished pasture and water resources arising from drought. In migration, pastoralists moved to areas where there is pasture and water and camped to those places with the option of returning to their original homes whenever the drought subsided. In mobility, pastoralists move their livestock to pasturelands and water points and returned their flock to their resident areas after feeding and watering. Both strategies were active coping mechanisms that the people of Mandera East sub-county practiced. Both migration and mobility were found to involve long distance movements, sometimes across the national borders and were adopted to ensure maximum livestock and human survival. Key Informant (2) and members of FGD (4) were of the view that the movement of pastoralists and their flock over a long distance across the Sub County and sometimes across national borders to Ethiopia and Somalia was a significant response mechanism to drought situations in Mandera East Sub-County. Most of the respondents were of the view that movements were age-old coping mechanism and are practiced till today. However, the nomads have to negotiate with the locals of the new area for them to be allowed to access the grazing sites and water points. One respondent affirmed that:

*“We take our animals to restricted areas where we can find permanent water points. These areas are already negotiated for before we move in. It is important to note that negotiations and agreements are vital prerequisites if a pastoral community seeks access to a grazing land and water outside their [unofficial] territory,” (FGD, 4).*

This finding confirms the submission by Barton (2001); Handley (2012); Notenbaert *et al.* (2012) who recognized the significance of migration as an escape mechanism to drought. Mobility offers pastoralists the opportunity to utilize water resources and pasture in areas unaffected by drought. The areas where they can find permanent water points are negotiated for beforehand before a pastoral community seeks to utilize this new pasturelands and watering points.

#### **4.2.2.5 Herd diversification**

This is practiced to reduce the risks of droughts and to maximize use of scarce pasturelands. Several forms of herd diversifications take place in this region during droughts. For instance, at the onset of droughts, the locals hold on to/ and even acquire more camels while selling or releasing cattle due to the cattle's low resilience in drought conditions. Camels are preferred because they are more resilient. One interviewed respondent affirmed this:

*“...I had to sell a portion of my cattle and buy a few camels because the grazelands were few yet the cows require more food than camels,”*  
(HH).

Another diversification pastoralists assume is division of their herds. The study found that pastoralists divide their flocks into several units and graze each unit separate of the others so as to minimize scramble for the limited resources in droughts, increase survival rate of the individual flocks and minimize mobility of large flocks at once. This finding was emphasized by FGD1 and FGD 4 and corroborated by several of the interviewed household heads.

Additionally, herd diversification also took place among kinsmen where livestock was shared or borrowed. This coping mechanism was disclosed by key informant (1) and during FGD (3). What is more, this diversification method was implemented according

to social class where rich kinsmen gave part of their flock to their relations and friends in areas with adequate pasture and water as a way of spreading their risk.

One key informant said:

*“Within clans and kinship group, borrowing and sharing of animals for the purposes of subsistence and reproduction is a common practice. It shields the poorer households from the adverse impacts of drought while at the same time it helps the wealthier ones to spread risk during drought periods,”* (KII, 1).

These findings corroborate the findings by Mengistu and Haji (2015) who submitted the various herd diversification methods used by Ethiopian pastoralists to overcome the harsh climatic conditions. The interplay of social class and the reason for diversifying as depicted by Little (2001) was also evidenced among herd diversifications undertaken by the people of Mandera East sub-county.

#### **4.2.2.6 Livelihood diversification**

This study found that most households with pastoralists had started to diversify their sources of income. Recently, many nomadic pastoralists have adopted a wide range of other revenue-generating occupations, typically uplifted more actively to deal with drought.

Majority of the respondents noted that most of the nomadic pastoralist have adopted diversification as a coping mechanism which in fact was affirmed by the KII (4) and FGD (5) that some have ventured into agro-pastoralism, construction works in urban areas, and burning charcoal. This finding concurs with Little (2001); Getachew *et al.* (2014); Mengistu and Haji (2015) who presented the various livelihood diversifications as coping measures towards harsh climatic conditions like drought. The challenge with this finding, however, is that if many youths favor engaging in construction works in

urban areas at the disadvantage of nomadism, there will be no one to continue the nomadic pastoralism practice. Additionally, although charcoal burning is a coping measure, it is not a sustainable venture in this area bearing in mind the scarce vegetation characteristic of this region as well as the relevance of the few trees available in managing the overall effect of the climate.

Agro-pastoralism will succeed if there is less dependance on rainfed agriculture and more dependance on irrigation. As shown in the table 4.3, previous studies have exposed the erratic and shortage of annual rainfall distribution in Mandera East and the surrounding counties.

**Table 4.3: Summary of Mean Annual Rainfall in mm per annum**

<b>Month</b>	<b>Garissa</b>	<b>Mandera</b>	<b>Wajir</b>
January	20.46	2.23	11.07
February	3.25	1.22	8.18
March	39.94	20.41	27.30
April	80.49	80.22	75.89
May	17.11	38.17	32.96
June	6.09	0.40	2.58
July	4.55	1.27	2.53
August	7.32	0.53	1.46
September	5.44	1.61	2.67
October	29.16	42.90	41.36
November	89.18	45.14	63.36
December	55.02	12.01	28.80

*Source; KMD, 2021*

From the analysis in the above table, it is evident that Mandera County receives the least rainfall. This data justifies the need to depend on irrigation rather than rain if agro-pastoralism is to succeed. GoK (2013) informed that Mandera County received an average annual rainfall of approximately 255 mm which is inadequate to depend on. The members in FGD (1), HHs and some key informants (3 & 4) affirmed to this.



### 4.2.3 Improving the Existing Coping Mechanisms

The pastoral communities in northern Kenya, particularly those in Mandera East Sub-County, frequently teeter on the edge of extinction due to their harsh and extremely demanding environment (Huho et al., 2011). Despite the difficult circumstances, pastoral groups have been able to adapt to climate change by using a variety of short- and long-term methods that enable them deal with periodic droughts (Ouma et al., 2012).

#### 4.2.3.1 Provision of water

The scarcity of water was identified as one of the major issues affecting nomadic pastoralist. As put by Wambua (2014), shortage of water falling below the usual average levels or a set threshold, is a concern that should be resolved. It is a naturally reoccurring climatic variability. This has made the residents to cope with it by migrating and settling near water points.

According to some Key informants this coping mechanism enabled the nomadic pastoralist not to trek long distances in search of water which would weaken the hungry animals further. As such, by residing near waterpoints, weak animals get water ready without an exhausting trek.

KII 2 explained as follows:

*“We have been doing this [staying near water points] since time immemorial and will continue to do it. However, we suggest that the county, national government, or well-wishers intervene and dig boreholes,”* (KII 2).

Members of the FGDs also affirmed that staying near watering spots enhanced survival for pastoralists livestock since the animals could quickly access the ‘water of life’ when need be. Additionally, it was found that grass is often available at the water points. A member of FGD 5 stated:

*“Pastoralists have no option than staying near water points so that their livestock can easily access ‘water of life’. However, to make them not camp near water spots, there is need to dig boreholes. If this is done, there will be no disruption of the functioning of a society if borehole is near the homestead. As the nomadic pastoralist will not travel far and wide and camp near water points.” (FGD 5).*

This finding is in line with the observations made by Swift (2001) that migrating to areas with water was one of the coping mechanisms pastoralists took to escape the effects of drought.

#### **4.2.3.2 Water Management**

The study found that the impact of drought on the people of Mandera East is fiercest because of poor management of water resource yet this commodity is critically needed for the survival of people and livestock. It was revealed that flash floods are common during rainy seasons due to the plain nature of the land and lack of vegetation to absorb the water into the ground. A Key Informant advised that the county government need to harvest this water for future use by pastoralists during drought seasons. The informant said that this would provide a lasting solution to the people of the county having adequate waterpoints. The informant said:

*“When it rains, although the rain is minimal, it is not harvested and stored. However, if this is done and the water protected, the water will be used during drought seasons to water our animals in addition to drilling boreholes,” (KI 4).*

This finding is in line with Assane and Waoundé (2022); Mengistu and Haji (2015) who observed that efficient management of water resources is an important coping mechanism for drought seasons.

#### **4.2.3.3 Drought Early Warning System (DEWS)**

DEWS can help in improving the lives of nomadic pastoralists especially in Mandera East Sub County during drought, if the government through its various organs can give

it in timely manner as stated in the study by Angeluccetti *et al.* (2014). This is possible if a significant interaction exists between drought mitigation and effectiveness of Early Warning Systems.

One respondent had this to say:

*“There is also good link between education, training, and collaboration among agencies in mitigating drought in Kenya. They should give the early warning to the people affected by drought so that they can take early mitigation measures,”* (KII, 1).

The ability to track and predict the various physical signs of drought as well as pertinent economic, social, and environmental repercussions is essential for early detection of drought risks. One essential component of a successful drought management approach is an early warning system that facilitates the prompt implementation of drought damage mitigation (Angeluccetti *et al.*, 2014).

#### **4.2.3.4 Destocking**

This coping mechanism can be effective if the government and other organizations can buy the fragile animals at good price. This will in the end help the nomadic pastoralist cash in on their weak animals.

This was affirmed by most of the respondents and all the KII as the nomadic pastoralist would rather take chance in anticipation of the livestock’s survival than selling at a throw away price. However, when the researcher sought to establish why pastoralists wait until their livestock are weak before they sell them at a throw away price, it was revealed that the pastoralists have high hopes that drought would end sooner before their animals perish. This highlights the need to enhance awareness creation on ensuring destocking while the animals are still strong. To make this possible, a KI informed that the government should ensure timely disseminating of weather forecast data to the locals about the oncoming drought to facilitate early destocking. However, he added

that this will be an uphill since the locals have a sentimental attachment to their livestock. Regardless, the study found that destocking could help because after selling the weaker animals, the herders can remain with the strong ones to survive the post drought.

The other option in balancing resources during drought conditions is to reduce animal stock size. Majority of respondents deemed this method as the most harsh and desperate way to balance resources because of supply and demand. While this may be the case there are times when it is the best option.

Most of the respondents opted for selling part of their herd and restocking later. One of the interviewed household head stated:

*“Given the cost of feeding animals during drought, we prefer to sell the weak in the early phase of the drought and restock them when conditions are favorable. This is a cost-effective way of keeping herd during drought,”* (HHs).

#### **4.2.3.5 Livestock insurance**

Technology has developed human lives in so many aspects. Nomadic pastoralists in parts of Kenya have recently started enjoying such accommodative innovation in the form of Index-Based Livestock Insurance (IBLI) whose goal as a drought loss prevention measure, is to protect pastoralist communities from the recurrent drought outbreaks.

This study found that respondents understood the significance of livestock insurance programs in cushioning pastoralists against harsh weather conditions and urged the county and national leaders to implement it locally so that locals can also tap similar benefits. A household head said:

*“We had about the insurance scheme implemented in Wajir County and how it helped pastoralists survive the drought. We are ready to have that scheme implemented here,”* (HHs).

A key informant privy to how IBLI works elaborated how the premiums are paid in Wajir county as per ILRI compensation plan. He indicated that the index-based insurance covers sheep, goats, cattle and camels only and has awarded each of these animals a standardized measure which is used to pay premiums. The standardized measure is called Tropical Livestock Unit (TLU) and is determined as per the type of animal such that a camel is 1.4 TLU, cattle is 1 TLU while a sheep or a goat is 0.1 TLU. The premiums paid for each TLU is Ksh. 14,000. These figures were also corroborated by the researcher based on statistics found at ILRI website. The study found that purchasing these premiums could help the people of Mandera East overcome the effects of drought as farmers could use the payouts to purchase food for their animals, replace lost livestock and purchase food for their families. This is in line with the findings submitted by Mude *et al.* (2009); McPeak *et al.* (2010); Dror *et al.* (2015); Amare *et al.* (2019) of how IBLI could enable pastoralists to cope against drought.

## **CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS**

### **5.0 Overview**

In this section, a summary of the objectives, conclusions that were drawn from the various results of the study together with recommendations of the study and areas for future research are presented.

### **5.1 Summary of the Objectives**

The discussion of the results is in accordance to the following research objectives. The purpose of the study was to assess the drought coping mechanisms among the nomadic pastoralists focusing on Mandera East Sub- County. The specific objectives were:

- I. To assess the effects of drought on nomadic pastoralists in Mandera East Sub-County at the household level
- II. To establish traditional drought coping mechanisms among nomadic pastoralists in Mandera East Sub-County
- III. To suggest better ways which the existing coping mechanisms can help in improving the lives of nomadic pastoralists during drought

### **5.2 Conclusion**

The study concludes that it is needful to recognize and preserve the nomadic pastoralist traditional coping mechanisms for drought. The laws and policies on these coping mechanisms will be an important factor for the successful implementation of government programs in addressing drought in the Northeastern parts of the country as through this, poverty will be eradicated or minimized, and hunger-stricken families will be catered for.

### **5.2.1 Effects of drought on nomadic pastoralists in Mandera East Sub-County**

The study found that there are numerous direct effects of drought on nomadic pastoralists, including the exhaustion of water supplies, the decrease in vegetative cover, decreased pasture for the livestock, affected body and health conditions of livestock, decreased milk generation, and eventually the security of livelihood for nomadic pastoralists who depend primarily on livestock and livestock products. High death statistics, decreased calving levels, decreased milk output, weak body condition, and illness prone are other effects of drought.

In general, the study concluded that the idea of nomadism as a whole can be seen as a way of utilizing and coping with highly unpredictable resources. This is made feasible in part by nomads' capacity to sustain a variety of livestock herds, including camels, cattle, sheep, and goats, as well as their geographic mobility. The study found that nomads retain more livestock than they can sustain, which makes them less able to withstand droughts due to poor pasture supply. According to a study by Sommer (1998), cattle health and body conditions are negatively impacted by the direct effects of drought on pastoral people' livelihoods and the limited availability of water supplies and pasture as a result of the drought.

This discovery is consistent with the cultural ecology, which used concepts from ecology theory to comprehend how people adapt to their surroundings. The cultural ecologists concentrated on material and energy fluxes, looking at how a culture's institutions and ideas governed its interactions with the surrounding natural environment. According to this viewpoint, people were an integral part of the biosphere just like any other living thing.

### **5.2.2 Traditional drought coping mechanisms among nomadic pastoralists in Mandera East Sub-County**

According to this study, drought is a condition on land marked by recurrent water scarcity that is below the average or predetermined threshold levels (Wambua, 2014). The study determined that, the traditional drought coping mechanisms among nomadic pastoralists in Mandera East Sub-County vary widely and that they are helpful in the short term.

The coping mechanisms are concentrating livestock in one water point, seeking admittance to external forage resources and water points (migrating and mobility), livelihood diversification, venturing into activities like conserving ecosystem services, promoting wildlife conservation, keeping herds of female animals, herd diversification, migrating with the domesticated animals as they search for water points and grazing lands, asking for relief food, destocking, herd splitting and loaning animals. According to Davies (1993), these coping strategies are engaged once the principal source of production has failed to meet expected levels.

### **5.2.3 Suggested ways that the existing coping mechanisms can help to improve lives**

According to the study's findings, Mandera East Sub County's nomadic pastoralists frequently teeter on the edge of extinction due to their harsh and demanding environment. Despite this, they have been able to cope with climate changes by adopting various long and short-lived mechanisms that aid in the coping with the frequent instances of drought.

The scarcity of water was identified as one of the major issues affecting nomadic pastoralist. The study found out that the nomadic pastoralists in this study area cope



with it by migrating and settling at water points. The suggested ways include the construction of boreholes or supplying water during drought to livestock and residents.

The study found out that the mechanism of seeking better pasture and watering points in external territories was viable as this is an age-old mechanism but often results to conflict. The study found out that the suggested way is to seek consent and or permission from the elders in order to avoid conflicts.

Livelihood diversification of species or rearing varying species of livestock also made the nomadic pastoralists have the different species that could resist drought.

Migrating with the livestock in search of pasture and water, asking for relief food, restocking, herd splitting, and loaning animals were found to be better ways of managing drought and ensuring that after drought the losses are minimized.

Livestock insurance programs which use satellite data to generate indices for the grazing conditions and then pay insured pastoralists in the early phase of the drought so that they can mitigate the impact of the phenomenon is also recommended. The scheme attracted global attention and is hailed as an appropriate way of bettering the lives of pastoralists. (Banerjee et.al 2019). The locals have a good understanding of livestock insurance program and urged the county and national leaders to implement it locally.

According to Barton (2001), migration during dry spells occurs in a planned manner and is facilitated by knowledge of grazing sites. The culture ecology theory examines the cultural implications of a number of important environmental knowledge domains, including health and disease, food, population sizes and quality, and the diversity of

human types and skills. According to this notion, having knowledge is essential for a modern adult in addition to being desired.

### **5.3 Study Recommendations**

The study recommends the Kenya National government and the Mandera County government should engage appropriate drought detection and management measures to cushion the nomadic pastoralist communities from the effects associated with droughts. Through the National Drought Management Authority, the government should detect early and communicate to pastoral communities the upcoming droughts and put into effect measures to cushion them from the effects of such droughts. Such measures as provision of forage, water and human relief foods should be looked into. Additionally, the governments should invest in tree planting episodes to increase vegetation cover which has a contributory factor to eradicating drought.

The study recommends the Kenya National government and the Mandera County government to substantially strengthen the activities of the nomadic pastoralist, advocate for traditional coping mechanisms and invest in purchase of the livestock before drought to save the nomadic pastoralists from losses due to price fluctuation when drought has struck.

There is need for strengthening and encouraging the traditional coping mechanisms adopted by nomadic pastoralist to enhance their capability to cope with drought and recuperate from its effects. These communal and household coping mechanisms have been used to manage drought effects in the region and therefore should be appreciated by the government while making plans for policy creation and enforcement.

#### **5.4 Areas for Future Research**

It became obvious during the study that there was a need to comprehend the household level effects of herd dynamics caused by drought in nomadic pastoralist settings. There is a need for additional research to be done in order to comprehend the household losses experienced by nomadic pastoralists and establish whether specific households can lessen such losses by engaging measures like livestock loaning, diversification, and restocking at the local level. This is necessary for the creation of a reliable database usable to generate appropriate plans and development frameworks on the growth of herds, statistics of flocks lost, and species of sold livestock in the past 20–30 years.

Additionally, the problem of droughts affects a large expanse of Kenya owing to a large land mass of the country being ASAL. As such, many other communities residing in these areas are affected by droughts and could have unique coping mechanisms that enable them deal with the effects of the drought. It is therefore relevant that other studies be conducted across unresearched areas of the ASALs to investigate these coping mechanisms and how they can be improved or copied and replicated in other areas for survival of communities living in ASALs.

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## APPENDICES

### **Appendix I: Introduction letter**

My name is MOHAMED ABDIRAHMAN SHEIKH, I am conducting this research entitled DROUGHT COPING MECHANISMS AMONG NOMADIC PASTORALISTS IN MANDERA EAST SUB-COUNTY, KENYA as a partial fulfillment of the degree Master of Science in development studies at Moi University. I will very much appreciate if you can complete this questionnaire, which will take approximately 40 minutes. Please answer all the questions by filling the spaces or ticking where appropriate. I will be available to answer all the questions you have regarding this research. The information you provide will be used for this study only and will be very confidential.

Thank you in advance.

## Appendix II: Household interview Schedule/ guide

### Household Profile

#### 1. Household head

Sex male...female..... Age .....

2. Family size and composition (wives only) .....

3. Family size (siblings only) by wives; Wife 1.....wife 2.....wife 3.....wife 4.....

4. Close relatives in the household (man's side) .....

5. Close relatives in the household (wife's side) .....

### Interview Schedule

#### 1. Key issues related to assets

Prompts:

- What are your households' main assets? .....
- Which year's droughts affected your assets most? .....probe for explanation.....
- How important are your assets during drought situations? Very .....little.....

#### 2. People with whom reciprocal exchange relationships are maintained

Age Economic status and/or location

1.....

2.....

3.....

3. Livestock wealth kept away with the bond friends and stock kept with him since when?

1.....

2.....

3.....

**4.** Livestock kept by the respondent for his bond-friends. Name of the bond friend stock kept for him since when?

- 1.....
- 2.....
- 3.....

**5.** Property (number of livestock) owned by the family before and after the drought and famine

Stock species before disaster after disaster

Sheep and goat .....

Cattle .....

Camels .....

Donkeys .....

Others .....

**6.** Was your livestock wealth enough to see you through the drought and famine period without asking for additional assistance from anybody? YES .....NO ....

Reasons for the answer.....

**7.** During the drought that affected you most and famine, were the members of the communality alerted of its coming? Yes..... No..... if yes how? .....

**8.** Did the people here take the warnings seriously? YES.....NO.....

Reasons.....

**9.** What coping mechanisms did the people use for fighting the problem of drought and famine?

Enumerate

- 1.....
- 2.....
- 3.....

**10.** Are there any existing traditional drought coping mechanisms among nomadic pastoralists in Mandera East Sub-County? .....

How effective are these traditional coping mechanisms in weathering the disaster?

Probe.....

**11.** In your case, when did you first learn that you were going to face acute food shortage because of the drought? .....



**12.** What coping mechanisms did you personally use to weather the drought and famine problem?

Enumerate starting with the one which came first:

- 1.....
- 2.....
- 3.....

**13.** What better ways can the existing drought coping mechanisms help in improving the lives of nomadic pastoralists and how effective are they? .....

**14.** What help did your family get from the bond-friends enumerated in Q. 2 above?

Name of the bond-friend.....

Help received how frequently.....

**15.** What help did you give out to your bond-friends? Name of the bond-friend .....

How much given.....

How frequently.....

**16.** Were there any loss of life in your family due to drought and famine?

YES.....NO.....

If yes, give the following details:

- | Age    | Sex       |
|--------|-----------|
| 1..... | M/F ..... |
| 2..... | M/F ..... |
| 3..... | M/F ..... |

**17.** Were there any loss of life you know of due to drought and famine in the neighborhoods outside your family? YES.....NO.....

If yes, give the following details: Age Sex locality

- 1..... M/F .....
- 2..... M/F .....
- 3..... M/F .....

**18.** Did you send any member of your family away to stay with relatives, friends or neighbors to ease the strain during the drought/famine?

YES.....NO.....

If yes, give details as to whom, when and how long?

.....

**19.** Did any member of the family migrate to nearby town or village in search of food or employment? YES.....NO.....

If yes, give the following details:

Name of migrant Age sex where migrated to

1..... M/F .....

2..... M/F .....

**20.** Give details of what help the family members you sent away in Q.19 above got from where they had gone?

1.....

2.....

3.....

**21.** Was your name entered in the famine relief food list? Yes..... no.....

**22.** Is the relief food supplied by government or by nongovernmental organizations?...

**23.** Does the relief food include fodder for your livestock? .....

**24.** What form of non-pastoral food aid did your family receive before the Kenya government supplied food to this locality?.....

.....

**25.** Considering what we have discussed, how would you describe the situation of household and other villagers now? Explain.....

**26.** Does the county or national government offer to buy your livestock during this period of famine.....

**27.** What mitigation measures have you put in place for future droughts and famine?.....

### **Appendix III: Key Informants interview Schedule/guide**

1. Oral history and cultural or traditional coping mechanisms during and after drought or famine by the Mandera east sub county elders.
2. In the past, who used to warn people of the impending outbreak of drought and or famine?
3. In the past, were there any rituals or ceremonies related to drought and famine performed?
4. Are these rituals still being practiced today by the communities in Mandera east? How effective are they today in wading off famine?
5. How effective will the coping mechanisms be in weathering drought and famine if managed by the government?
6. How best would the communities /households in Mandera east like drought and famine be managed by them..... or by the government?
7. Would you consider nomadic pastoralist more vulnerable to the devastating effects of drought and famine today than in the past? *Explain fully what factors are perceived to account for the changes in adaptive capacity if any?*
8. What do you suggest as a better way which the existing coping mechanisms can help in improving the lives of nomadic pastoralists during drought?
9. To what extent have the recent past droughts affected the live of nomadic pastoralists in Mandera East Sub-County?
10. In your view, would you say famine relief food as distributed during this famine or draught reach the needy?
11. In your view, would you rather suggest the households depend on the famine relief food or adopt drought coping mechanisms to help themselves in improving the lives?
12. Considering what we have discussed, how effective are the existing traditional drought coping mechanisms among nomadic pastoralists in Mandera East Sub-County?
13. What better ways can you suggest being adopted by the households as coping mechanisms in improving their lives?
14. How would you describe your current situation? And that of other households in Mandera east

**Appendix IV: Focus Group Discussions (FGD) Guide**

1. How have the rain patterns in Mandera East Sub County affected you for the last ten years?
2. Which years was drought experience hardest?
3. Which years were floods experienced?
4. What is the impact of drought on the livelihoods? (Livestock, pasture, water availability) and other household assets?
5. What is the source of livelihood among the communities in Mandera East Sub County?
6. How long have you been in this village?
7. Who migrates?
8. Why do the nomadic pastoralists move?
9. To what extent have the recent past droughts affected the livelihoods of nomadic pastoralists in Mandera East Sub-County?
10. Do the households in Mandera East Sub County have any traditional drought coping mechanisms?
11. Are these traditional drought coping mechanisms effective among nomadic pastoralists in Mandera East Sub-County?
12. What better ways can the existing drought coping mechanisms help in improving the lives of nomadic pastoralists?
13. How have you tried to cope /adapt to impact of drought
14. How has rainfall patterns affected the coping mechanisms among the communities in the sub county?
15. What is the role of conflict in shaping your adaptation mechanism?
16. How have the changes in rainfall characteristics affected livestock productivity?
17. What safeguards do you and your family put in place against drought (Explain).
18. What traditional coping strategies do you adopt during the drought? (Explain)
19. Are you able to move your livestock to all the traditional grazing areas?
20. Which traditional practices (Laws) help you to adapt to drought in relation to?
21. What in your own opinion limits the ability to cope with drought?
22. In your own opinion, what Government laws/actions affect your ability to cope with droughts (positively/negatively).

## Appendix V: Research Letter from Moi University



### MOI UNIVERSITY SCHOOL OF ARTS & SOCIAL SCIENCES

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ELDOROT  
KENYA

16<sup>th</sup> February, 2021

NACOSTI (National Commission for Science, Technology and Innovation),  
P.O. Box 30623,  
Utalii Hse,  
**NAIROBI.**

Dear Sir/Madam,

**RE: MOHAMED ABDIRAHAN SHEIKH - REG NO. SBE/PGD/002/17**

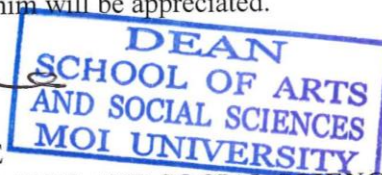
This is to certify that the above named is a bonafide student at Moi University, School of Arts and Social Sciences. He is a Master of Science (MSc) student in Development Studies.

He has completed his coursework component and proposal and has now embarked on Thesis writing.

His Thesis is entitled: **“Drought Coping Mechanisms among Nomadic Pastoralists in Mandera East Sub-County, Kenya”**

Any assistance accorded to him will be appreciated.

  
**PROF. MARY WAHOME**  
**AG. DEAN, SCHOOL OF ARTS AND SOCIAL SCIENCES**



Appendix VI: Approval from NACOSTI




**REPUBLIC OF KENYA**  
**NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION**

**Ref No: 602469** **Date of Issue: 09/March/2021**


**RESEARCH LICENSE**



**This is to Certify that Mr. MOHAMED ABDIRAHMAN SHEIKH of Moi University, has been licensed to conduct research in Mandera on the topic: DROUGHT COPING MECHANISMS AMONG-NOMADIC PASTORALISTS IN MANDERA EAST SUB-COUNTY, KENYA for the period ending : 09/March/2022.**

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**Applicant Identification Number**

  
**Director General**  
**NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION**

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