DROUGHT EARLY RECOVERY STRATEGIES INFLUENCING SUSTAINABLE LIVELIHOOD OPTIONS AMONG HOUSEHOLDS IN TURKANA CENTRAL SUB COUNTY, KENYA

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other university or any other award.

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CERTIFICATION

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ABSTRACT

Drought has significant impacts in climate sensitive sectors in ASAL areas of Kenya. Despite the existence of drought early recovery strategies, Turkana central suffers from extreme drought conditions with negative implications on livelihood security. This study sought to examine the drought early recovery strategies influencing Sustainable livelihood options among households in Turkana Central Sub County. The study was guided by three specific objectives including to: determine the early recovery strategies towards drought occurrence among households; examine the effects of drought on livelihood options among households and to evaluate the effectiveness of early recovery strategies in use against drought. The study used structured household questionnaires, participant observation checklists, key informant interview guides and focus group discussions to collect both quantitative and qualitative primary data. Secondary data included content reviews obtained from publications, journals, and internet access. A sample size of 384 households was determined using fisher's formula. The study utilised proportionate, quota sampling and purposive sampling. All the quantitative data collected was analysed using Excel and SPSS version 20 to generate descriptive statistics. The study was anchored on Pressure and Release Model as well as the Watts and Bohle vulnerability Model. The drought early recovery strategies identified in this study included crop farming found to be the main livelihood activity relied on by households at 58% with 26% relying on livestock keeping, 14% on social support networks while other livelihood diversification activities at 4% respectively. The results indicated that drought has had a huge negative impact on the lives of pastoralists. Livestock mortality accounted for 51.5% of the effects of drought on pastoral households while shortage of food accounted for 25.5%. Water shortage and poor nutritional diets accounted for 20% and 3% of the effects of drought on livelihoods respectively. The study also revealed further that among the drought early recovery strategies used in the area, crop farming and provision of food for school going children were the most effective early recovery strategies as they addressed long-term needs. The study concluded that drought remains a potent threat to the fragile local and climate sensitive economies such as livestock keeping and crop farming in Turkana central sub county. The findings of this study will therefore deepen understanding and knowledge about pastoralists 'adaptation and coping responses to drought stresses, possible intervention measures as well as inform policy makers on policy designed to reverse the decline in pastoral production systems. Furthermore, the findings will also seek to inform the formulation and establishment of an early recovery strategy and policies for ASAL areas using Turkana County as a reference case study. It will also further contribute to the scientific knowledge base which can be used for academic purposes globally.

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LIST OF ABBREVIATION AND ACRONYMS

ASALs	-	Arid and Semi Arid Lands
CBPP	-	Contagious Bovine Pleuro Pneumonia
CCA	-	Climate Change Adaption
CIDP	-	County Integrated Development Plan
CSG	-	County Steering (Technical) Group
CSWGs	-	County Sector Working Groups
CT-OVC	-	Cash transfer for Orphaned and Vulnerable Children.
CWGER	-	Cluster Working Group on Early Recovery
DRR	-	Disaster Risk Reduction
EDE	-	Ending Drought Emergencies
EIA	-	Environmental Impact Assessment
ERS	-	Early Recovery Strategies
FAO	-	Food and Agriculture Organization of the United Nations
FFA	-	Food for Assets
FGDs	-	Focus Group Discussion
GOK	-	Government of Kenya
HH	-	Household
IGAs	-	Income Generating Activities

KII	-	Key Informant Interviews
KSH/KES	-	Kenya Shillings
MTP	-	Mid Term Plan
NDMA	-	National Drought Management Authority
NGO	-	Non-Governmental Organization
SMEs	-	Small and Medium Enterprises
UNDP	-	United Nations Development Programme
UNICEF	-	United Nations Children Fund
US$	-	United Stated of America Dollar
HSNP	-	Hunger and Safety Net Program
HEA	-	Household Economy Approach
WMO	-	World Meteorological Organization
GWP	-	Global Water Partnership.

OPERATIONAL DEFINITIONS

Coping Strategy: In this study, it refers to a collection of people's responses to declining food availability and entitlements in abnormal seasons or years.

Disaster Risk Management: Disaster risk management is the application of disaster risk reduction policies and strategies to prevent new disaster risk reduce existing disaster risk and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses.

Disaster Risk Reduction: Disaster risk reduction is aimed at preventing new and reducing existing disaster risk and managing residual risk, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development. Disaster risk reduction is the policy objective of disaster risk management, and its goals and objectives are defined in disaster risk reduction strategies and plans.

Disaster Risk: In this context, it is the probability of harmful consequences or expected losses (deaths, injuries, livelihoods, economic activity disruption and environmental changes resulting from interactions between natural or human induced hazards and vulnerable conditions)

Disaster: It is a serious disruption of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.

Drought Assessment: This is the process of determining the probability of occurrence of a drought of certain intensity.

Drought: Is a deficiency of precipitation over an extended period, usually a season or more, which results in a water shortage for some activity, group, or environmental sectors.

Early Recovery: Is a set of specific programmatic actions to help people to move from dependence on humanitarian relief towards long-term development actions.

Hazard: A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. It does not include the occurrence or risk of armed conflicts and other situations of social instability or tension, which are subject to international humanitarian law and national legislation.

Resilience: The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management.

Risk: The combination of the probability of an event and its negative consequences.

Sustainable Development: The kind of development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The overall goal of sustainable development (SD) is the long-term stability of the economy and environment; this is only achievable through the integration and acknowledgement of economic, environmental, and social concerns throughout the decision making process.

Vulnerability: Refers to the likelihood that an individual or group will be exposed to and adversely affected by the circumstances. It can also be defined as the characteristic of individuals or groups in terms of their capacity to anticipate cope with resist and recover from the impacts of environmental change.

Livelihood diversification: Livelihood diversification refers to the processes by which households construct a diverse portfolio of activities and social support capabilities in their struggle for survival and in order to improve their standards of living.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Drought is often one of the most devastating but least understood weatherphenomena, largely because of its slow onset and its accumulating impacts over time (Opiyo *et al.* 2015). According to World Meteorological Organization and Global Water Partnership (WMO and GWP, 2017), droughts are major natural hazards and have wide-reaching economic, social and environmental impacts. Their complex, slow and creeping nature; the difficulty of determining their onsets and endings; their site- dependence; and the diffuse nature of their damage (Below *et al.* 2007) make the task of comprehensively and accurately determining the cost of droughts a highly challenging one.

Previous studies, (Bruce 1994, Obasi 1994, Cook *et al*. 2007, Mishra and Singh, 2010) have shown that droughts are the most detrimental of all the natural disasters. Globally, about one-fifth of the damage caused by natural hazards can be attributed to droughts (Gerber and Mirzabaev, 2017), and the cost of droughts is estimated to be around USD
80 billion per year (Carolwicz 1996). Although definitions vary depending on the context, drought is generally an extended period of months or years in which precipitation is less than the annual average and results in severe water scarcity (Wilhite, 2000; Downing and Bakker, 2000; Whetherald and Manabe, 2002). UNISDR *(*2009) also gave a broad definition of drought as a deficiency of precipitation over an extended period, usually a season or more, which results in a water shortage for some activity, group, or environmental sectors.

According to Tallaksen and Van Lanen, (2004), drought is subdivided into different types in

relation to the variables of the hydrological cycle, precipitation (meteorological drought), soil moisture (soil moisture drought), and groundwater and stream flow (hydrological drought). Almost all drought impacts are related to soil moisture drought or hydrological drought, since both the ecosystem and society depend upon water from the catchment stores (soil, aquifers, lakes, rivers) rather than from precipitation directly.

In agreement with Tallaksen and Van Lanen (2004) findings, a report by GOK (2011) on Kenya Post-Disaster Needs Assessment of 2008-2011 drought also defines and categorizes drought in the following ways; lower-than-normal precipitation duration and intensities at various times which rendered it a meteorological drought, an agricultural drought with inadequate soil moisture to meet the needs of various crops in the country, hydrological drought with deficiencies in the availability of surface and ground water supplies over periods of time and a socio-economic drought with physical water shortages affecting the health, wellbeing, and quality of life of communities across the country.

According to studies by Mulama (2017), drought are caused by precipitation deficiency in a certain region which may be triggered by: above average prevalence of high pressure systems, winds carrying continental rather than oceanic air masses and ridges of high pressure areas aloft which prevent the developing of thunderstorm activity or rainfall over a certain period.

Similar studies by Wanjohi (2010), suggests that droughts are caused when precipitation over a given region performs poorly and is accompanied by relatively high evaporation rates for prolonged periods. This in most cases is caused by a deficiency of either precipitation or inadequacy of inland water resources supplies for a prolonged period.

Other possible causes of drought is attributed to the process of aridity and deforestation. Accordingly, studies by Holzapfel (2008) aridity is defined as a nature that produces permanent imbalance in the water availability consisting in low average annual precipitation, with high spatial and temporal variability, resulting in overall low moisture and low carrying capacity of the ecosystem.

Olofin (2017) in his study also defines deforestation as the sum total of activities that contribute to the removal of vegetative cover in the forest which could either be anthropogenic (man) activities or natural (wildlife caused by lightning) phenomenon. It also embraces all other activities that cause temporal removal of forest cover such as slashing and burning technique, shifting cultivation, and clear cutting. Often, critical limits are exceeded causing irreversible damage to the forest.

For the Horn of Africa region, drought occurrence has become increasingly severe during the last decade, with rainfall totals of at least 50–75 % below normal encountered in most areas, such amounts are not sufficient to support crop and pasture growth for livelihood security (Nicholson, 2014). According to the report of the Intergovernmental Panel on Climate Change (IPCC, 2012), there is likely to be a marked increase in drought risk over much of Eastern Africa by the 2050s, which ultimately will threaten climate sensitive economic sectors. Indeed, studies by (Below *et al.* 2010*;* Nicholson 2014), did confirm that drought pose serious challenges for populations whose livelihoods depend principally on natural resources.

Studies by Mbogo *et a*l. (2014) suggest that droughts in Kenya affect all sectors of the economy and the population at large. According to the same author drought affects water supply in both rural and urban areas, leads to reduced hydro-power generation and power rationing, causes crop failures and reduced food security, causes death of humans, livestock and wildlife, leads to job losses when industries are shut down when resources are depleted, causes the deterioration of human health due to malnutrition and poor access to quality water and finally causes conflicts between communities and wildlife.

In addition, studies by Huho and Mugalavai (2010) and Nkedianye *et al. (*2011*)*) indicated that Kenya has experienced an increase in drought frequency from once in every 10 years in the 1960/70s to once in every 5 years in the 1980s. The frequency of drought increased to once in every 2–3 years in the 1990s, and it has become increasingly unpredictable since 2000). Kenya's arid and semiarid lands (ASALs), which have faced increasing drought frequency and intensity since the 1960 s, are one of the most vulnerable and drought-prone regions in the country (Nkedianye *et al*., 2011).

Despite this exposure and sensitivity to frequent droughts, pastoral economy in the ASALs of Kenya accounts for 90 % of all employment opportunities and 95 % of family income and livelihood security (GOK, 2012). According to Thornton & Lipper (2014), the changing global climate, coupled with expected increase in evapotranspiration due to increased temperatures, the ASALs are expected to experience frequent climatic extremes, increased aridity, increased water stress, and diminished yields from rain-fed agriculture, and increased food insecurity and malnutrition).

Based on these observations, adaptation and coping practices are therefore necessary to reduce vulnerability to drought stresses as well as to prepare for possible future extreme climate events. The Intergovernmental Panel on Climate Change reports (IPCC, 2012) defined adaptation as an adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.

Adaptation therefore involves adjustments in reducing the vulnerability of households to climatic variability and change (Ad*ger et al*., 2007). On the other hand, Blaiki*e et al.,* (1994) defined coping as the manner in which people act within existing resources and ranges of expectation in a given context to achieve various ends. Therefore, adaptation involves longer-term shifts in livelihood strategies, while coping involves temporary adjustment in response to change or to mitigate shocks and stresses on livelihoods (Eriksen *et al*. 2005*;* Migosi *et al*. 2012).

According to Opiyo *et al*., (2015), Turkana pastoralists employ various coping responses against extreme drought events. Unlike adaptations that involve long-term shifts, coping responses are more reactive and mainly involve temporary adjustment of livelihood activities in response to drought. However, adaptation or coping mechanisms of people to different hazards vary from household to household and region-to-region based on existing support systems that increase the resilience of affected individuals (Brooks *et al*., 2005).

Turkana County which is one of the arid and semi arid areas in Kenya is situated in the North West of Kenya covering an area of 77,000km^2 with a population of over 850,000

(population census, 2009). Drought occurrence in the county is cyclic with major droughts occurring once in every three years and localized droughts every season.

Early recovery in the context of this study and in accordance with (Extract from Guidance Note on Early Recovery, CWGER, April 2008) is a multidimensional process of recovery that begins in a humanitarian setting. It is guided by development principles that seek to build on humanitarian programs and to catalyze sustainable development opportunities. It aims to generate self-sustaining, nationally owned, resilient processes for post-crisis recovery. It encompasses the restoration of basic services, livelihoods, shelter, governance, security and rule of law, environment and social dimensions, including the reintegration of displaced populations. Similarly, studies by (UNDP, 2008) also suggest that while early recovery program are foundational in nature, recovery program, in turn, build on these early foundations and restore the social, political and economic fabric of a society while addressing the root causes of the crisis. These programs are longer-term and are normally based on a systematic, multi-dimensional needs assessment such as the Post-Conflict Needs Assessment or Post Disaster Needs Assessment.

According to Longley and Wekesa (2008), the current weakness of formal policies and structures allows for an approach to the current drought response systems which is based on the mistaken notion that food security can be achieved predominantly through short- term measures relating only to the productive sectors, and the conventional (yet changing) view of humanitarian relief as primarily short-term interventions that aim to save lives in drought prone areas rather than also contributing towards preventing disaster or assisting in recovery through support to livelihoods.

1.2 Statement of the problem

Drought is expected to have significant impacts in most of the climate sensitive sectors in Kenya. In the ASALs, for example, frequent droughts are associated with the deterioration of livestock conditions, increased incidences of diseases, and livestock deaths, altered herd structure, and a collapse of livestock markets (Speranza, 2010). Extreme drought conditions have serious negative effects on the livelihood security of most pastoralists in Turkana central sub county. This is compounded by the inability of communities to respond to extreme environmental conditions, in addition to the challenges faced with prolonged drought events (Handley, 2012).

Indeed Mureithi, (2012) asserts that the Turkana community uses coping strategies that are inadequate for vulnerability reduction due to the changing global environment characterized by climate change, evolving socio- political and economic circumstances. Whereas most studies dealing with drought have concentrated more on the traditional coping and adaptation strategies among the Turkana pastoralists (Ouma, 2011; Mureithi, 2012; Opiyo *et. al*., 2015), there is little information on the post drought period in general and on the recovery strategies in particular.

As an effort to fill this gap,"Inadequate coping strategies and limited information on recovery strategies" this study therefore sought to investigate the drought early recovery strategies and their effectiveness in influencing sustainable livelihood options among households in Turkana Central Sub County.

1.3 Study Objectives

The overall objective of the study was to examine the early recovery strategies influencing sustainable livelihood options against drought among households in Turkana Central Sub County, Kenya. The specific objectives of the study were to:

i. Determine early recovery strategies towards drought occurrence among households in Turkana Central Sub County.

ii. Examine the effects of drought on livelihood options among households in Turkana central Sub County.

iii. Evaluate the effectiveness of early recovery strategies in use against drought in Turkana Central Sub County

1.4 Research questions

The research questions derived from the study objectives were as follows:

i. Which are the early recovery strategies used towards drought occurrence among households in Turkana Central Sub County?

ii. What are the effects of drought on livelihood options among households in Turkana Central Sub County?

iii. How effective are early recovery strategies employed against drought in Turkana central Sub County?

1.5 Justification

Despite the fact that Turkana Central Sub County compared to other sub counties within Turkana County is rich in livelihood zones diversity, the area continues to suffer from the adverse effects of extreme drought conditions with negative implications on livelihoods security. Given the high frequency and recurrence of drought episodes that threaten the fragile livelihood options in the study area, this study was expected to strengthen the understanding and knowledge about pastoralists adaptation and coping responses to drought stresses, possible intervention measures as well as inform decision makers on policy designs to reverse the decline in pastoral production systems.

It was also expected to provide some of the solutions that will cushion communities in the study area against the effects of persistent drought occurrences. Furthermore, the study will equally inform the formulation and establishment of the drought early recovery strategies and policies for ASALs areas using Turkana county as a reference case study. The findings would additionally ensure continued sustainability of rural livelihoods in arid and semi-arid environments. The findings of this study will further contribute to scientific knowledge base for academic purposes globally.

1.6 Scope of the study

This study confined its geographical jurisdiction within the administrative and political boundaries of Turkana Central Sub County that is part of the larger Turkana County. Turkana central is one of the 7 sub counties that form the county. The other six are Turkana Central, Loima, Turkana East, Turkana South, Turkana West, Turkana Northand Kibish. Turkana Central has three distinct livelihood zones; namely pastoralism, agro pastoralism

and mixed livelihoods.

This study was carried out in all the three zones with a purpose to characterize the effects of droughts covering the period 2007 to 2017 and the subsequent effects on livelihood options among households in Turkana Central Sub County.

In order to highlight the effects of the most devastating drought in the recent history as perceived by the community, the 2016/2017 drought was used as a reference point. Indeed, this position was confirmed by the Government of Kenya (GOK) which declared the 2016-2017 droughts as a national emergency on April 2017.

This same position was also shared by Oxfam International (December, 2017) in their report which suggested that in the Arid and Semi Arid in Kenya (ASAL), the number of food insecure people reached 2.7 million in July 2017, including 375,285 children and pregnant and breast feeding women. Furthermore, the same report by oxfam also affirmed that the drought had undermined coping capacities and exacerbated vulnerabilities by destroying livelihoods and triggering local conflicts over scarce resources.

The unit of the study focus and data collection was the household while the key stakeholders involved local leadership such as: Sub Chiefs, NGOs, CBOs, NDMA and the various Turkana County government departments.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter is a review of relevant literature on the subject matter. The chapter paints a picture on drought management systems and practices in light of community livelihoods on a cascaded scale from the global, regional, to the local level. Themes discussed include effects of drought on livelihoods; early recovery strategies against drought occurrence among the households and their effectiveness thereof for sustainability. The chapter ends with a conceptual framework informed by the study objectives and methods from the literature reviewed. The discussions are contextualized to Turkana Central Sub County.

2.2 Effects of Drought on Livelihoods

Drought is a chronic problem in Sub-Saharan Africa and the most important factor affecting livelihoods of the people in the region (Hagman, 1984; Sear, Campbell, Dambe & Slade, 1999; Wilhite *et al*., 2000). According to (Huho, *et al*., 2010), droughts have direct and indirect impacts on livelihoods especially where they are weather dependent. The same authors also defined livelihood as a means of living, especially of earning enough money to feed oneself.

FAO (2016), in its annual report on climate change, Agriculture and food security, pointed out that the impacts of climate change on agriculture and the implications for food security are already alarming. The same report concluded that there is an urgent

need to support smallholders in adapting to climate change. Farmers, pastoralists, fisher folk and community foresters depend on activities that are intimately and inextricably linked to climate – and these groups are the most vulnerable to climate change. They will require far greater access to technologies, markets, information and credit for investment to adjust their production systems and practices to climate change.

In most African countries, rural livelihoods are largely derived from rain-fed agriculture with about 70% of the continent's population depending on agriculture for their livelihood Muthui, (2009). Ngetich et al., (2014), in his study confirmed, that drought plays an important role in year-to- year failure in crop production and on the overall economy of the nation. The same author also pointed out that vulnerability of crop production to drought can be decreased with crop specific climate information and use of such information in crop management decisions.

The same sentiments were echoed by Ouma, (2011) who asserted that Arid and semi-arid lands (ASALs) which occupy 70% of east Africa – ranging from 95% in Somalia, more than 80% in Kenya, 60% of Uganda and approximately half of Tanzania (Kirkbride and Grahn, 2008). These dry lands are productive and contribute to national economies and to the society. They support agriculture, livestock rearing, tourism and wild resource harvesting, and play a critical role in ensuring national food sufficiency (Nori and Davies, 2006). Nonetheless, increasing rainfall variability and frequent extreme climatic events especially droughts and floods disrupt agricultural production leading to famine and severe loss of livelihoods (Mose, 1999). Prolonged dry years have reduced the ability of African societies to cope with droughts (Muthui, 2009).

In the arid and semi-arid land (ASAL) counties of Kenya, people are experiencing a food security and nutrition crisis as the drought has been worsening year in year out. The number of food-insecure people reached 2.7 million in July 2017, including 375,285 children and pregnant and breast-feeding women (OXFAM, 2017). The drought has undermined coping capacities and exacerbated vulnerabilities (e.g. by destroying livelihoods and triggering local conflicts over scarce resources.

Despite the fact that drought remains a potent threat to most African economies, the concept of drought risk reduction is not at the core of disaster management in most countries of Africa (Dube, 2008) with disaster reduction efforts always following a somewhat different course than those in other continents.

A report by GOK (2014) on *Ending Drought Emergencies* identified that there is a symbiotic relationship between DRM and every aspect of development in ASAL areas in two ways; First, failure to manage drought risks as far-reaching effects including on livelihood, and environmental sustainability, health and nutrition status, educational opportunity, social relations (particularly gender roles), political stability, inequality and economic growth. Secondly, effective action in all these areas – and particularly the capacity of the sectors to adapt to changing levels of risk by scaling their services up or down – is essential foundation of sound DRM.

According to studies by Gomes (2006), access by the vulnerable communities to natural resources (land, forests, water, fisheries, pastures) is essential for sustainable poverty reduction. The author further concludes by suggesting that the livelihoods of the rural people without access, or with very limited access to natural resources are vulnerable

because they have difficulty in obtaining food, accumulating other assets, and recuperating after natural or market shocks or misfortune.

According to a report by UNDP (2013), traditional livelihood activities in pastoral areas and related enterprise activities can be enhanced through management arrangements and investments designed to enable pastoral areas to become more productive and economically diverse. These can include large scale public and private initiatives as well as activities of communities, households and small businesses.

2.3 Drought Early Recovery Strategies.

Recovery is the manner in which people act within the confines of existing resources and range of expectations to achieve various means (Wisner, *et al,* 2004*).* It does not only involve the management of limited resources but how it is done in unusual, abnormal and adverse situations. Resources may include land, livestock, draught animals, seed for crops and labour. Ndlovu (2010*),* in his study averred that to mobilize resources, people should be entitled to command them which can be through exercise of rights, using the market, calling upon obligations or even through theft and violence.

Early recovery has, in the recent years, been recognized predominantly as a cross-cutting issue, an approach that makes the gains of emergency humanitarian response sustainable, and integrates approaches into emergency response that mitigates the potential for and impact of future crises (FAO, 2018). Early recovery is a responsibility of all, and should be integrated into the activities of all sectors. Humanitarian projects include elements of sustainability, links to local authorities, and include building the capacities of affected

communities to become self-reliant and resilient to the impact of future droughts KHPT (2012).

The (GCER, 2016), in its report concluded by stating that successful practices for the integration of early recovery in humanitarian response are found to be context specific, with key variables depending inter alia on: the type of crisis, the capacity and leadership role played by clusters and governments, the existing resilience of affected communities, and the pre-crisis engagement of the international community.

When people know an event may occur in the future in a similar pattern as it has happened in the past, they set up ways of coping with it. Such coping strategies are guided by the assumption that the event will follow a familiar pattern and that people's earlier actions will be reasonable guide for similar events. This is common in some social environments where some disasters have such precedents, and some traditional early warning signs have been employed to predict the events. The increasing severity and frequency of drought over the last decade has rendered traditional forecasting less reliable than it has been in the past (Pratt, 2001). However, some hazards have long return periods that the precedents are imperfectly registered. This study reviews some of the conventional ERS employed by households in Turkana Central Sub County whenever they are subjected to drought conditions.

2.3.1 Crop production

Drought is a recurring reality in many parts of the sub-Saharan Africa, whereby rain fed agriculture continues to be a major sector of most economies, and is highly prone to drought

(Madhur, 2006). Most households in rural areas of developing countries rely on rain fed agriculture for their livelihoods and as; such are highly dependent on climatic conditions. Recent evidence and projections indicate global climate change is likely to increase the incidence of natural hazards, including the variability of rainfall, temperature and occurrence of climatic shocks (IPCC, 2014). Consequently, the effects of changes in climate, including food availability, access, utilization and stability (Challinor *et al*., 2010; IPCC 2014), may potentially threaten all aspects of food security. According to (GOK, 2012), Agro-pastoralism and marginal farming are critical to the livelihoods of communities in semi-arid areas in particular.

This is because farming in these areas will be done in a manner that complements mobile pastoralism and not to substitute pastoral production systems. The potential to increase both rain-fed and irrigated crop production is constrained by inadequate extension services and production technologies, limited access to affordable credit (particularly given the high investment required for irrigation), and poor postharvest management and storage facilities. Semi arid areas are only suitable for rain fed marginal crop production and livestock farming for subsistence. This form of agriculture does not provide substantial contributions to the economies, producing barely enough food food for human survival (William and Balling, 1996). Two major types of rain-fed subsistence agriculture practiced in the ASALs of Kenya are: small scale mixed farming which involves growing of crops and keeping of livestock.

According to (World Neighbors, 2000), farming in arid and semi-arid areas could also benefit from careful investment in biotechnology and crop genetic engineering particularly in developing early maturing and water stress resistant crop varieties. Further, to lessen

water demand and on-farm production pressure, investment in alternative food security measures like bee farming has proved effective in some marginal areas in Kenya.

Information on recent and near-term projected climate change trends is used to assess the food security and adaptation potential of these technologies and practices under *site- specific* climate change conditions, and to determine what adjustments may be needed (FAO, 2016). .Examples of such adjustments include: modifying planting times and adopting varieties resistant to heat and drought; developing new cultivars; changing the farm portfolio of crops and livestock; improving soil and water management practices, including conservation agriculture; integrating the use of climate forecasts into cropping decisions; expanding the use of irrigation; increasing regional farm diversity; and shifting to non-farm livelihood sources (Asfaw *et al.*, 2014; Branca *et al.*, 2011; FAO, 2010; FAO, 2013).

The FAO approach to sustainable food and agriculture recognizes that countries will pursue multiple objectives across the economic, social and environmental dimensions of sustainability, and will need to balance trade-offs between objectives and between short-term and long-term needs (FAO, 2016). The same report, also emphasizes that such trade-offs will differ among countries, depending on natural resource endowments, socio-economic characteristics, political systems and stages of development. Similarly, countries will have different priorities, according to their specific circumstances, which need to be taken into account when designing climate change responses.

Livestock and agricultural production in Kenya is highly dependent on rainfall (Parry, 2016). Only 1.7% of Kenya's agricultural lands is irrigated (GOK, 2010), which leaves agricultural production and food security, as well as national economic performance, highly sensitive to changes in rainfall volumes and patterns (MSDP & UNDP, 2013). Land fragmentation is a further source of vulnerability. An estimated 75% of rain-fed agricultural output and 70% of marketed agricultural produce is derived from farms with an average size of 0.2–3 hectares (GOK, 2010). Further difficulties facing the agricultural sector include insecure tenure, landlessness, and land degradation (GOK, 2010).

2.3.2 Livelihood Diversification

Diversification of livelihoods is regarded as one most important risk-averse and ER strategy with the pastoral communities (Opiyo *et al*., 2015). According to studies by (Ellis 1995), it is the processes by which households construct a diverse portfolio of activities and social support capabilities in their struggle for survival and in order to improve their standards of living. In fact, (Little, 2001) defines livelihood diversification as pursuit of any non pastoral incoming earning activity in both urban and rural environments which includes: selling of livestock, milk, hides and skins, honey, artisan goods, waged employment, small business enterprise, farming (mainly subsistence) and gathering and selling of wild products. This strategy, according to (Wisner *et al.*, 2004), provides a surplus in good years since it is normally planned on the basis of meeting subsistence needs in bad years.

It should be noticed that diversifying livelihoods makes use of environmental variations and provides the best chance of livelihood optimization under extreme climate scenarios. Barret and Luseno, (2004) in their observation about Turkana pastoralists households, suggest that livelihoods diversification is primarily based on extensive livestock production and cash earnings come from sales of livestock or livestock products. This view is however contradicted by (Little, 2001) who believes that Turkana pastoralists, and East Africa in general, are increasingly pursuing non pastoral income strategies to meet consumption needs and to buttress against shocks caused by climatic fluctuations, animal disease, market failure and insecurity.

2.3.3 Social Support Networks

In adversity, people also rely on social support networks. These include rights and obligations between members of the same household and with other wider groups with a shared identity such as a clan or tribe (Dercon, 2002). Parents may influence strategic marriage partners for their daughters or sons into a comparatively wealthy family to call on resources in difficult times. There are also wider obligations from the whole community to assist those facing acute hunger and some public assistance and food aid from a number of Non-Governmental Organizations have been very helpful. At the same time, sources of household income other than the dominant one may be employed, such as casual labour, petty trading, cross border trading and artisanal work. There is also sale of household disposable assets that do not undermine future productive capacity such as small stock and building material. It is clear that these strategies do not seem to try maintaining an adequate food intake for a household but instead are aimed at preserving the means for continuing

the household's livelihood after the drought. As highlighted, food aid and cash, transfers have been very helpful to meet food deficit requirements for many vulnerable households. However, food aid has created dependency such that some households no longer see the need to revive their livelihoods (Dub*e*, 2008).

2.3.5 Gender Considerations in Drought Early Recovery Programming .

Gender inequality also continues to be a persistent challenge, with Kenya ranking 122 out of 187 countries on the Gender Inequality Index (UNDP, 2014). Fewer women move from primary to secondary school, and fewer again then move on to post-secondary education, and less than 30% of people engaged in wage employment are women. Access to and control over property remains a concern, particularly given that up to one-third of Kenyan households are now headed by women. Many of these households are in rural locations, largely due to men migrating to urban areas (Omondi, 2014). Female-headed households are more likely to suffer chronic food insecurity than male-headed households (Nakweya, 2014). The assurance of legal access for women under the new constitution may help to overcome these current inequalities (MSDP & UNDP, 2013).

Gender is one of the key determinants of the options chosen for diversification (Little 2001). According to Field (2005), single women with children are most likely to try new income generating activities, even though resources are limited and individuals possess low levels of human capital. In general, women tend to move into petty trade, namely, milk, *uji* (porridge), mandazi (buns), wild fruit, processing and selling fish and/or animal skins, charcoal, firewood, alcohol, weaving (mats and baskets) and offer their services to fetch water and undertake household cores (Nduma *et al*. 2001). Conversely, men frequently

engage in livestock trading, fishing, carpentry, construction work, long distance hawking, provision of security services, take advantage of comparatively more remunerative waged employment than women (which often involves labour migration) and sell poles, rent buildings, and own shops (including butcheries) (Little *et al*. 2000).

This study will be looking at how gender roles have played out in ER programs for livelihood enhancement against drought in Turkana Central Sub County. Watson and van Binsbergen (2006) in their study reported that most of these drought early recovery strategies activities are practiced by women in Turkana county. Other studies by (Fernando 2002; Njiru 2012) have also shown an increasing involvement of women in income generating activities as a way of supporting their households especially during the drought period.

2.3.6 Sending children to school to acquire education

Education is one important way individuals acquire knowledge, skills, and competences that could directly or indirectly influence coping capacities in times of crisis (Ndichu, 2013). More educated individuals may have improved access to information and a better ability to interpret and evaluate that information (Jerit, 2006), including climate risks and self-protection. (M`Nyiri,2014), in his study avers that education endows individuals with real skills that are useful for work and for life, such as decision making abilities and problem solving skills that can be useful in hard times.

In arid areas like Turkana Central Sub County, frequent drought because of climate change has exacerbated and compounded the problem of provision of quality basic education to the pastoralists ’children. In this region, rather than attend school in times of water scarcity,

children of 12 years and older are often grazing animals or looking for water for domestic use (Ngigi, 2009). During droughts, education becomes a low priority in the struggle for survival, especially if school fees need to be paid, and enrolment plummets. This phenomenon can have negative impact on school attendance rates and poor access to education by the pastoralists' children.

Despite these challenges presented by drought to pastoralist's children in Arid areas, progress has been made in education, particularly since Kenya introduced free primary education for all in 2003 (World Bank, 2009). The Net Enrolment Rate at the primary level reached 95.3% in 2012, with just over three-quarters of students (equally between girls and boys) moving from primary to secondary school (MDP, 2013a). However, the level of enrolment in the north eastern region remains below the national level, with only 40.3% of school age children enrolling in primary education (MDP, 2013a). Female literacy in some arid counties is less than 10% (MDP, 2013b). Availability of food in schools also determines whether children will remain in school or not. Children may opt to drop out of school and either join their parents in search of food or may opt to get married at a tender age. This is a common phenomenon in arid and semi areas like Turkana Central. It has therefore been noted that schools with feeding programs register a significant increase in school enrolment (Ndung'u, 2011).

2.3.7 Livestock Keeping and use of livestock migration as an ERS.

In Kenya's ASALs, livestock production is particularly significant and this sector collectively generates about 13% of GDP (MSDP & UNDP, 2013). Among the Turkana the community, livestock production remains the economic mainstay. The animals reared are

camels, cows, donkeys, goats and sheep (NDMA 2018 Turkana LRA report). The report further suggests that in Turkana County, livestock production is a major income earner for pastoral households besides providing food in form meat, milk and blood.

Small stock, sheep and goats have become the mainstay of the herd in some areas for a variety of reasons; partly in response to disease and drought and it's utilization of water points and the grazing areas that are tied to them that (Ndichu, 2013). Goats reproduce faster and hence generate quicker returns on invested capital. Other authors (Imana, 2011) found goats to be a liquid asset than other livestock – one that can be utilized during emergencies.

Climate variability and change in the recent past which has led to recurrent drought thus leading to water shortage and disruption of the vegetation cycle are considered to be the root cause of crisis facing pastoralists, Ouma *et al*. (2012). As a result of these frequent and severe droughts, these pastoralists continue to suffer catastrophic losses of livestock (capital and savings) during drought.

In order to manage and minimize the adverse effects of drought on livestock, Turkana pastoralists' practice seasonal mobility as a well-known primary risk reduction strategy, particularly in times of drought. According to studies done by Ahmed *et al.* (2001), this strategy allows for extensive utilization of rangelands as common pool resources through the full use of culture and its attributes. Pastoralists have therefore over the year's practiced mobility as an adaptation strategy to reduce risk, and to access livestock, markets, or urban centres. However, the level of mobility always differs from one location to the other depending on access to pasture and water resources.

The advantage of this strategy is that it enables opportunistic use of resources and helps minimize the effects of droughts, disease outbreaks, and livestock losses through raids. Turkana herders frequently migrate across borders, especially to Uganda, South Sudan, and Ethiopia, to access resources and markets. These movements are often affected by impacts such as violent conflicts, diseases outbreaks, and recurrent drought.

Research by (Ellis and swift 1988; Little and Leslie 1999; Musembi and Kameri-Mbote 2013*)* have shown that seasonal decisions to migrate ensure that households maintain the productivity of their herds and security of their families. This form of mobility is pursued primarily for livelihood purposes and is strategic (McCabe, 2006).

Movement of livestock to areas with secure water and pasture resources is an effective strategy against droughts *(*Niamir-Fuller 2000) and has remained important for herders in northwestern Turkana County of Kenya. With the recent discovery of oil in Turkana and changing land tenure systems from communal to private ownership in the rangelands, mobile pastoralism is becoming increasingly constrained (Eliza *et al*. 2015). Probably, a key issue to consider in the future in order to retain mobility as an adaptation strategy will be the ability of pastoralists to continue managing the rangelands at a communal scale, rather than fragmenting rangelands into private and individual tenure systems.

2.4 Effectiveness of Early Recovery Strategies Employed against Drought

Given the projections for increasing drought impacts in the pastoral areas and other social pressures, it is important to document the effectiveness of various drought ERS at

household level in order to reduce risks associated with recurrent droughts. Knowledge about pastoralists ’adaptation and coping responses to drought stresses can guide possible intervention measures, as well as better inform policy designed to reverse the decline in pastoral production systems, and hence ensure continued sustainability of rural livelihoods in arid and semiarid environments, and importantly for this study in Turkana Central Sub County.

2.4.1 The Drought Cycle Management (DCM)

Drought cycle management is a cyclic process that acknowledges drought as a cyclic event and defines what actions to be taken in different stages of “a drought”. The concept of Drought Cycle Management (DCM) was developed in Kenya by Jeremy Swift in the mid-1980s under the European Union (EU) funded Turkana Rehabilitation Project (Pantuliano and Wekesa, 2008*).* Figure 2.2 summarizes the drought cycle management model. Drought in Kenya is cyclical. Understanding the historical frequency, duration, and spatial extent of drought assists planners in determining the likelihood and potential severity of future droughts. The characteristics of past droughts provide benchmarks for projecting similar conditions into the future. At the same time, successful experiences in adopting a comprehensive and active approach across various sectors and stakeholders in dealing with droughts should be widely shared, and the capacity to apply such approaches built and developed where needed.

Figure 2. 1: Drought Cycle Management

Source: Pantuliano and Wekesa, (2008)

In spite of these revelations, available literature reveals that management of the drought cycle remains a paradox to both the Kenyan government and the humanitarian responders. The UNISDR, (2009) recons that exposure to drought varies regionally and overtime, and there is little, if anything, that can be done to alter its occurrence. This however could be resolved by having a grasp on the link between the various phases of the drought and particularly the critical role played by early recovery programming. The study, therefore,

purposes to identify drought early recovery strategies applied appropriately within the drought cycle that can be adopted for Turkana Central Sub County for sustainability.

2.4.2 Drought Response Plans (DRPs)

Most Drought Response Plans (DRPs) are designed to address the emergency needs of, and to prevent further impact on people most affected by protracted drought (FAO, 2009). The Response Plans identify strategic priorities that largely address rapid provision of humanitarian assistance, the strengthening of resilience to future drought and climate change, and assisting in the return process and ensuring socioeconomic stability among the worst affected groups (UN, 2009). Governments also welcome international assistance provided to the drought-affected populations through multilateral channels (Solh, 2010). Cash transfer programs and various loans to those affected, including farmers and women entrepreneurs, are also provided (UN, 2009).

In Kenya, there is an elaborate drought coping mechanism in place to respond to drought situations. Noting that drought comes in cycles, different activities are carried out at different times of the drought cycle. The table in Appendix VI shows some of the key interventions and practices applied by government and other supporting institutions, including NGOs and private sector at different times of the drought cycle to help affected communities to cope.

From the foregoing, the precedence has been set and as the best practice it is better to invest in preventative-based DRR plans, strategies, and tools for adaptation than in response to extreme events. Greater investments in proactive hazard and vulnerability reduction measures, as well as development of capacities to respond and recover from the events have

demonstrated to have benefits. In developing countries like Kenya, as much as DRR planning approaches seem to receive more emphasis than disaster response and recovery, looking at the drought management cycle holistically leaves the critical role played by early recovery planning a grey zone subject for this inquiry.

2.4.3 Drought Management and Recovery System

Drought risk management may be defined as the actions taken on a continuous basis to prevent, mitigate or prepare for the adverse impacts of drought and to build drought-resilient communities.

2.4.3.1 Drought Risk Management System in Kenya

An efficient and effective drought management system requires five components that must work smoothly together. These include drought management policies and strategies; credible drought early warning system; multi-sectoral contingency (shelf) plans; drought contingency (response) fund; and drought coordination and response structures at national and county levels.

(i) **Drought management policies and strategies:** The government has prepared draft policies and strategies aimed at strengthening drought risk management. These include a policy on the sustainable development of arid and semi-arid lands (ASALs); the Ending Drought Emergencies (EDE) strategy and the NDMA Bill.

(ii) **Drought early warning system:** The NDMA has established a community-based drought early warning system currently covering 23 arid and semi-arid counties. The system provides timely, accurate and credible information for planning and decision-

making.

(iii) **Multi-sectoral contingency plans:** Comprehensive, multi-sectoral contingency (shelf) plans have been prepared for arid and semi-arid counties, for rapid reaction to the early warning. They cover necessary interventions at each phase of drought (normal, alert, alarm, emergency and recovery) together with detailed budgets for each activity.

(iv) **Drought Contingency Fund (DCF):** The most critical issues in emergency response are timing and appropriateness. Early response is in most cases restricted by lack of, or limited, readily available funds. DCF provides flexible resources that can be drawn on quickly to improve the timeliness and appropriateness of interventions.

(v) **Drought coordination and response structures:** Drought and food security coordinating structures have been established. At the national level, they include the Kenya Food Security Meeting (KFSM) and the Kenya Food Security Steering Group (KFSSG). The latter is a sub-committee of the KFSM and acts as a technical advisory body with technical sub-committees. At the local level, the County Steering Groups (CSGs) are in charge of coordination and are composed of sectoral line ministries and other relevant stakeholders operating at the county level.

To determine the drought cycle phase (normal, alert, alarm, emergency and recovery), NDMA has developed a methodology which combines various drought indicators using specific thresholds. Recovery and rehabilitation interventions include restocking,

rehabilitation of dams, cash - for – work, food – for- work, natural resource management, capacity building and infrastructure development.

2.4.3.2 Policy Response to Drought Management in Kenya

Policy response to drought management in Kenya starts with the domestication of the global United Nations Convention to Combat Desertification (UNCCD) after ratifying it in 1997. It requires that Parties prepare and implement the National Action Programmes (NAPs) to address matters of desertification, land degradation and drought. Kenya prepared and adopted its first NAP in the year 2002 and has been implementing it since then. During the Conference of Parties (Decision 3/COP.8) parties were asked to review and align their NAPs to the UNCCD Ten Years Strategy (2008-2018). Kenya is at an advanced stage of aligning its NAP to this Strategy after receiving both technical and financial assistance from UNEP. It is expected that implementation of this policy document will go a long way in addressing impacts and mitigation of droughts in the country.

Policy paper (Sessional paper No. 8 of 2012) was also developed with an overall goal to guide Sustainable Development of Northern Kenya and Other Arid Lands by increasing investment in the region and by ensuring that the use of the resources is fully reconciled with the realities of peoples ’lives. The policy provisions are consistent with the African Union Policy Framework for Pastoralism in Africa that was approved in January of 2011. It is through this policy that the National Drought Management Authority was formed to coordinate all matters related to drought management in the country. Although the policy encourages contribution from all stakeholders and at all levels for the achievement of the above outcomes, it places the primary responsibility of reducing disaster risks on the nation

states. It will be reasonable that the States share this responsibility with local governments, the private sector, academia, civil society and other stakeholders.

2.5 Review of vulnerability Models

This study will embrace two (2) models: The pressure and release model; the stress-vulnerability model and Watts and Bohle Model of Vulnerability and each model has been explained herein as follows:

2.5.1 The Pressure and Release (PAR) Model

Pressure and Release Model (PAR) is a framework that can be useful for understanding and reducing disaster risk which is also known as the disaster **"**Crunch Model". According to this model vulnerability (pressure), which is rooted in socio-economic and political processes, has to be addressed (released) to reduce the risk of disaster. The pressure and Release (PAR) model provides a framework for analysing disasters, in which existing vulnerabilities within the affected populations, rather than the intensity of the event itself, lead to certain outcomes. The natural hazard is a trigger event, which exposes these vulnerabilities and leads to some people suffering more than others do.

The 2015-2017 droughts in Turkana Central Sub County provides a good example of this, where one group of people and their livelihoods were severely affected than another group. There has been a lot more discussions about why communities in ASAL counties continue to succumb to the effects of drought despite government and other stakeholders **'** interventions. This study proposes to hinge itself on the argument that the effects of the

2016-2017 droughts were due to various causes and pressures, which made certain sections of the populations and livelihoods more vulnerable.

There is growing literature showing that the impact of a disaster is a function of the pre-existing conditions: the preparedness of government and individuals; emergency planning; and the existing divisions and inequities in society (Alexander, 2006). The PAR model was formulated by Blaikie *et al*. (1994), and it states that a disaster occurred when processes creating vulnerability meet with physical exposure to a hazard. The ‘release ’ occurs when vulnerability is reduced, thus reducing the extent of the disaster. Factors affecting vulnerability include access to resources and wealth, risk perceptions, community structure, and emergency management, which organises warning, planning and response (Masozera *et al.*, 2007).

Blaikie *et al. (*1994) and many other authors (Cannon, 2005; Alexander, 2006; Cutter, 2006; Lukes, 2006, Mulcahy, 2006; Masozeraet et al. 2007; Schuemer-Cross & Taylor, 2009) argue that vulnerability is determined by social conditions and historical circumstances; and that these conditions creating unequal exposure are perhaps more important than the hazard itself *(M*asozera *et al.*, 2007). Cannon (2008) further posits that understanding the effects of a natural hazard can only occur through understanding every life before the trigger event. In his argument, Terry Cannon has further identified five components of vulnerability to help practitioners to obtain a more comprehensive understanding while analyzing risk. The most important links are those that affect livelihood strength and social protection, both of which are largely dependent on governance to determine how effective they are. Cannon argues that vulnerability should be defined in terms of five interrelated components that capture all

aspects of the exposure to risk from natural hazards: livelihood strength and resilience; well-being and base line status; self-protection; social protection, and governance. The linkages between these are important in understanding the causes of vulnerability and therefore how to design policies to address it. In this current study therefore, the interaction of these components have been organized into the conceptual framework as illustrated in Figure 2.4

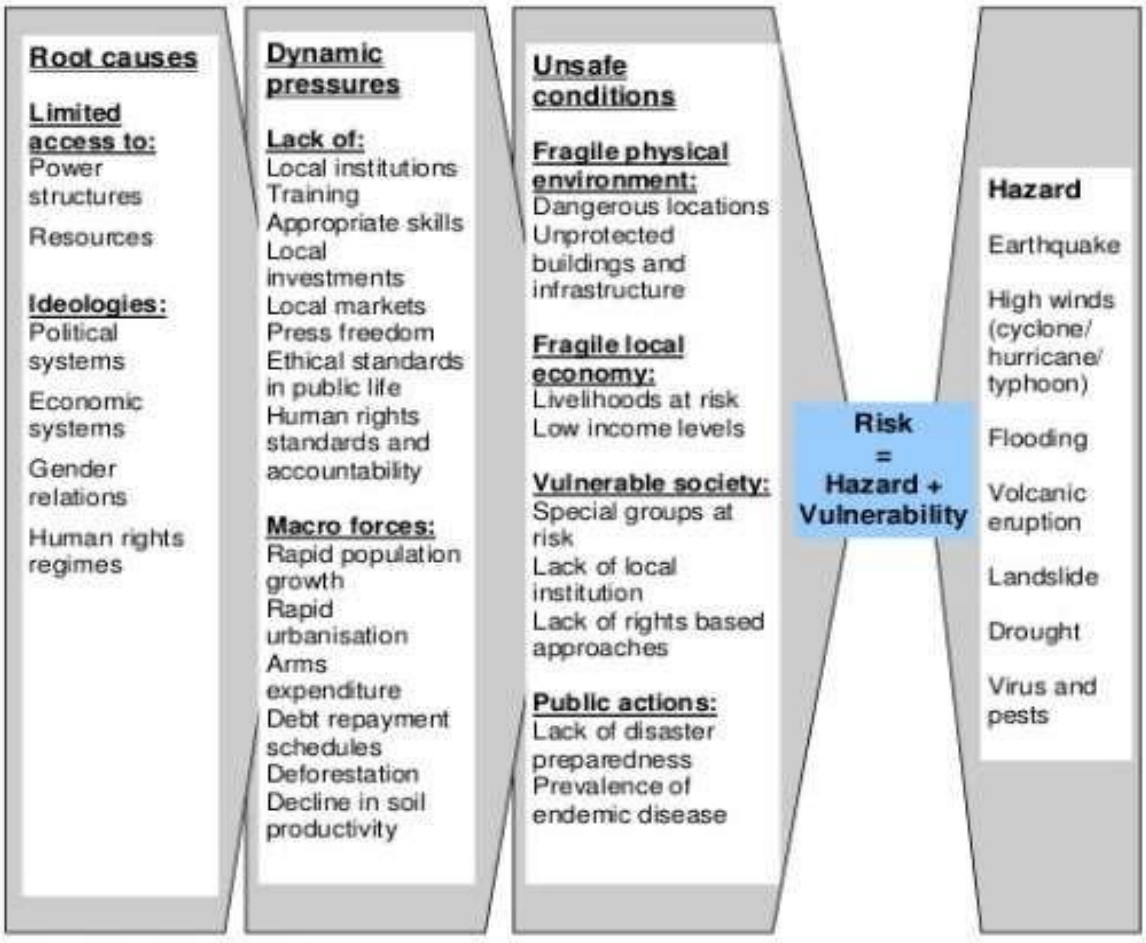

Figure 2. 2: The Pressure and Release (PAR) Model Source: Blaikie et al. (1994)

Oxfam has used this model as a framework for situation analysis in its guidelines for Participatory Capacity and Vulnerability Assessment (PCVA).

2.5.2 Watts and Bohle Vulnerability Model

Watts and Bohle model examines external processes not as geographical and physical characteristics, but as the wider scale, political, economic and social processes that affect individual capacity to respond and cope with disaster events (Watts and Bohle, 1993; Villagrán, 2006). Through this approach, access and control over assets, including economic, socio-political, infrastructural, ecological and personal, is recognized as a key process affecting vulnerability levels. In this sense, those individuals and groups who have control over key assets have increased their coping capacities to disaster events, thereby reducing their vulnerability. This model of vulnerability is effective because is provides not only an explanation of vulnerability, but also some of the key causes and origins (Villagrán, 2006*).*

The Watts and Bohle (1993) model also incorporates the geographical importance of place through the interaction and manifestation of various processes at the local scale. Vulnerability makes it more or less likely that an individual will succumb to effects of drought if a certain severity is encountered. Vulnerability can also be conceptualized as situational factors, such as low socio-economic status or predisposition to drought conditions as already seen is this case with ASAL communities in Turkana County. In the Watts and Bohle model, the external processes are still related to the exposure to shocks and stressors, and the following influence these external factors:

a) *Human-Ecological Perspectives*: these perspectives focus on population dynamics and the capacities of individuals, groups and communities to manage their surrounding environment.

b) *Entitlement Theory*: argues that those individuals, groups and communities who are unable or incapable of obtaining and managing their assets through legitimate economic means have increased vulnerabilities

c) *Political Economy Approaches*: examines the social inequalities and injustices that lead to struggles and conflicts between classes of people. This approach relates vulnerability to exposure to social inequalities and lack of control of assets.

The following influence the internal processes, or coping abilities, of individuals and groups:

a) *Action Theory Approaches:* examines the means and ways incorporated by people, which allows them to act, either by free will, or as a consequence of societal, governmental or economic constraints.

b) *Models of Access to Assets:* These models relate vulnerability to control over their assets and provide techniques through which individuals can mitigate their vulnerability through access to resources and assets of a different nature.

c) *Crisis and Conflict Theory:* examines how control over resources and assets, as well as capacities to manage resources and assets through crises can influence vulnerabilities.

Watts and Bohle, (1993) expanded the Chambers model of vulnerability through the incorporation of their view of vulnerability as a **"**multi-layered and multi- dimensional social space defined by the political, economic, and institutional capabilities of people in specific places and times" (Villagrán, 2006, p. 12; Watts and Bohle, 1993). While the Watts and Bohle (1993) model is similar to the Chambers model of internal and external processes of vulnerability, the factors, which influence these processes, have been enhanced. As depict in figure 2.4, the Watts and Bohle model of vulnerability.

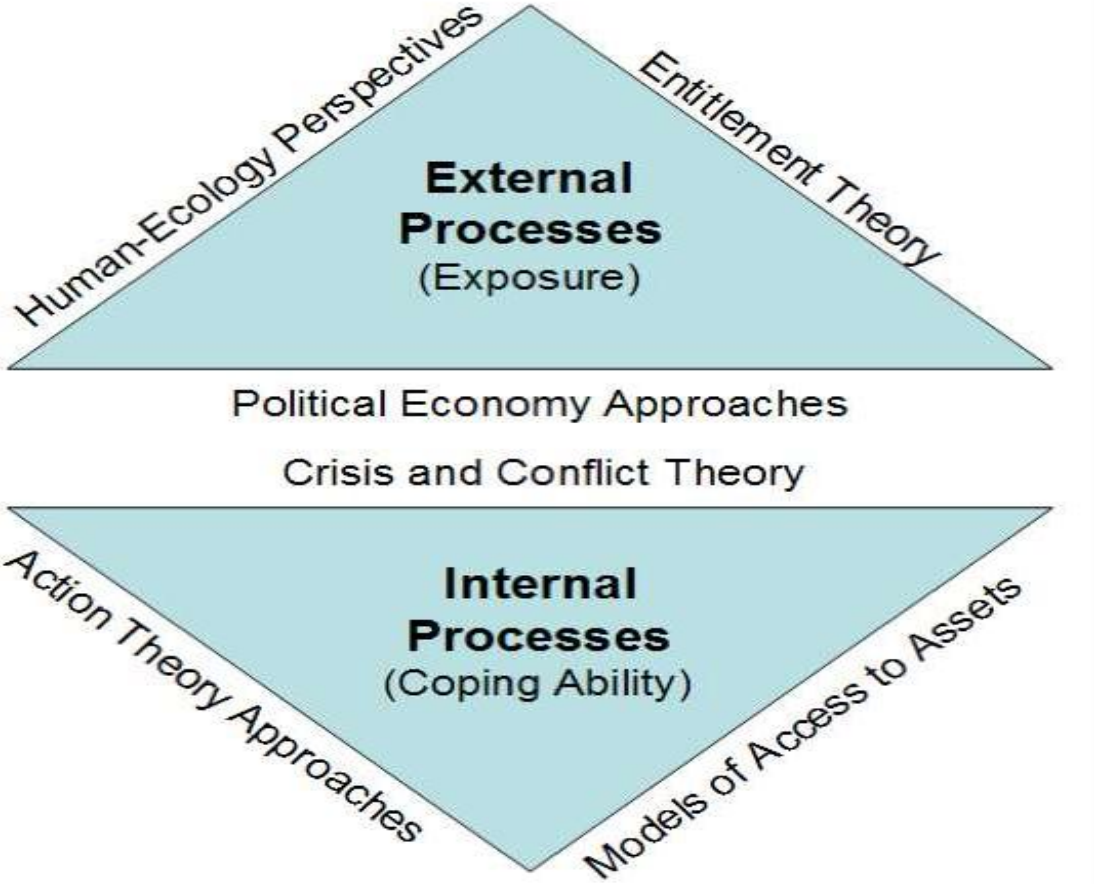

Figure 2. 3: Watts and Bohle Model of Vulnerability

Source: Watts and Bohle (1993)

2.6 Conceptual Framework Model

The interaction between variables in this current study has been coined into a conceptual framework. The independent variable that is not static in the area under study is the drought early recovery strategies. The dependent variable constitutes the effects on the livelihood options and the recovery needs. The study also considers an array of intervening variable as shown in Figure 2.4.

In an effort to explain the role of intervening variables in moderating the drought early recovery strategies in influencing sustainable livelihood options in the study area and as indicated in the logical framework (Figure 2.4), the following sources of literature were reviewed so as to understand the relationship.

For instance, in Turkana Central sub-county which is an example of an arid area, both exposure and vulnerability to drought are high. A report by GOK (2014) on *Ending Drought Emergencies* confirms that drought vulnerability is a product of the chronic under development of these regions, particularly the limited provision of public goods such as security, infrastructure and services that build human capital.

The same report further suggested that a number of other social, political and institutional factors are influencing drought vulnerability in ASALs either positively or negatively this include high population growth, increasing sedentarisation, the weakening of community based institutions, expansion of educational opportunities and short comings of contingency planning and response mechanism. New threats include discovery of natural resources such as oil and gas, and advent of climate change, which is likely to make the normal climate variability of dry ecosystems more pronounced and less predictable.

Similar studies by Ahmed *et al.* (2002) also suggest that drought early recovery strategies in the arid and semi arid areas, are constrained by several resource shrinking factors including: expansion of wildlife parks and sanctuaries, population growth, insecurity, encroachment of rangelands by unwanted species and high drought frequency.

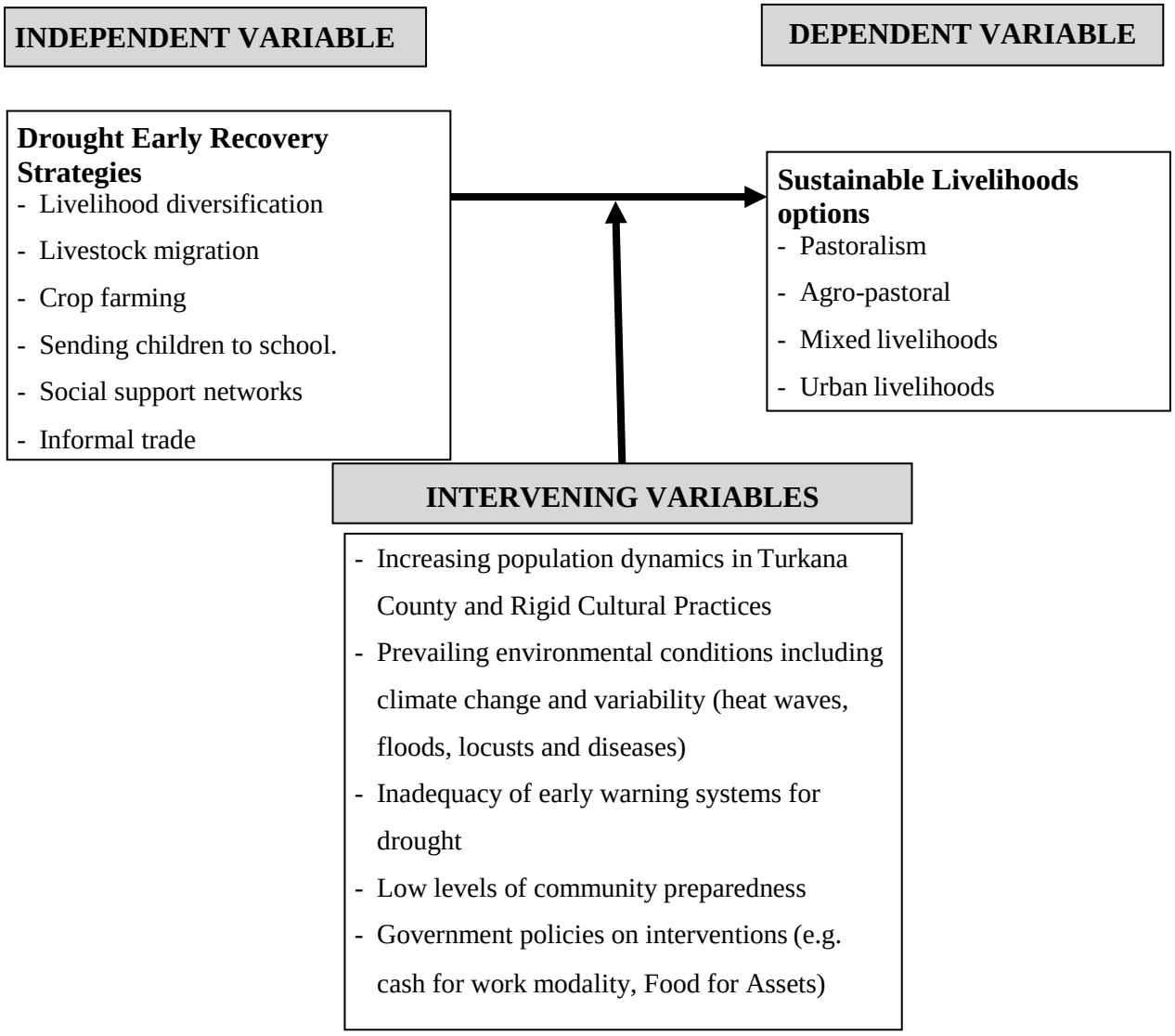

Figure 2.4: Conceptual Framework

Source: Researcher, 2018

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter is a description of the selected methods that will be used in establishing drought early recovery strategies influencing sustainable livelihood options among households in Turkana Central sub-county located within Turkana County. The description includes setting of the study research process, sampling frame and sampling techniques. The research design is discussed herein giving justification for the particular design that was chosen. The method of data collection, the research instruments used, method of data analysis, as well as the ethical considerations for the research are discussed.

3.2 Area of Study

This study was carried out in Turkana Central Sub County that falls within the greater Turkana County that occupies the Northwestern tip of Kenya. It is bordered by the countries of Uganda to the West; South Sudan and Ethiopia; to the North and Northeast; and Lake Turkana to the East. To the South and East; neighbouring counties are West Pokot, Baringo and Samburu Counties, while Marsabit County is located on the opposite side (i.e. Eastern) shores of Lake Turkana (Figure 3.1). The County lies between Longitude: 35° 35' 13.79" E and Latitude: 3° 07' 18.60" N. Its administrative headquarters and largest town is Lodwar. Administratively, it is one of the seven sub counties that make up Turkana County which include Turkana East, Turkana South,

Loima, Turkana West, Turkana North and Kibish. According to the Census report 2009, Turkana Central has a population of 242,979 people majority of whom are settled around Lodwar town and its environs.

The choice of the study area was informed by the fact that Turkana Central sub county compared to the others cited herein is rich in livelihood zones diversity which is a critical component of this study given that the early recovery strategies are hinged on diversification of livelihood options in response to drought vagaries in the study area. In terms of livelihoods options, pastoralism, which has traditionally been practiced by the Turkana ethnic community, is the preferred pattern of livelihood in this exceptionally hot, dry and arid environment.

However, in reality most households are heavily dependent on a combination of self-employment activities (charcoal, firewood, handicrafts, petty trade, etc.), wild foods, and safety net (Turkana HEA Baseline Report, 2016). Other livelihood zones in Turkana Central include Lodwar Urban Livelihood zone, Lake Turkana fishing zone and Kerio Riverine Agro- Pastoral livelihood zone. It was also evident from earlier studies (Odhiambo, 2011), that droughts have been so frequent in the northern Kenya region inhabited by this pastoral group and yet they are hesitant to abandon their livelihood strategy to adopt other means of survival. This study was aimed at establishing how this community has been able to cope with and recover from effects of persistent and recurrent drought.

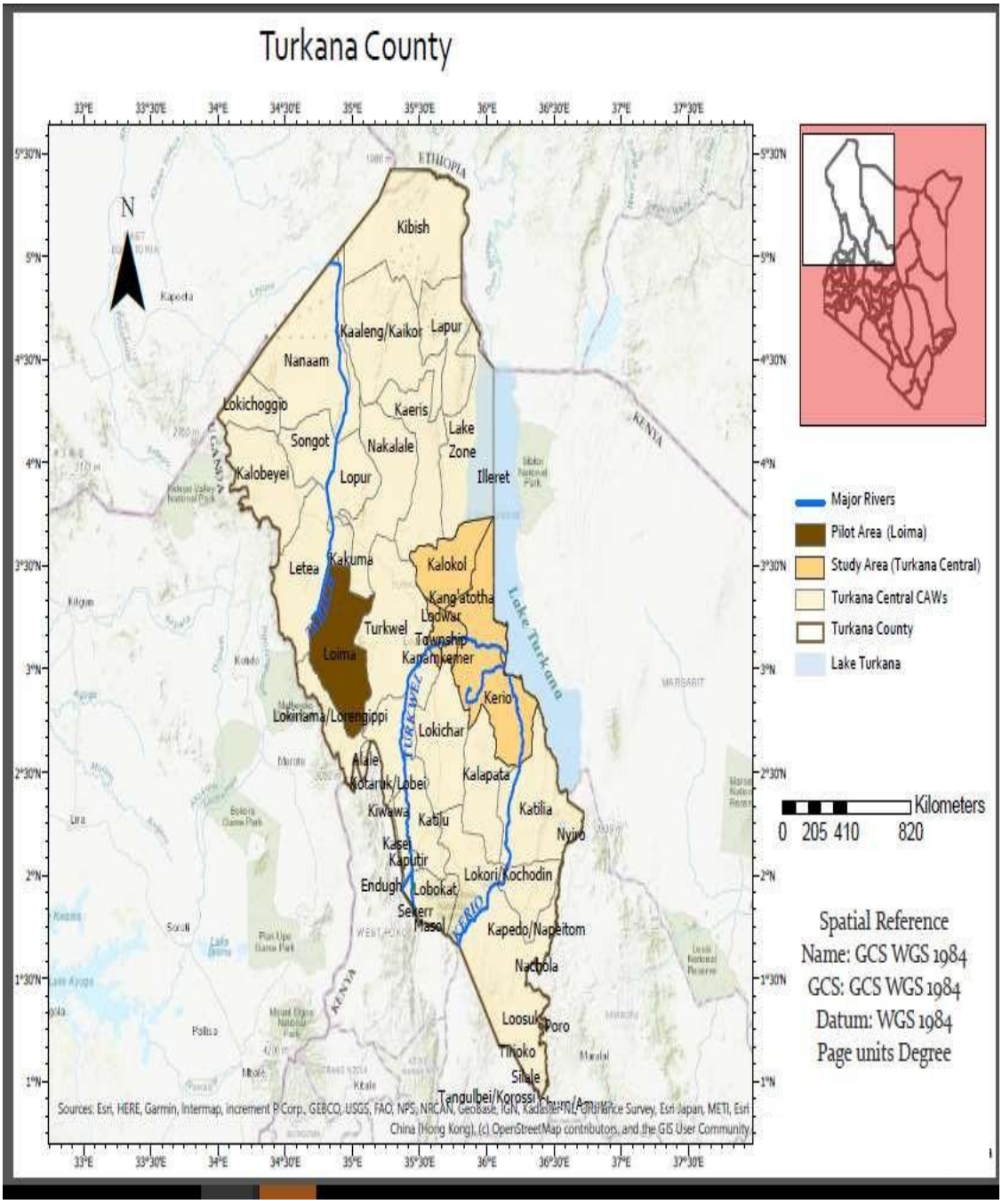

Figure 3. 1: Map of the study area located within Turkana County

Source: Author, 2019.

3.3 The Study Population

The study consisted of households from the study area identified as Nadoto, Kerio, Kalimapus, Lodwar Township sub locations. This is because these areas were representative of livelihoods of pastoralism, Urban livelihood zone as well as Riverine agro pastoralism zones respectively and were therefore thought would give an objective information for the study. The study also consisted of information obtained from different actors, which included the Sub Chiefs, Non- Governmental Organisation (NGOs), Community Based Organisation (CBOs) Turkana County Government Ministry of Agriculture, Pastoral Economy and Fisheries. Others were Ministry of Environment and Water Resources as well as the National Drought Management Authority (NDMA). The households were the main respondents and major suppliers of primary data.

3.4 Research Design

The research adopted descriptive survey. Mugenda and Mugenda, (1999) state that descriptive research aims to gather data without any manipulation of the research context, as the researcher has no control over the variables. This was the case in this study, as the researcher had no influence on the effects of the drought on the livelihood options for sustainable recovery of the affected communities. The study also had an evaluative aspect with regard to the drought early recovery needs for livelihood options in Turkana Central Sub- County.

Table 3.1: Research Designs by specific objectives, Data analysis and presentation.

Specific Objective	Measurable Variable(s)/indicators	Research Design	Data Analysis
Determine early recovery strategies towards drought occurrence among households in Turkana Central sub county.	Diversification of livelihoods, crop farming, livestock migration/herds splitting, social support network, engaging in petty trade and sending children to school	Descriptive	Descriptive statistics through pie charts, bar charts, percentages, frequency curves and tables.
Examine the effects of drought on livelihood options	crop farming, livestock keeping, small business enterprises, basket making, casual labour, salaried employment, wood selling and charcoal burning	Descriptive among households in Turkana Central Sub County.	Descriptive statistics through pie charts, bar charts, percentages, frequency Curves and tables.
Evaluate the effectiveness of early recovery strategies for sustainable livelihoods against drought in Turkana Central Sub County	Pastoralism Agro-pastoral Mixed livelihoods Urban livelihoods	Evaluation	Evaluation data analysis and comparative study with verbatim reports from key informants.

Source: Researcher, 2018

3.5 Sampling Strategy

A Multistage sample size of 384 households was selected. Sample size (N) was estimated using the formula according to Mugenda (2008);

$N=Z^2pq/d^2$ ..... Equation 3.1

Where N=desired sample size,

Z=the standard normal deviation at confidence interval of 95 %(I.96),

p =proportion in the target population estimated to have the characteristic of 0.5 (assumed) of households

q=1-p (0.5) and

d=level of statistical significance or Alpha (0.05) Therefore,

$N=1.96^2x0.5x0.5/0.05 = 384.16$ or 384 households

$$N= \frac{Z^2pq}{d^2} = 384$$

Turkana Central Sub-county consists of the followings sub locations: Kang'irisae, Nakoret, Lorengelup, Nakurio, Kerio, Kakimat, Kang'agetei Nadoto sub-location, Ille, Naoros, Lomopus, Lochor Ekeny Namukuse sub-location, Namadak, Kalokol, Kapua sub-location, Lodwar Town, Nakwamekwi, Napetet sub-location, Kanamkemer Nawoitorong sub-location. Kang'ototha and Kanamkemer sub locations were not selected due to households being purely pastoralist compared to other sub locations which have varied livelihoods, which include Agro-pastoralists or being involved in trade, or

households depending on employment apart from being pastoralists (Odhiambo, 2011). In addition, the proportion of sub locations where the study was conducted were computed based on 30% sampling units as supported by Mugenda and Mugenda (2003) as illustrated in Table 3.4.

Purposive sampling was used to select the number of sub locations based on the type of sustainable livelihoods option practiced in that area. Stratified random sampling was used to determine the number of households ’units that were sampled per sub locations because of the variation in the number of households ’units in the sub location (Barrerio and Albandoz, 2001)

nh= (Nh/N) n….....Equation 3.2

Where

nh=sample size of stratum Nh=Population size of the stratum N = total population size

n=Total sample size

Table 3. 2: Proportion Allocation by Sub locations.

Sub locations	**Total Number of Households (Nh)**	**Sample size** nh=(Nh/N)n
Kerio	2704	183
Kalimapus	2140	145
Lodwar Township	832	56
Total	**5676**	**384**

Source: GOK, 2017 and Researcher, 2018

3.6 Data Collection

In depth interviews were conducted in person using semi-structured interview guidelines. The interviews were recorded with the consent of the participants. Note taking from the non-verbal expression, the mood and tone of the participants were observed. Quota sampling was used to sample FGD participants. Each interview was summarised in short document highlighting key findings on the day it was concluded.

The following table 3.4 provides a summary of details of sampling strategy per each population size targeted

Table 3. 3: Summary of study population units, sample methods, sample size and Data collection Instruments

Study Population	Target Units	Sampling method	Sample size	Data Collection Instruments
Households	5676	Multi-stage random	384	Household Questionnaire
Ass chiefs	21	Purposive	6	Interview Guide
Ministry of Agriculture (Department of Livestock and Fisheries)	9	Purposive	6	Interview Guide
Non Governmental Organization	5	Purposive	3	Interview Guide
FGD	21	Quota	(3) 8-12 members per group and 1 per sub-location	Interview Guide
Regulatory/Organizations	2	Purposive	1	FGD Guide
Observation	21	Purposive	13	Observation checklist

Source: Researcher, 2018

3.6.1 Primary Data

Descriptive survey allows for collection of data in the form of questionnaires and interviews. Ethnographic design was used where Interviews, questionnaires and Focus Group Discussions (FGD) was the main sources of primary data in this study and composed of 8-12 participants with different gender. An observation checklist and the

interview guides were used to source information from key stakeholders and questions were unstructured while the questionnaires were both structured (with set responses) and open ended (Mugenda & Mugenda 2003).

3.6.2 Procedure of Primary data collection.

Each Head of the Household within a sentinel site to be administered this questionnaire. If they are in FGD they should comprise 10 persons (female and male separately) mainly pastoralists/herders, agro pastoralists and others involved in businesses related to animal production (include youth and elderly). Before starting Interview, introduce yourself. Thank the interviewees for their time. Explain the purpose of the study and avoid raising expectations as far as possible.

Further Table 3.5 summarizes the objectives and the respective question items that shall be derived from the field to achieve them.

Table 3. 4: Data collection Instruments per objective

Objectives	Data collection Instruments
1. Objective I	3, 4 and 18. FGD (Appendix 3), KII(Appendix 4)
2. Objective II FGD	2, 4, 16, 19, 25, 26, 27. (Appendix 3), KII(Appendix 4)
3. Objective III	7, 8, 11, 12, 13, 14,15, 18, 20, 22. FGD (Appendix 3), KII(Appendix 4)

Source: Researcher, 2018

3.6.2 Secondary Data

Secondary information was sourced from published and unpublished sources with literature on drought early recovery strategies influencing sustainable livelihood options among households in Turkana Central Sub County. These included textbooks, journals, government policy documents, government annual reports on the topic, seminar papers, conference proceedings, business journals, newspapers and periodicals and other relevant literature. The data in these secondary sources was used to support the research objectives and the primary data (Mugenda & Mugenda, 2003).

3.7 Pilot of the study

The purpose of the pilot of the study was to determine the instruments and approaches set

for the study in generation of information to meet the objectives of the study. It assisted the researcher to identify areas of concern in the questionnaire in terms of clarity with the

questions. There was need for the researcher to be keen and observant of the comments and trends of respondents that showed whether the question was well understood. The piloting was carried out in Turkwel sub-location in Loima Sub-County. This helped in reducing vagueness and improved understanding of the questions for precise response.

3.8 Validity and Reliability of data study instruments

Mugenda and Mugenda, (2003*)* defined reliability as the degree to which research instruments yield consistent data or results after repeated trials. The study used a test and retest technique by carrying out a pilot study in Loima sub-county. Reliability of the research instruments were enhanced through training of the research assistants on the use and administration of the research instruments. According *to Cronbach,* (1946), reliability coefficient of above 0.80 is considered a good indicator of internal consistency. Cronbach's alpha can be written as a function of the number of test items and the average inter-correlation among the items. The formula for the standardized Cronbach's alpha is:

$$\alpha = \frac{N.\bar{c}}{\bar{v}+(N-1).\bar{c}} \quad \text{.....Equation 3.3}$$

Where N is equal to the number of items, c-bar is the average inter-item covariance among the items and v-bar equals the average variance. It can be seen from this formula that if the number of items is increased, Cronbach's alpha increases. Additionally, if the average inter-item correlation is low, alpha will be low. As the average inter-item correlation increases, Cronbach's alpha increases as well (holding the number of items constant). If the pilot study yields a Cronbach alpha coefficient of 0.8, then the instruments can be considered

reliable.

3.10 Ethical Considerations

The researcher obtained a letter from the University, the Director, Board of Postgraduate Studies (DBPS) of Masinde Muliro University for Introduction to the relevant authorities and the National Commission for Science Technology and Innovation (NACOSTI).

The researcher also obtained a permit from the NACOSTI, which facilitated issuance of an introduction letter by the Ministry of Education, State Department of Research and Innovation to all concerned sources of information in the county under study. The instruments were administered through personal visits on appointment with key informants, and random household surveys. The instruments were then administered in the presence of the researcher with the help of research assistants after agreeing on the dates and then collected personally. The research assistants had been trained appropriately on data collection before proceeding to the field.

After being granted the research permit from the National Council for Science Technology and Innovation (NACOSTI), the researcher liaised with the Sub-County Livestock Extension Officers during data collection exercise. Permission was sought from County Director of Livestock Production and from the county director of irrigation in Turkana County for the researchers to administer data collection instruments and collect the data.

Confidentiality was observed throughout the study for respondents who gave personal opinions. Data collection is a sensitive issue as it borders on interrogating people's private lives. Ethical considerations are therefore, of paramount importance in research (Mugenda & Mugenda, 2003*).* The researchers ensured that the respondents were made aware of the intended use of the data and that the information obtained was confidential and would not be disclosed or discussed with any unauthorised persons. Effort was made to ensure that the respondents were protected from any psychological harm during data collection. Moreover, punctuality was observed to avoid any inconveniences to the respondents.

3.11 Limitations

i. Language was a key barrier witnessed, however the researcher overcame this by sourcing and training research assistants from within the target community and were identified by the chiefs and sub-chiefs.

ii. The respondents were suspicious and therefore withheld vital data pertaining to this research. Re-assuring respondents of their privacy was the only way to overcome this and confidentiality of all data collected that they were able to give the information.

iii. Lack of /inadequate information about the effects of climate change especially on their livelihoods by the respondents. This was overcome by the researcher through supplementary information from the Ministry of agriculture, meteorological departments and NGOs was used comprehensively to complement this research.

iv. Seasonal migration of the respondents due to drought. This was overcome by enlisting the support of the sub chiefs who acted as study guides and were able tolocate settlements with ease saving the researcher precious time in trying to locate the target households.

3.12 Data Analysis and Presentation

Using the Statistical Package for Social Sciences (SPSS) version 20.0, the data from the field was analysed and the results presented by the use of descriptive statistics, *(*Obure, 2002). The results were presented in form of pie charts, bar graphs, frequency tables and percentages. Qualitative data from the in-depth interviews and focus group discussion were analysed and presented in form of narrative reports and verbatim quotations.

CHAPTER FOUR

DROUGHT EARLY RECOVERY STRATEGIES AMONG HOUSEHOLDS IN TURKANA CENTRAL SUB COUNTY

4.1 Introduction

In this chapter of the study, the first objective was to determine the drought early recovery strategies among households in Turkana central sub County. The discussions were based on the identified variables as defined by the conceptual framework. Data was collected from respondents using household questionnaires, Key informants guide, observation checklists and focus group discussions. Data was analysed both quantitatively and qualitatively. It was presented using tables and figures as follows.

4.2 Demographic characteristics of the household heads

The demographic characteristics of this study included age and the number of people living in a household.

4.2.1 Gender of the Respondents

The study sought to establish the gender of the household heads. The results in Figure 4.1 revealed that 58.0% (223) were males while female sampled households were 42% (161). From these findings, it was deduced that males at 58% headed most of the households while females headed the remaining 42%. Just like in any other African traditional set up,

among the Turkana Community, males head households. Female-headed households were mainly due to the death of the male head leaving the widow to take care of the family (Ouma, 2011).

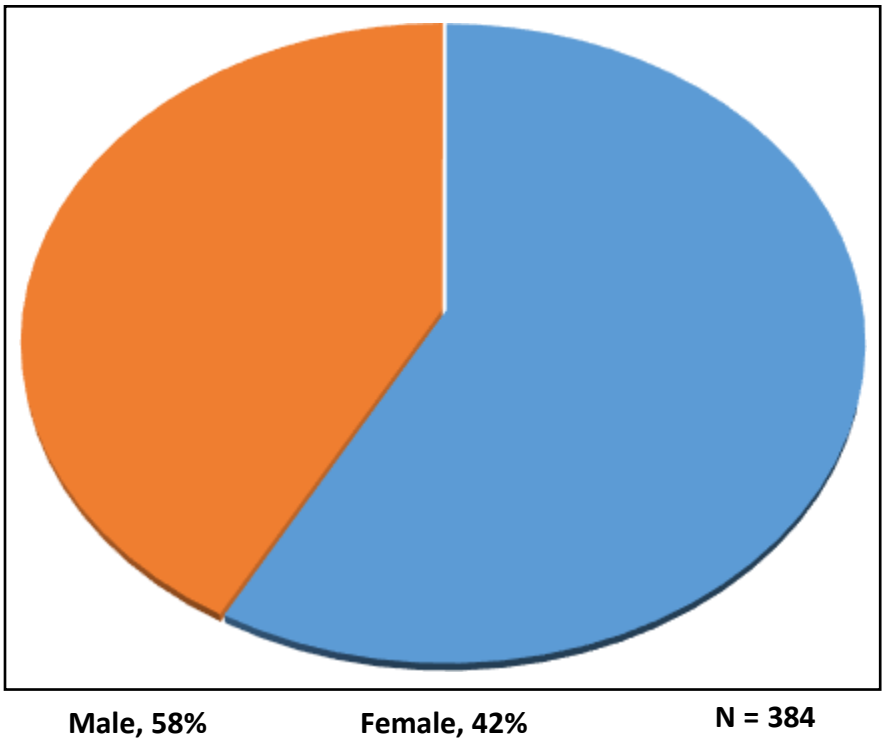

Figure 4. 1: Gender of the Respondents Source: Field Data (2019)

The findings were consistent with the KDHS 2014 study, which indicated that men are the major decision makers in most of the important household activities. According to KDHS 2014, only 20% of married women make decisions mainly on important issues such as household purchases, meaning that it mostly men who make key household decisions (KNBS, 2015).

The socio-economic status of men and women can be shown through ownership of assets. According to the KDHS 2014 survey, more men than women own and control assets and

as such, most women have to depend on men economically (KNBS, 2015). In this regard, this gender imbalance makes women more vulnerable to the impacts of drought and as such special intervention measures must be put in place to take care of the needs of women in Turkana central sub-county.

4.2.2 Number of People in the Household

The respondents were asked to state the number of people living in their households. The results were as shown in Figure 4.2. Figure 4.2 revealed that, majority of the sampled households had between 5 and 10 persons as shown by 55.7% (218) and 44.2% (166) respectively.

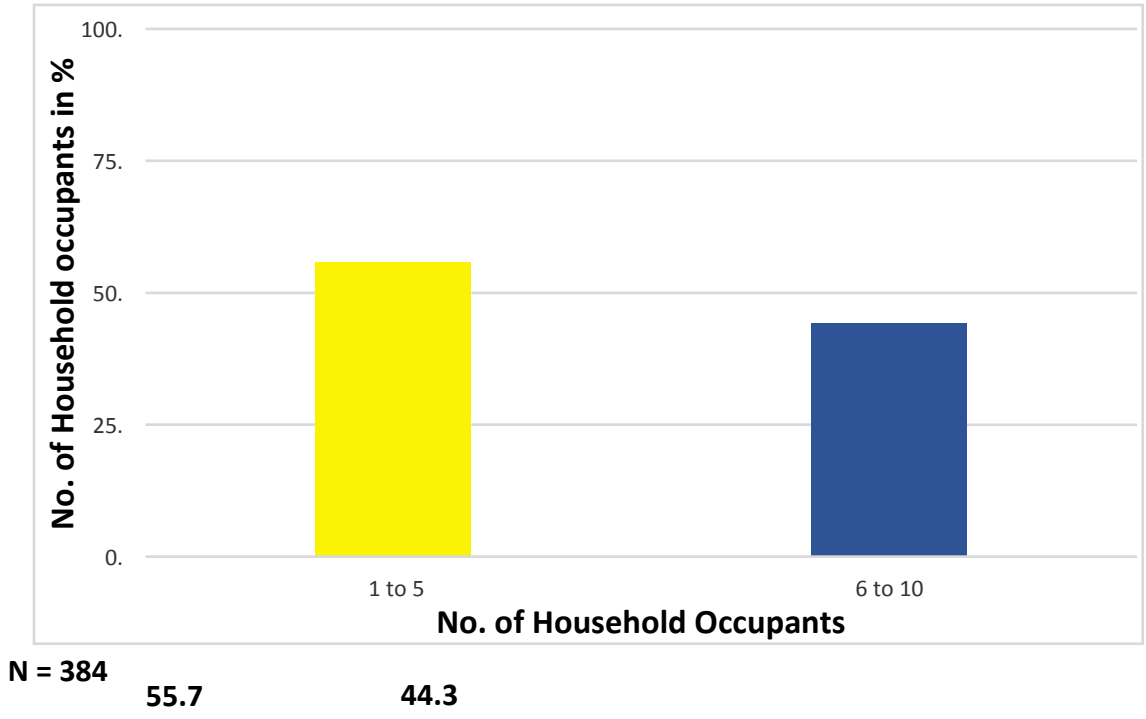

Figure 4. 2: Number of People in the Household Source: Field Data (2019)

4.3 Main Livelihood Activity

The study sought to establish the main livelihood activities of the household heads in Turkana Central Sub-county. The findings were as indicated in Figure 4.3. The results in Figure 4.3, revealed that 58% (223) of the household heads relied on Crop farming while 26% (100) relied on livestock keeping, 14% relied on social support while others at 2% relied on small businesses, brewing of local brew, selling of charcoal/firewood as their main livelihood activity.

The findings were in conformity with UNDP (2006) report which stated that over the years, pastoralist communities in Turkana central sub county have had to employ other supportive activities to supplement pastoralism, which had proved to be ineffective in meeting most of their economic and social needs. Key areas of activity include sedentary agriculture particularly a long Turkwel and Kerio rivers where settled farmers and agro- pastoralists grow maize, sorghum, Sukuma wiki, oranges, bananas and vegetables.

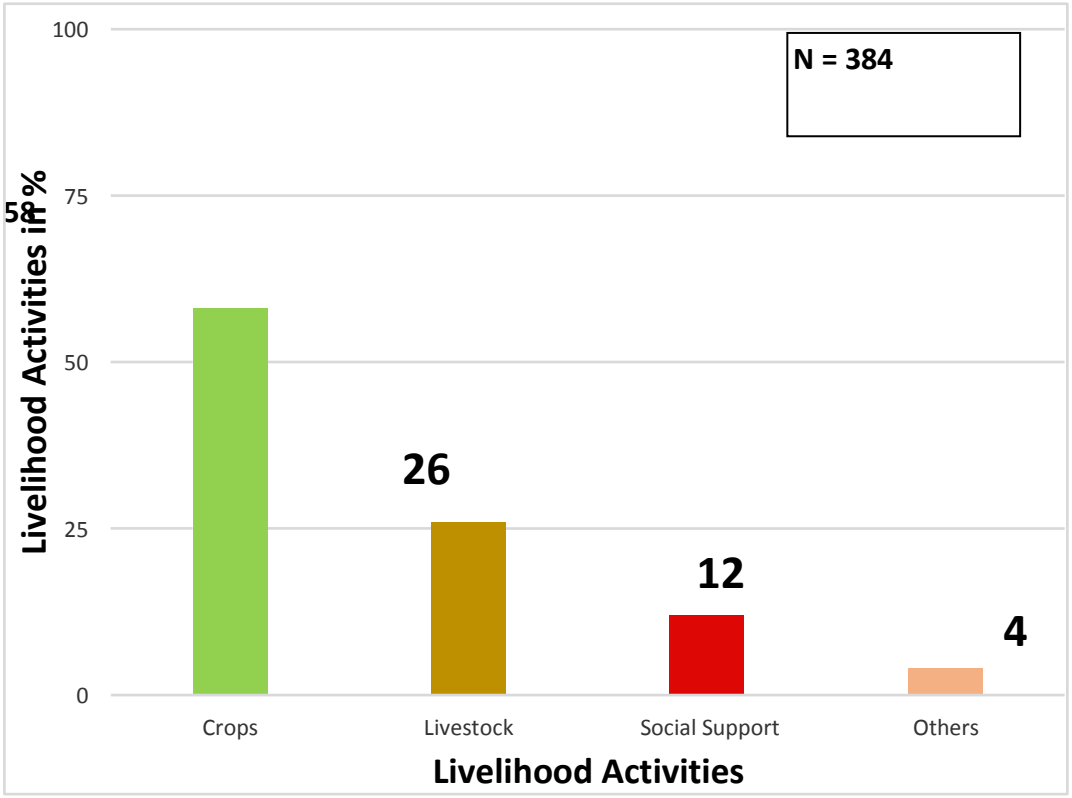

Figure 4. 3: Main livelihood activities in Turkana Central Sub-county Source: Field data (2019)

4.3.1 Crop farming

The most important crops grown under irrigation agriculture were maize and sorghum, which comprise about 80% of irrigated crops in Turkana County. These crops are normally cultivated on small acres of land and are mainly for household consumption although some could also be sold to meet other financial obligations such as paying school fees. According to (HEA Report, 2006) Irrigation schemes are just but a story about opening up opportunities for livelihood diversification in Turkana Central sub- county.

However, from year to year, production outcomes are highly variable and the schemes regularly require extensive rehabilitation efforts including de-silting of water canals, which is always a challenge to the residents owing to their low-income base. This could explain why other options like traditional livestock keeping at 26%, social support at 12% and others at 4% exist.

As revealed by these findings, majority of the households are moving away from traditional over-reliance on livestock keeping to sustainable crop production as a way of diversifying their sources of livelihood. These findings are also corroborated by studies (Ellis 1995), which suggested that livelihood diversification refers to processes by which households construct a diverse portfolio of activities and social support capabilities in their struggle for survival and in order to improve their standards of living.

4.3.1.1 Main crops grown by households

From the results in Figure 4.4 majority of the respondents cultivated maize as shown by 62% while 20% relied on sorghum, 14% on cowpeas and other types of crops at 4% respectively.

Maize, cowpeas and sorghum are the major crops cultivated by majority of the farms during the long rains season mainly in the Agro Pastoral livelihood zone (NDMA Drought Early Warning Bulletin, 2019).

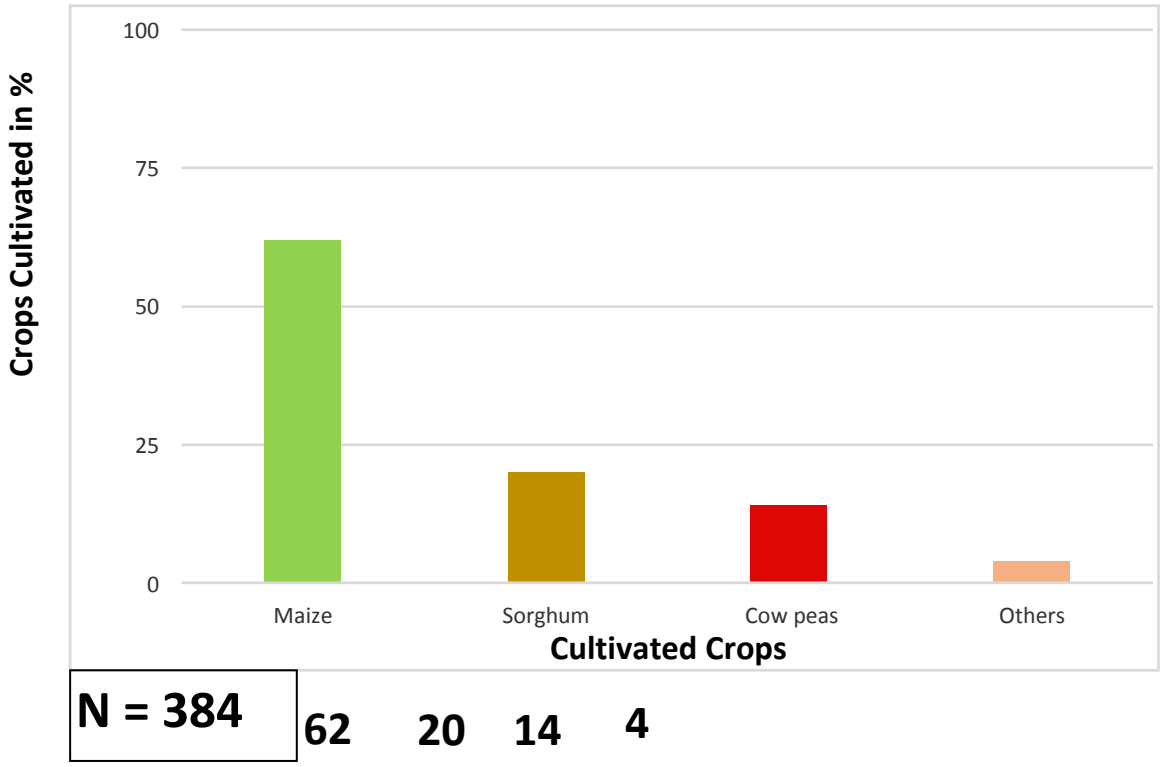

Figure 4. 4: Crops cultivated by households Source: Field data, (2019)

Earlier reports for instance by Turkana county Annual report on Agribusiness 2018 showed the type of crops grown, targeted acreage (HA), targeted production (90kg bags), Achieves (HA) and achieved production (90 Kgs bags) shown in Table 4.1 This pointed to the increasing reliance on crop farming as a source of livelihood.

Table 4. 1: Type of crops grown, targeted acreage (HA), targeted production

County	Crop	Targeted (HA)	Targeted Production (90 kgs bag)	Achieved (HA)	Targeted Production (90 kgs bag)
Turkana	Sorghum	750	21000	3153	24542
	Maize	670	18300	3276	47191
	Green grams	6	105	0	0
	Cowpeas	80	1200	0	0

Source: **Turkana County 2018 Annual Report**

A study by Njagi (2018) however revealed that, Impacts of climate change such as decreased crop yields, severe disruption of livelihoods opportunities, increased food prices, and exacerbate household vulnerability to food insecurity have pushed various communities in the world to seek ways of reducing their vulnerabilities. Hence in this study this is being done through diverse crop production and specific activity diversification. For instance, the rainfall in arid areas ranges between 150 mm and 550 mm per year, and in semi-arid between 550 mm and 850 mm per year, temperatures are high throughout the year with high rates of evaporation (Vision 2030, 2011).

As asserted by Ngugi (1999) and UNDP (2006) Crop farming in the study area has been possible due to irrigation agriculture and sustainability of maize varieties that are not only resistant to drought and hot weather but also crop pests. Many in this areas, practice irrigation agriculture with the sole objective of providing more water to crops when the rain has stopped, with little or no regard to the Best Management Practices (BMPs) for the systems at the back of their minds.

Due to the erratic and poor distribution of rainfall, patterns in Turkana Central sub county, majority of the households grew maize through irrigation. This was because this variety of maize could do well in hot weather and was the drought resistant type. It also took a short period to mature. It was also resistant to crop pests and did not require expensive farm inputs such as fertilizer for it grow. The other crop grown under irrigation was sorghum and others were Sukuma wiki, bananas, oranges and vegetables.

4.3.1 Livestock Keeping and Migration

From the study results indicated in figure 4.3, livestock keeping is rated at 26% yet this is a nomadic pastoralist community. Traditionally, Turkana community had relied on Pastoralism as their principle livelihood source and their nomadic system is believed to have evolved under variable climatic conditions, marked by multiple livelihood strategies deployed to meet changing environmental conditions (Blench 2000; Notenbaert *et. al,* 2007).

However, studies conducted by (Ouma,2011), revealed that the pastoral production system in the northern Kenya region is said to be in a critical situation in the sense that it had become unable to support the basic needs of people whose very survival is strongly

linked to the performance of this sector. This statement nonetheless seems to be in agreement with the findings of this study, as clearly demonstrated in Figure 4.3, which show that there is a paradigm shift in that only a paltry 26% of them still practice pastoralism through livestock migration.

As opposed to the practice before, most pastoralists prefer rearing small stock in the form of sheep and goats. Even then, goats are more preferable because goats reproduce faster and hence generate quicker returns on invested capital (Imana, 2011). Other authors (Heffernan and Misturelli, 2000) found goats to be a much more liquid asset than other livestock – one that could be utilized during an emergency.

These revelations were a clear demonstration of the impact drought has had on pastoralism as a livelihood activity. Like other nomadic communities, Turkana pastoralists had therefore been forced to diversify their sources of livelihood as a way of augmenting for the dwindling pastoralism fortunes in the face of recurrent and intensified drought.

As shown in Figure 4.3 also, a majority of them had embraced crop farming at 58 %, while the rest at 4% have engaged in other livelihood diversification strategies such as small business enterprises, selling of charcoal, selling of traditional brews, selling of aloe Vera, selling of firewood and seizing of employment opportunities either as casual labourers or on a permanent basis.

4.3.3 Diversification of Livelihood Sources

The respondents were asked whether they just relied on one main activity of crop farming or agriculture as a survival strategy against drought. Majority at 84% seemed to be specialized either on crop farming at 58% or livestock at 26%. Those who specialized in crop farming

Practiced diversification by growing more crops such as maize, sorghum, cowpeas as shown in Figure 4.4. Others collectively reported growing vegetable, bananas and fruits. Those who stated that they practiced livestock farming also indicated that they reared goats, cattle and sheep though the spread was skewed to goats and sheep. There are also those who diversified by engaging in small-scale merchandise or petty trade, this took the form of Kiosk Trade.

In this study, livelihood diversification refers to the processes by which households construct a diverse portfolio of activities and social support capabilities in their struggle for survival and in order to improve their standards of living (Ellis, 1995). Livelihoods in Turkana central just like in any other pastoral set up are primarily based on extensive livestock production and most cash earnings come from sales of livestock or livestock products (Barrett and Luseno 2004).

Indeed, approximately 70% of the human population inhabiting the area is nomadic or semi-nomadic pastoralists. However, the impact of drought, increasing insecurity, and famine has led to a growing emergence of sedentary Turkana and experimentation with alternative livelihoods. Pastoralists in Turkana, and East Africa in general, were increasingly pursuing non-pastoral income strategies to meet consumption needs and to

buttress against shocks caused by climatic fluctuation, animal disease, market failure, and insecurity (Little, 2001).

Figure 4.4, showed that livelihood diversification at 4% seemed to have been embraced by the Turkana central pastoralists as an alternative source of livelihood. Some of these livelihoods include: kiosk-based trade (Little *et al*., 2001), Natural resource-based livelihood diversification activities have also included the collection and sale of aloe (UNDP 2006), gum Arabic (Little *et al*. 2001), honey (UNDP 2006), wild fruits (ITDG 2005b), firewood (Little *et al*. 2001), and the productionand sale of charcoal (Little *et al*, 2001) and alcohol (Little *et al*. 2001; ITDG 2005a).

It is also good to note that the rationale of livelihood diversification ventures among the pastoralists have been the search for cash to meet other household financial obligations such as payment of school fees for the school going children (ITDG, 2005a). In addition, to take note is the fact that, among the Turkana community, gender is one of the key determinants of the options chosen for livelihood diversification (Little, 2001).

Studies by Field (2005), pointed out that single women with children are most likely to try new income generating activities, even though resources are limited and individuals possess low levels of human capital. In general, women tend to move into petty trade, namely, milk, *uji* (porridge), mandazi (buns), wild fruit, processing and selling fish and/or animal skins, charcoal, firewood, alcohol, weaving (mats and baskets) and offer their services to fetch water and undertake household cores (Nduma *et al*, 2000).

According to FAO (2016), in its annual report on climate change, agriculture and food security, observed that livelihood diversification could also help rural households manage

climate risks by combining on-farm activities with seasonal work, in agriculture and in other sectors. The same report also pointed out in all these cases, social protection programmes will need to play an important role in helping smallholders better manage risk, reducing vulnerability to food price volatility, and enhancing the employment prospects of rural people who leave the land.

4.3.4 Social support and protection network Against Drought

During interviews with Key informants and FGDS, another early recovery strategy for survival in the study area was seeking social protection funding. Social protection was through predictable cash transfers and it was observed to have been successful as a safety net for poor households just as it did with negative impacts of poverty of the 2017 drought that affected the horn of Africa (Merttens *et al*, 2013).

According to the majority of participants interviewed for this study, the cash from the HSNP and the CT-OVC is used to purchase food throughout the year, yet the proportion of the transfer spent on food increases particularly in the dry months.

For instance, according to HSNP (2012) the way cash transfer programs are designed can also increase the anticipatory capacity of national disaster response systems. The aim of social protection according to Bahadur *et al*. (2015) is meant to increase resilience of the target beneficiaries through adoptive, anticipatory and adaptive capacity to long-term and future climate change risks and also learn and adjust after a disaster.

Studies by (Merttens *et al,* 2013) have shown that social protection through HNSP have

had a positive impact on households ’ability to save and access credit. Similarly, investing in social networks, as well as livestock is a traditional risk management strategy for pastoralists and agro pastoralists who had always had to live with drought. As can be observed, Climate change, however, is increasing the frequency, duration and severity of drought and is putting these customary coping strategies under pressure.

CHAPTER FIVE

EFFECTS OF DROUGHT ON LIVELIHOOD OPTIONS AMONG HOUSEHOLDS IN TURKANA CENTRAL SUB COUNTY

5.1 Introduction

The second objective of the study was to examine the effects of drought on sustainable livelihood options among households in Turkana central sub County. In this section, the general effects of 2016/2017 drought was presented with key interest on the causes, trends in drought and the category of persons affected most.

The results were as indicated in Figure 5.1. The findings of the study revealed that, 51.5% of the respondents indicated that drought resulted to livestock mortality, while 25.5% said it resulted to food insecurity, 20% indicated water shortage, 3% poor nutritional diets respectively.

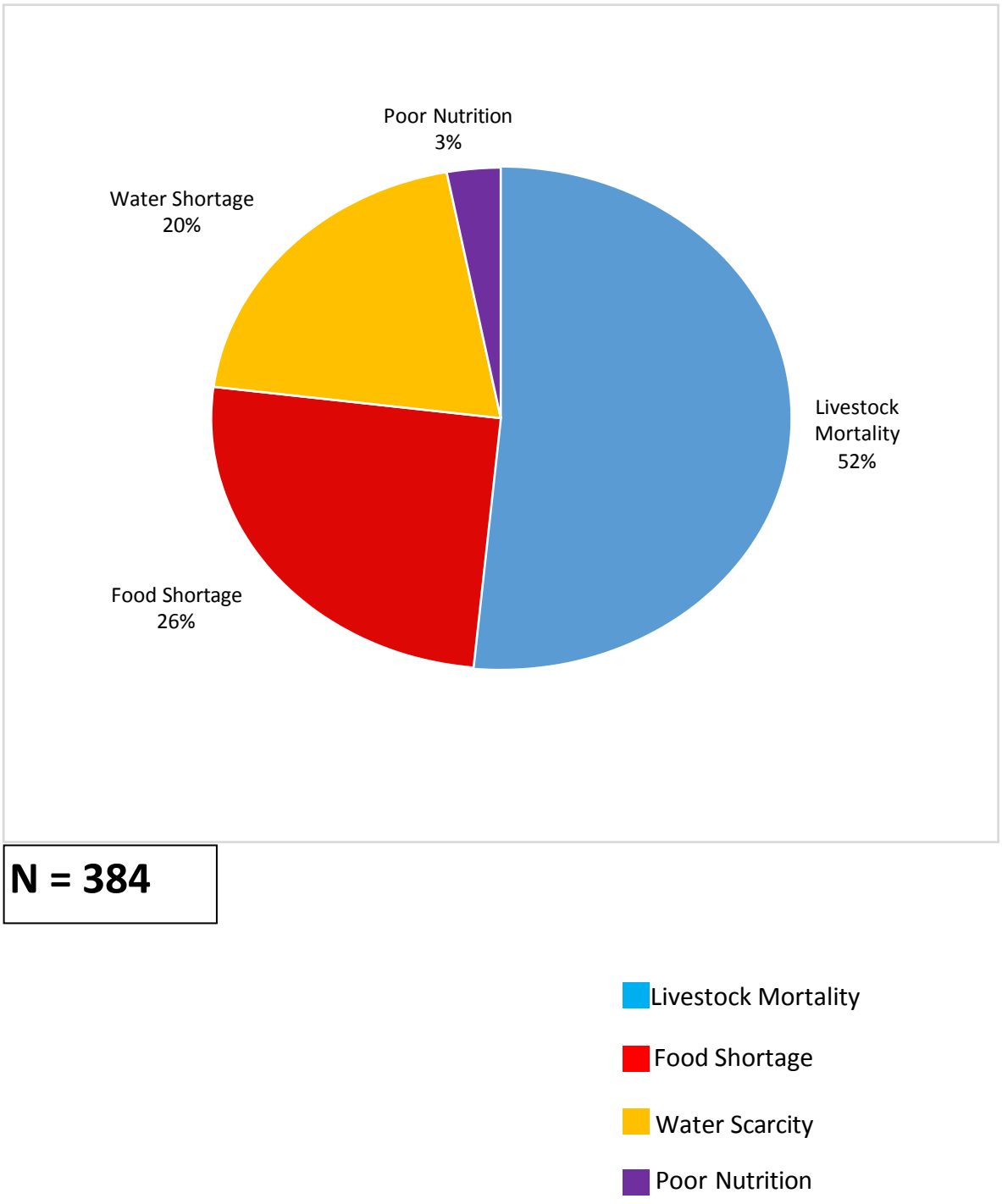

Figure 5. 1: Effects of Drought on Livelihood Options Source: Field data (2019)

The findings were in agreement with studies carried out by Makotsi (2014), which pointed out that drought affected more people than any other disaster in Africa and its consequences were as a result of many interacting factors such as poverty, high dependency on rain-fed agriculture, population increase, lack of natural resource management and inadequate economic development.

Lekapana (2013) in his study also noted that the socio-economic impacts of drought on pastoralists households includes: Livestock mortalities and morbidity, conflicts, food insecurity, reduction of livestock prices and increase in food prices.

This argument is also supported by a report from FAO (2011) which ranks drought as the single most common cause of severe food shortages, particularly in developing countries and represented one of the most important natural triggers of malnutrition and famine as it affects the four dimensions of food security-availability, stability, access and utilization.

Similarly, Tor (1995) and Fankhauser (1995) in their findings also confirmed that rural areas were more vulnerable to drought because the rural economy was tied to the agricultural sector, which has lower technology and where climate change was a factor whose substitutability was very limited.

Indeed, Mendelsohn (2001) also indicated that less developed regions were more likely to be vulnerable to climate change, due to the weaker capacity of local residents to adapt and recover from the drought impacts. Arid and semi-arid lands of Kenya, commonly called the ASALs, make approximately 80% of the country, and they are a home to one- third of the population. The primary challenge of these regions was how to ensure food security in a sustainable manner in such environments that are prone to drought and where climate

change increases unpredictability (GOK, June 2008).

5.1.1 Causes of Drought

The study further sought to find out the main causes of drought in the sub county. The results revealed that human activities had worsened the drought incidences in the study area. During the FGD interviews, it was revealed that drought had been in existence in the sub county for a very long time but had of late increased in frequency and severity. However, during FGD interviews, human activities like felling down of trees for charcoal burning, unregulated farming activities, overstocking and increased soil erosion were cited as some of the contributors to drought occurrence in the study area.

Results from interviews with key informants indicated drought, floods and locust invasion as the major hazards that had affected livelihoods in the region. However, drought was identified as the major hazard as its effects has had detrimental effects on the household income, livestock mortality, conflicts, and cattle rustling. One of the respondents indicated as follows:

> Drought has been necessitated or rather been promoted as a result of cutting down of trees for charcoal burning which in itself leads to desertification. Trees attract rain but when felled, rains cannot be attracted (Field data, 2019).

Nonetheless, the respondents managed to list some of the causes as follows in order of preference that was informed by their personal experiences and perceptions: Cutting down of trees for charcoal/firewood; Lack of information on occurrence of drought and early warning systems; Drying up water sources; High temperatures; Privatization of land; Lack of alternative sources of livelihoods other than pastoralism; Insecurity; Poor grazing

patterns.

Like other communities living in these ASAL areas, the Turkana have had a good understanding of drought and had even developed techniques to characterize major drought events with Table 5.1 providing an illustration. Research by the development organization Oxfam, (2002) revealed that the Turkana, a nomadic community in North- Western Kenya, named droughts in relation to their impacts. Thus, the 1960 drought is remembered as ❝Namotor" or ❝bones exposed" because of the high number of dead animals. Kimududu or ❝the plague that killed humans and livestock" occurred in 1970. Lopiar or ❝sweeping everything away" refers to the 1979/80 drought Mureithi (2012).

Table 5. 1: Description of drought events in Turkana County

Year	Local Name	Description/meaning
1950	Ng'wolojom	Hides: Sale of hides and skins
1952	Lokulit	A punishing/whipping drought
1953	Lotiira	Stagnant drought
1956	Eloch	Fog
1960	Namator	Herds and herders were emaciated
1961	Etop	A long tailed star was observed in the East
1970	Kimududu	People survived on little food/starvation after losing herds
1972	Kibekbek	All herds died from the drought
1973	Aribokinet	The drought of the solar eclipse
1980	Lopiar	Killed all herds
1990	Nakwajom	All households were covered with hides from dead cows White bones littered the landscape
1992	Ng'akima	Finger millet was distributed as relief food
1998	Kimiirik	Migrate further North
2000	Lagara	The drought killed all herds
2001	Kidiirk	Moving straight to other lands
2002-2004	Kanyangiro	Migration to Kanyangiro in Uganda
2006	Lomoo	PPR affected animals, drought named after the disease
2007	Ngasaj Epoo	Donkey with harness
1984	Kilejok	A repeat of drought as severe as the previous

Source: Mureithi, (2012)

5.1.2 Persons affected by drought and their vulnerability

The study sought to find out the impact of the incidences of drought on households and their livelihoods. The results were as shown in Figure 5.2. The results revealed that majority of those who were affected by drought were the elderly at 46% while disabled at 28%, pregnant and lactating mothers at 22% while orphans at 11% respectively. Other groups included the unemployed persons, widows and infants at 1% each.

The study revealed that this group of people was vulnerable to drought due to their socio-economic characteristics. The root cause of their vulnerability included lack of social support, lack of employment, high inflation, lack of sources of income, poor nutrition and poverty. It is worthwhile to note that Turkana central sub County registers low socio-economic indicators, which makes the residents vulnerable to the effects of drought.

Also during the FGD interviews, the study established that the level of poverty amongst household was high and when drought occurs, most of the households were affected negatively as they had no other source of income apart from agro pastoralist produce, which were also affected by drought.

The study further indicated that there were few employment opportunities especially to the youth. Because of their unique needs, these people often face barriers in accessing healthcare services and in receiving timely public health or emergency information in an accessible format. Additionally, many people with disabilities experience high rates of

social risk factors that contributed to poor health, such as poverty, unemployment, and lower education.

According to UNSDR (2009), economic losses to disasters have been increasing world over due to increasing vulnerability. Also, Oxfam (2016) seems to be in agreement thus recurrent droughts have destroyed livelihoods, triggered local conflicts over scarce resources and eroded the ability of communities to cope. Families were always on the move because of drought, which poses protection risks for women and children.

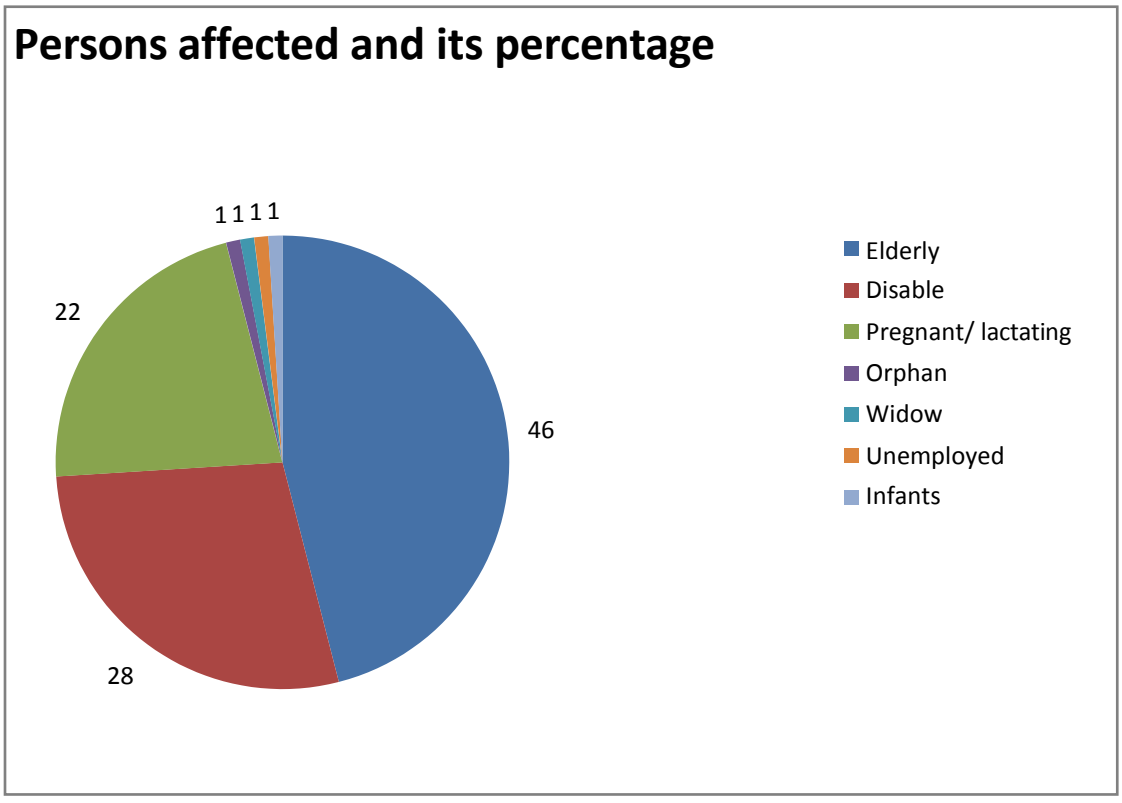

Figure 5. 2: Person affected by drought and their vulnerability

Source: Field Data, (2019)

5.2 Effects of drought on Education

The study further sought to establish the effects of drought on education. The respondents were asked to indicate the number of school going children affected by the 2016/17 drought by age. The results in Table 5.2 revealed that majority of the respondents were having children aged between 12 and 16 years of school going children as shown by 23.4% (90), 20.8% (80), 18.2% (70), 15.6% (60) respectively, while others had children aged 11,17 and 18 years had 5.8% (20), 2.6% (10) and 1.04% (4) in that order. According to ADB (2011), water and sanitation are among the priorities of the world.

The United Nation's Millennium Development Goals (MDGS) included the target to reduce by half the number of people without sustainable access to safe drinking water and basic sanitation by the year 2015. Also, studies by M`Nyiri (2014), revealed that availability of adequate clean and safe water is necessary for the day-to-day running of schools as it is used for drinking, maintaining school hygiene in the classrooms and toilets as well as cooking food for learners.

However, in the event of drought in ASAL areas like Turkana Central, the available sources of water sometimes dry up compromising school operations and learner participation (Save the Children UK, 2010).

The findings were also corroborated by similar studies by Odaga and Haneveld (1995) which concluded that children in rural areas in Kenya were likely to miss out of school as a result of social-cultural and economic factors such as engaging them in agricultural work, domestic work such as cooking, collecting wood for fuel and hawking water especially

during the drought period. These practices have had a negative impact on children participation and enrolment in school especially in arid and semi-arid areas.

Some African cultures also do not value a girl's education when severe drought starts to take effect. Girls are more affected than boys as in some cultures, they have to drop out of school to care for their younger siblings as their parents travel long distances looking for food and water Ndichu (2013).

According to a report by World Vision international (28th February, 2017) on the Impact of drought on education in Baringo county, the impact of drought on education is due to the fact that there is migration of families to other areas in such of food and pasture for livestock. This normally causes a significant number of children to drop out of school and when the drought persists a number of schools are closed altogether.

Similarly, the same observations were made by NDMA in their *2017 Turkana County Long Rains Food Security Assessment Report* where it was reported that migration had affected boy child more than the girl child. This is because during drought, the boy child drops out of school to accompany their fathers in herding family animals in search of water and pasture.

Equally, a report by Oxfam GB (December, 2017) also indicated that early marriage incidences among the school going age children usually increases during drought period. This is because hunger forces families to marry off teenage girls to anyone who could manage to pay dowry.

According to NDMA *2017 Turkana County Long Rains Food Security Assessment Report*, the transition rate from ECD to primary is almost 100% as at this stage parents are still not keen on their children taking active role in household chores. The same report however, suggested that the transition rate from primary to secondary schools drops to about 70%. According to the respondents interviewed, the low transition rate is largely attributed to lack of school fees due to low livestock prices and crop production failure (for households which depend on food supplies to schools for fees).

Table 5. 2: Number of School Going Children affected by drought in 2016/2017

Age of children	**Frequency**	**Percentage**
11	20	5.8
12	50	13.02
13	80	20.83
14	90	23.44
15	70	18.23
16	60	15.63
17	10	2.6
18	4	1.04
Total	**384**	**100**

Source: Field Data, 2018

5.4 Effect of Drought on Human Health

The study sought to find out the effect of drought on human health in Turkana central sub

County. The results revealed that drought has had profound effects on both the children and adult health, which limited their participation in productive livelihood activities. Few of the sampled household respondents were able to relate health related effects of children under five years with drought. However, majority of the respondents identified malnutrition at (52%), diarrhea diseases (21%), eye infections (11%) and malaria (9%) respectively as the main effects of drought on human health.

Only a paltry of the respondents at 3% cited other unidentified diseases, which were also associated with the effect of drought on human health. During FGD interviews, it was noted that drought had affected food production, which had negative effects on nutrition of children under the age of five years in the county. Drought was also associated with increase in insect infestations for both animals (human and livestock) and plants. The discussant indicated that increase in temperature had resulted to increase in tropical diseases such as dengue and malaria, which limited their participation in livelihood options such as trading and charcoal burning.

The findings of this study were in agreement with Stanke *et al.* (2013) who opined that drought caused Distress or ‘emotional consequences ’whose indicators were the most often measured as drought-related mental health outcomes; depression, anxiety and post-traumatic stress disorder, mostly affecting rural populations whose livelihoods (i.e., farming) are environment-dependent.

In further agreement with the results of the study Renzaho (2007) opines that the malnutrition/mortality impacts of drought are often indirect and complex. In the simplest case, drought affects ecosystems, thereby reducing food supplies (principally crops and

livestock). This in turn reduces quantity and/or quality of nutrient intake, which leads to greater vulnerability to illness, which can increase mortality risk.

For example, during a 1973-4 Ethiopian drought, distribution of malnutrition did not always reflect drought's effects on food supply: the drought-affected North Ogaden area showed high malnutrition prevalence but the Issa desert did not. Issa, however, while having lowest rates of malnutrition among the areas studied also had the highest mortality rate. This statement was a clear evidence that drought, had indirect effects on livelihood options such as trading and crop production under irrigation.

Further discussions with respondents through the FGD revealed that drought led to reduction of household incomes as households were forced to spend the little cash on medication, the money that would have been invested in crop production and trading. Participants also revealed that drought resulted to increase in human diseases, had been found to affect social support systems in Turkana Central Sub County. Households were unable to get help from relatives and friends due to widespread effects of drought, as everybody was a victim of drought impacts.

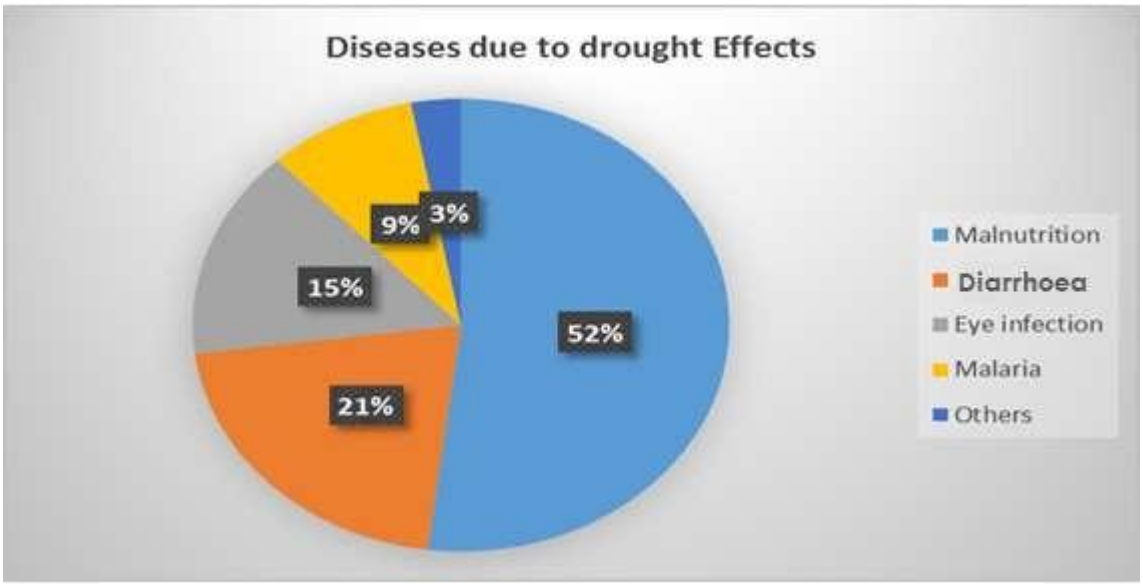

Figure 5. 3: Effect of drought on human health

Sources: Field Data, (2019)

5.5 Effect of Drought on Peace and Security

The study also sought to find out the effect of drought on peace and security. Even though peace and security was not classified as livelihood options, but the researcher noted that peace and security affected livelihood options due to drought. It was found that insecurity as results of drought had affected livelihood options such as petty trade, crop production under irrigation and livestock production.

Turkana central was found to be relatively safer except areas bordering Turkana East Sub County where incidences of cattle rustling do happen. However, it was important to acknowledge that during the drought period, there were always incidences of conflicts between pastoralists and agro pastoralists. Due the effects of drought, pastoralists ' animals sometimes stray to agro pastoralist's farms and cause damage to crops. This in most cases

resulted to conflicts although it was normally resolved through traditional arbitration mechanisms including compensation of the lost crop. Over half of the respondents 61.5% revealed this. It was revealed that drought had resulted to increase in conflicts, which had profound effects on petty trade such as retail business, charcoal burning among others. One of the discussant during FGD indicated that:

> During drought, there is conflict over resources such as pasture and water. This normally disrupts the peaceful coexistence and sharing of these resources during drought situations (Field data, 2019).

The findings of the study were in agreement von Uexkull *et al* (2016) who argued that drought had consequences that greatly affected the peace and security in affected communities. They argued that Poverty and low economic development were generally associated with low coping capacity and limited outside options in the wake of a drought, increasing the incentives for protest and rebellion. In their study, it emerged those ethnic groups that were politically marginalized or subject to outright discrimination were overrepresented among actors in armed conflict. Aside from its direct effect on opportunities and motivation for protest, the configuration of political power may also exert an indirect influence on conflict propensity by denying or restricting assistance and compensation to excluded groups in the wake of climatic disasters, thereby increasing frustration and animosity toward the central government.

From above the statement, the researcher noted that indeed drought had effects on livelihood options due to the disruption of normal businesses which some of the household depended on. The results further revealed that reduction of income from other livelihood sources such

as livestock has resulted to increase in robbery and banditry as youth resort to these vices to support their families.

According to a report by GOK (2014) on *Ending Drought Emergencies* in counties such as Turkana, repeated surveys and assessments have noted that one of the obstacles to resilience is conflict, which curtails mobility and trade, it hurts investment and services, and makes prime grazing inaccessible.

5.6 Effect of Drought on Households

The study also sought to find out the effects of drought in Turkana Central on household income. In this case, the study investigated effects of drought on income from crop production, livestock or animal products, selling of firewood or other natural resources, employment in government or private sector, daily labour in agricultural activities as well as non-agriculture, petty trade, remittance and cash transfer such as HSNP, OVC etc.

5.6.1 Effects of Drought on income from Crop production

The study sought to establish the effects of factors affecting in crop production with specific reference to maize production which was the most commonly grown crop in the study area as revealed in the previous chapter (Figure 4.4.) The results were as shown in Figure 5.4. The results revealed that drought affected crop production at 34.6% (133) of sampled households while pest and diseases affected of 15.0% (58). Other factors identified at 17% (193) include poor farming practices such as late planting, poor agricultural extension services and nature of the soil.

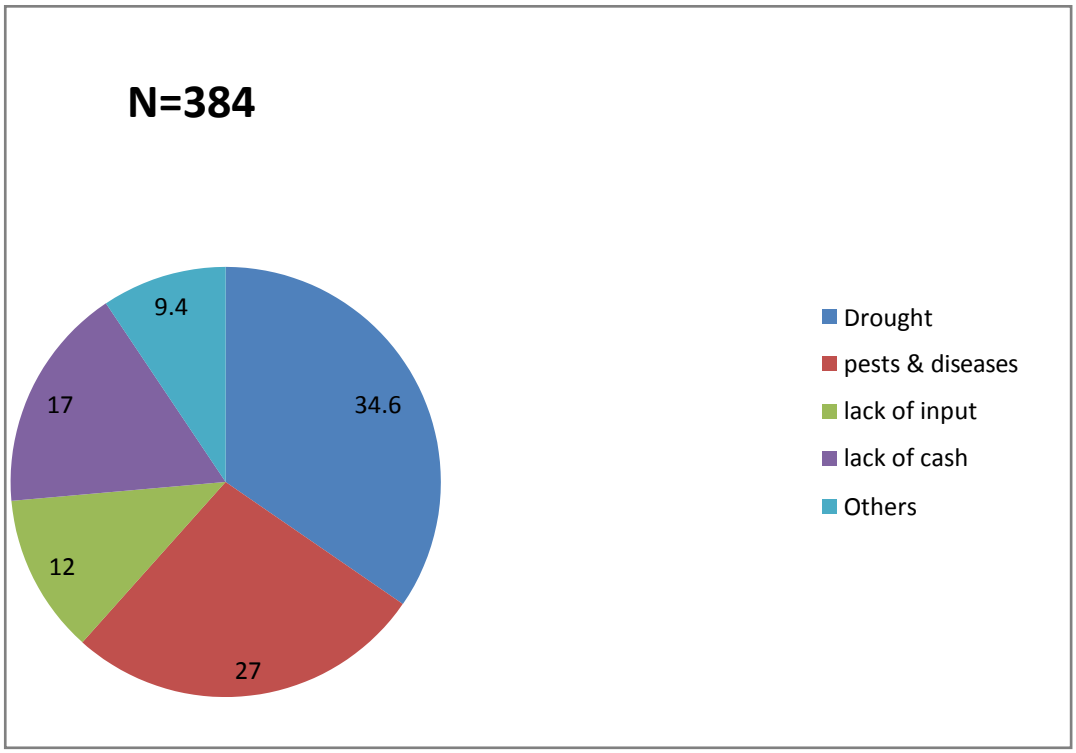

Figure 5. 4: Main Causes of Affected Crop Source: Field Data, 2019

In this regard, the results revealed that there was reduced crop production during drought as opposed to when there was no drought in the area. Therefore, in as much as other factors affected the production of crops, drought had the greatest impact. The significant reduction of crop production by drought meant that those farmers who relied on crop production as the key livelihood activity faced reduced income due to drought, a fact that emerged during an FGD meeting in Kerio. During the FGD, the researcher noted that drought, decreases household income especially from those households, which depend on natural resources like rainfall. One of the discussants said that:

> During drought, I witnessed reduction in crop yield from maize and sorghum. This affected my household income from crop farming with a reduction of up to 90% (Field data, 2019).

From the above statement, it was evident that drought had affected income from crop production. From this list also, it was clear that different crops are grown in Turkana central sub county. However, while discussing crop production, only maize crop featured prominently signifying its importance to the households especially during drought situations. The crops affected by drought were maize, millet, sorghum, fruits, vegetables and other pulses. This also affected income from daily labour in agricultural activities.

The study further revealed that that there was reduction in employment opportunities in agricultural activities. A part from that, income from livestock production also reduced due to reduction in animal and animal products. They were forced to sell their emaciated livestock at low prices, which led to low income. Income from milk and eggs was also affected by drought. There was also reduction in petty trade as households were unable to afford goods on cash basis and resorted to credit which in some cases, they failed to repay. This forced business people to close down their businesses resulting to lose of sources of income eventually resulting vulnerability to the effects.

The results of the study were consistent with those of a study by Udmale *et al* (2015) who argued that the 2012 drought in India resulted in devastating impacts on agricultural crop production and livestock. Respondent households suffered an average reduction of about 86% in the production of major crops. The extent of irrigation played a key role in mitigating drought damage to crops. The production of major crops showed an increasing trend with access to mixed and irrigated farming systems during normal as well as drought years. This shows the importance of bringing more crop areas under irrigation to increase farmers' adaptive capacity to drought. Households with rain fed farming systems, small to

marginal landholding size, and low income were found to be more vulnerable to drought. Drought threatened their household food security and income. However, households with irrigated and rain fed farming systems, large land holding size, and high income were able to cope with drought-driven household food insecurity.

The scholars further argued that crop failure subsequently affected livestock rearing and rural employment activities, resulting high reductions in on-farm unskilled employment opportunities and an increase in unskilled labor in off-farm rural employment activities. Drought caused severe decreases in the annual income of respondent households and resulted in financial hardship, forcing them to seek alternative source of income (off-farm employment) or loans with high interest rates. On average, a respondent household reported a decrease of 85.4% in annual income from crop production and livestock and was found to be availing loan amounts approximately equal to the respondent's normal annual income (INR107 000). This explains the severity of drought impacts on farmers' income and the financial hardships faced by farmers due to drought.

5.6.2 Effect of Drought on household Food Security

The study sought to find out the effects of drought on household food security. The study focused on establishing how drought had affected livestock and crop production in Turkana central sub County. As indicated in Figure 5.5, majority of the sampled household heads indicated that they were forced to purchase food on credit 30% and 26.67% sold their agricultural assets. The results also revealed that 12% consumed seed stocks, 14.1% lease land and 19.17% sold productive assets.

Results from the FGD and household interviews supplemented results in the Table 5.6. The qualitative data indicated that most of the household were forced to purchase food on credit

due to reduction in income as a result of drought. One of the shortcomings of

purchasing food on credit was that it was not sustainable in the long run and repaying of debt meant that some households were either forced to sell other household assets to repay the debt risked being reported to the chief which could even attract a jail term unable to invest full in livelihood option such as crop farming. One of the discussants said that:

> Scarcity of food during drought forces majority of us to get food on credit. When debts accumulate, we are forced to sell our household and agricultural assets to repay the debt and at same time make new credit with traders. When drought ends, we are unable to participate in crop farming (Field data, 2019).

Studies by UNDP (2007) suggested that Agriculture supports up to 75% of the Kenyan population and generates almost all the country's food requirements, which in turn depends on rainfall. However, Mugalavai *et al.* (2010) observed that only about 12% of Kenya's landmass is of medium to high agricultural potential due to adequate and reliable rainfall. According to studies carried out by Lolemtum *et al*., (2017), household food security is a critical issue in Kenya due to its magnitude especially in ASALs that comprise 88% of Kenya's land area.

From the above statement, it was deduced that the effects of drought on household food security had cyclic effects on livelihood options in Turkana central sub County. Selling of productive assets to buy food or to pay off debts, jembes, seeds and other equipment-affected livelihood options especially agriculture. Similarly, leasing of productive agriculture land during drought to get income reduced the acreage under crop cultivation during normal periods. The discussants revealed that it was common to see households go for a day or more without food yet there was land that could be leased out so as to buy food.

This was also reflected on selling of the household assets such as bicycle, which may be otherwise, be used to hawk milk in normal period in urban areas of Turkana Central and neighboring sub counties.

It was noted that food insecurity had negative effects on livelihood options in Turkana central sub County as households were forced to consume seeds and income, which was supposed to be re-invested in livelihood options such as food production and trading. Wilting of crops, stunted growth and crop failures, all caused by droughts, were the major causes of low crop yields in the study area. During drought periods, households in the study area consumed all harvested yields together with seeds preserved planting seeds. One of the discussants said that:

> When the drought continues for long period than anticipated, we are forced to consume seed stock for the next planting season. In some homesteads, the hybrid seeds are washed to remove chemicals and boiled for eating. This practice is dangerous and harmful to human health and there is therefore need for awareness creation. Therefore, when rain comes we lack seeds but this has to be blamed on the effect of drought (Field data, 2019).

This means that during normal period they were forced to seek for planting seeds so as to provide food crops to their families. The study revealed that residents had to depend on NGOs, the County government and National government to provide farm inputs. However, the aid from government usually came later when the rains had started. It was also noted that planting late coupled with the effects of drought also resulted to emergence of locust, which negatively affected crop production. The results also revealed that those households, which heavily relied on food crop as their main source of livelihood, were affected negatively by drought. Massive crop failures incapacitate farmers, forcing them to reduce

the acreage under subsistence agriculture, which further increases food insecurity in the area of drought.

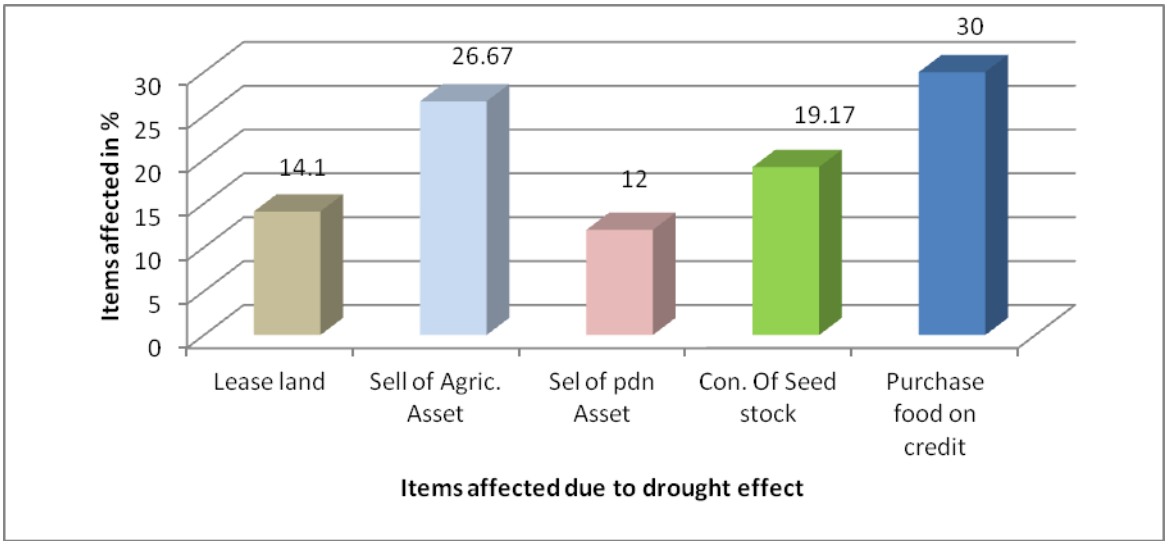

Figure 5. 5: Effect of Drought on Food Security Source Field Data, (2019)

5.7 Effect of Drought on Environment

The study also revealed that drought has had effects on the environment, which negatively affected livelihood options in Turkana central sub County. Environmental degradation is accelerated during periods of drought due to poor land use activities such as cutting down of trees for fuel; wood and charcoal burning for income and overgrazing in the available wet lands. The human factor in environmental degradation does not allow the environment to recover even after the end of the drought period. In some areas, droughts catalyze desertification, leading to loss of biodiversity and other natural resources.

The researcher established that environmental degradation as a result of drought has resulted to reduction in crop farming and livestock production. This was observed during interview where it was revealed that environmental degradation as a result of drought had affected crop production and livestock production in Turkana central sub county, the same sentiment

was revealed during FGDs where discussants indicated that the uncontrolled cutting down of trees for fuel as a result of reduction in income from livestock products has had negative effect on the environment. One of the discussants stated that:

> **“**Drought has resulted to decrease in income from normal livelihood (livestock production) which has forced the local residents to cut down trees for charcoal burning and firewood. This in itself has resulted to loss of vegetation and soil erosion in the long run has affected crop production” (FGD, 16/08/2018)”

CHAPTER SIX

EVALUATION OF EFFECTIVENESS OF EARLY RECOVERY STRATEGIES IN USE AGAINST DROUGHT IN TURKANA CENTRAL SUB COUNTY

6.1 Introduction

The third objective of the study was to evaluate the effectiveness of the drought early recovery strategies in influencing sustainable livelihood options among households in Turkana central sub county. The chapter presented the effects of drought on livelihood options with great emphasis on the early recovery strategies identified in chapter four such as crop farming under irrigation, livelihood diversification, sending children to school, social protection programs, livestock keeping/migration and social support network. The analysis undertaken in this section was to identify the effectiveness of the drought early recovery strategies used by the communities in Turkana central sub County to augment shortfalls occasioned by drought episodes. During the study, drought early recovery strategies were analysed to determine whether they were able to withstand, cope and recover from the effects of drought.

6.2 Crop Farming as an Early Recovery Strategy

The study sought to find out the effectiveness of crop farming as an early recovery strategy against drought. The household heads were asked to state whether crop farming was either sustainable or beneficial, as an early recovery strategy. Based on their perceptions, the results were as shown in Table 6.1.

Table 6. 1: Crop farming as an early recovery strategy

	Frequency	Percent
Sustainable	223	58.0
Beneficial	161	42.0
Total	384	100.0

Source: Field Data, 2019

The Findings in Table 6.1 revealed that 58% (223) stated that crop farming was a sustainable early recovery strategy against drought with 42% (161) opining that crop farming was beneficial as an early recovery strategy. Based on the results it was evident that majority of the household heads were of the opinion that crop farming was an effective early recovery strategy against drought in Turkana Central Sub County. In support of the results from the household heads, a key informant from the County government of Turkana revealed that:

> Crop farming had become an important source of livelihood in Turkana County. The farming types were mainly early maturing forms of grain crops such as sorghum and maize breeds. Settled farmers and agro-pastoralists grow maize, sorghum, and vegetables. The need for grains by pastoral household is rapidly growing as the milk production decreases and the need for energy rich foods rises. Farming was also supported by the county government efforts and other development partners through irrigation systems and provision of farm inputs such as seeds and farm implements (Interview with an official from the Ministry of Agriculture and Irrigation, Turkana County, 20th June 2019).

Additionally, it was found that, during drought, some households depended on farming for up to 100% of their household needs as revealed during the Interview, where one of the Key informants opined that:

> Many households have benefited a lot from crop farming to cope with the effect of drought. We are able to afford at least one meal per day courtesy of engaging in crop farming (Interview with an Assistant Chief, 10th June 2019).

The results were further supported by FGD participant views in Kerio Sub-location. One of the participants opined that:

> With proper strategies, crop production can achieve maximum sustainability through support and promotion of irrigation technology, best farming practices and investing in agro- ecological zones (an FGD Participant from Kerio, 11, June 2019).

In agreement with the findings, the Turkana County LRA Report (2017) revealed that Crop production contributes 60 and 40 percent to food and household income respectively. The report further suggests that the County is dependent on long-rains accounting for approximately 70 percent of annual crop production with maize, cowpeas and sorghum being the major crops grown.

The findings of this study are also in agreement with Ogenga *et al.* (2018) who argued that Maize crop is considered the staple food in most parts of Kenya, thereby indicating that availability of this particular food crop means there is food security. The scholars further argue that, Maize crop tends to experience extreme sensitivity to water deficit, during a short critical period, from flowering to beginning of grain filling phase, maize crops are more sensitive to the drought related climatic factors than other crop types in water stressed

regions yet in the eyes of the rural small scale farmers, lack of maize means hunger and famine. In this regard, Irrigation and the use of fast maturing crops is a possible sustainable solution to drought problems in Turkana Central Sub County since the issues of hunger and famine will be seen as matters of the past in situations where crop farming is embraced.

6.3 Livestock Migration as an Early Recovery Strategy

The study sought to find out the effectiveness of livestock Migration as an early recovery strategy against drought in Turkana Central Sub-County. The household heads were asked to state whether Livestock migration was either sustainable or beneficial as an early recovery strategy. Based on their perceptions, the results were as shown in Figure 6.1.

The results in Figure 6.1 revealed that 84% (322) of the household heads opined that livestock migration was beneficial while 16% (62) suggesting that it was sustainable. In this regard, it emerged from the study that in as much as majority of the household heads viewed livestock migration as beneficial, they however, did not think it was sustainable as an early recovery strategy against drought.

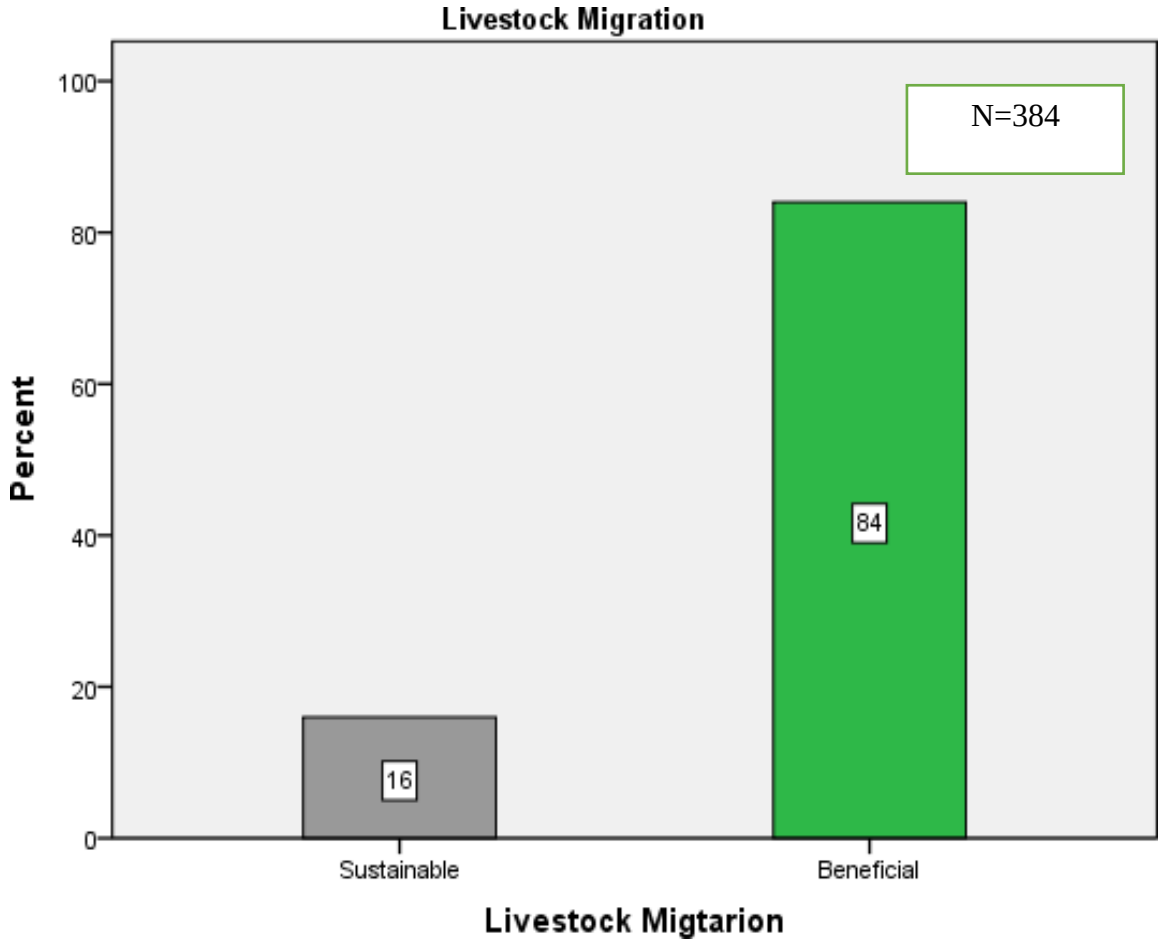

Figure 6. 1: Livestock Migration as an Early Recovery Strategy Source: Field Data, 2019

However, the Findings from FGDs were twofold, with some concurring that livestock migration was an effective early recovery strategy while others said that it needed to be embraced with caution since such movements caused conflicts that in most instances resulted into loss of lives for both humans and livestock.

In support of livestock migration, one of the discussants for instance said that;

> Livestock migration has resulted to reduction in the loss of livestock as a result of drought and scarcity of water and pasture. During this time, animals can be migrated to resource rich areas

> where they could calf, increase their productivity and improve their general body condition which when sold could fetch good prices for the households to buy food. (FGD Participant at Nang'olekuruk, on 13/06/2019).

These sentiments were echoed by studies by Field, (2005) which suggested that the traditional strategy of pastoralists is to move to areas with higher rainfall, and then return to traditionally dry areas when the rain arrives and both pasture and browse is renewed. The same study reiterated that several factors are severely compromising this long distance movement of livestock, i.e. establishment of national frontiers, increased frequency of droughts, growing human and livestock numbers, insecurity and encroachment into traditional dry season pasture by agro- pastoralism.

However, the same author in another study on *pastoralists and their promoters* confirms the availability of droughts grazing areas and existence of conflict resolution committees. This finding also coincided with findings by Ebei et al. (2007), who stated that in the drought prone region of Turkana, grazing areas scarcity and insecurity from raids are the main contributors to livestock losses.

In support of Field (2005) findings, Notenbaert, *et a*l. (2008) established that grazing could be secured by making arrangements with neighbouring countries to reduce stress on the herds, while combating raiding through gun running where the region may require better regional security.

On the other hand, another discussant from a different FGD was of the opinion that livestock migration was to be embraced with caution due to the challenges it had been associated with in the past, He said that:

> Although livestock migration has helped the pastoralist community by saving animals from dying due to drought, we must be alive to the fact that it has also made us lose lives due to conflicts occasioned by competition over water and pasture resources (FGD Participant at Soweto, on 20/06/2019).

Despite its immense benefits as espoused by the respondents in this study, mobility is, however, affected by many factors. These include the type of relations that exist between local groups, which live in or around drought refuge areas; long, distance movement, which results in heavy loss of livestock; the existence of livestock disease risks, which delay movement to drought-refuge areas or result in heavy losses of livestock (Ahmed *et al*, 2002).

However, according to studies by Notenbaert, et al, (2008), pastoralists usually employ a number of coping strategies against ravaging effects of persistent drought. Such strategies include slaughtering livestock and preserving the meat, the preservation of grazing areas for times of extreme drought, division of large herds into smaller units and species, stock loaning between relatives and friends, collection of wild fruits and bartered cereals, and begging for food.

6.4 Food for Education as an Early Recovery strategy

The study sought to find out the effectiveness of provision of food to school going children to promote education as an early recovery strategy against drought in Turkana Central Sub-County. The household heads were asked to state whether providing food in schools for their children to boost attendance was either sustainable or beneficial, as an early recovery strategy during drought period. Based on their perceptions, the results were as shown in Figure 6.2.

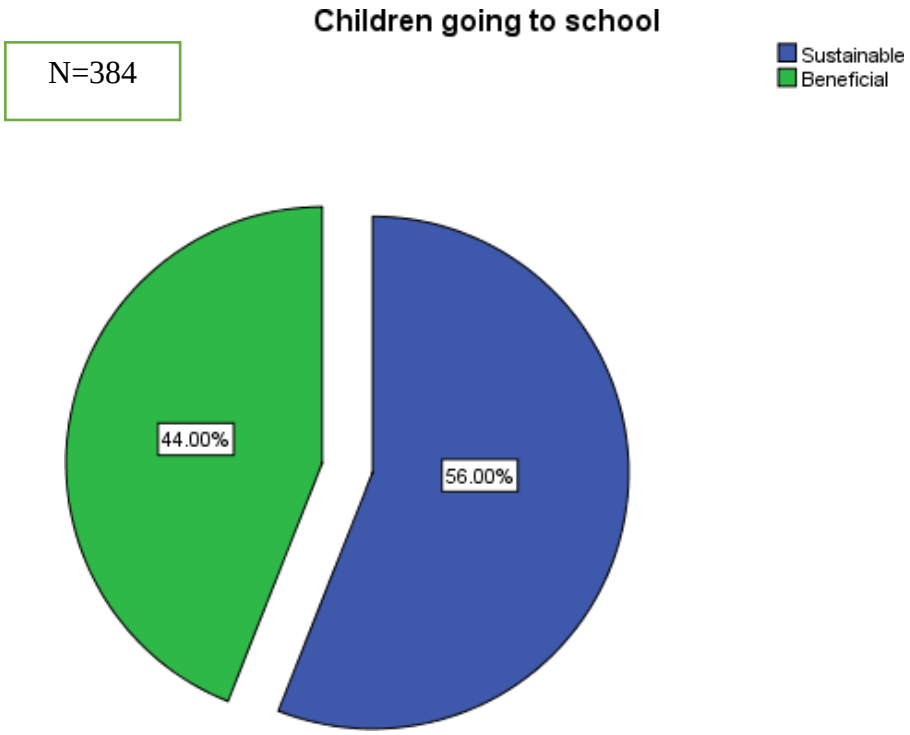

Figure 6. 2: Food for Children Going to School

Source: Field Data, 2019

The findings in Figure 6.2 revealed that 56% (215) of the household heads opined that Education (their Children going to School) was a sustainable early recovery strategy against drought while 44% (169) suggested that it was beneficial.

In support of the results from the household heads, an assistant Chief said that:

> In my sub-location, it is evident that those homesteads where people are more educated and working, I can attest that the effects of drought are normally not severe as compared to those with little or no education. This is because those who are educated are more economically independent and as such are able to support their families during these hard times (Interview with an Assistant Chief on 10th June, 2019).

During FGDs, it emerged that some parents took their children to school to get food especially during drought situations. This therefore, relieved them the burden of fending for their children during the period of scarcity. One of the discussants said that:

> School going children are somehow well off during school days but during weekends and school holidays, they face the wrath of drought just like any other family member in the household (FGD Participant from Soweto, 20th June, 2019).

In support of the results from the FGDs, an interview with an official from Mary Meals an NGO based in Lodwar, revealed that it was useful to provide food to school going children as a way of encouraging them to go to school especially during drought situations. This eventually led to increased mean enrolment age in schools and thus guaranteed access to education for the pastoralists ' children. The official further stated that that food offered in schools were balanced in terms of nutritional requirements and thus offered school going children low chances of suffering from malnutrition related conditions.

The findings agree with the Turkana County LRA report (2017) which confirmed that all schools in Turkana County are beneficiaries of School feeding programme either through Cash Transfers to Schools or regular School Feeding Programmes. The same report also revealed that availability of food in the schools had led to a significant increase in enrolment rates of school going children at 71.5 percent in 2017 as compared to only 32 % of the school age children are enrolled in school in 2012 (Migosi *et al*, 2012).

It is therefore important to note that Education as an early recovery strategy has a huge impact based on its sustainability to the household heads. Education has both short term and long-term benefits that have proved to be beneficial and at the same time shown that it is a more sustainable recovery strategy against drought. This has also been due to the realization by pastoralist communities that sending children to school to acquire education and training is as an essential strategy to facilitate income diversification for pastoral households.

6.5 Informal Trade as an Early Recovery Strategy

The study sought to find out the effectiveness of informal trade as an early recovery strategy against drought in Turkana Central Sub-County. The household heads were asked to state whether informal trade was either sustainable or beneficial, as an early recovery strategy. Based on their perceptions, the results were as shown in Figure 6.3. The results in Figure 6.3 revealed that 90% (345) of the household heads were of the opinion that informal trade was beneficial as an Early recovery strategy against drought, while 10% (39) said it was sustainable.

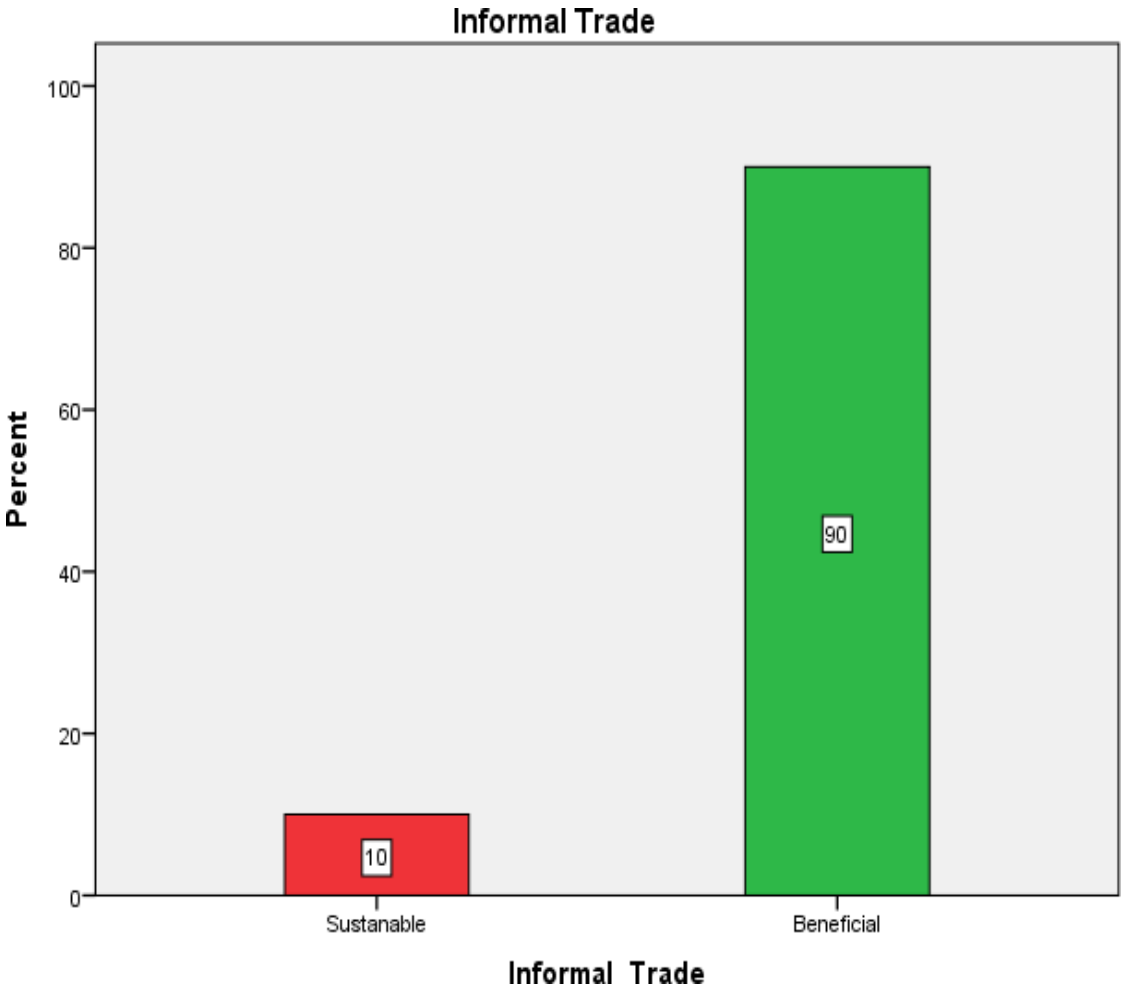

Figure 6. 3: Informal Trade as an Early Recovery Strategy

Source: Field Data, 2019

In all the 8 FGDs, it was revealed that informal trade such as selling of charcoal, basketry/weaving, beadwork, tobacco, alcohol, butchery was a common source of livelihood in Turkana Central Sub County. Some traders also engaged in retail trade, which ensured availability of some foodstuff like sugar to the local community during drought period. It was revealed that some of the households were dependent on traders to sell their livestock products and crop produce during drought period. Therefore, engaging in trading as an effective early recovery strategy was beneficial to both the buyer and seller.

These observations were corroborated by the opinion from a sub-county administrator who indicated:

> Presence of increased trading activities in the sub county has been attributed to the increase of drought in the area. Livestock and farm products have been traded as an early recovery strategy. Women are engaging in non-ruminant trade especially poultry during drought and the proceeds are utilized to buy foodstuff for household consumption. Artisan trading activities such as selling of beads to other communities is also common (a sub-county administrator 20th June, 2019).

On the other hand, informal trading was not sustainable but beneficial as an early recovery strategy. The harsh economic times have resulted to some of the traders incurring losses due to high taxation and expenses in conducting businesses.

In some cases, some of them have been forced to close business due to insecurity and low sales volume. The respondents who have engaged in retail trading before also indicated that doing business is difficult especially during drought as most of the household lack cash and therefore, choose to get products on credit. In some cases, as it was revealed, some of them fail to clear their debt and denied that goods on credit also results to negative publicity. Therefore, petty trading was not sustainable and at the same time beneficial to the communities in Turkana County during drought. Those who engaged in charcoal selling also indicated that the trade is not sustainable because there have been a lot of effort to conserve environment. It was revealed during the interview that; charcoal burning is not encouraged as it has negative effects on the environment. Therefore, as aN

early recovery strategy, trading activities offer limited options to the community in Turkana County.

6.6 Social Support Networks and an Early Recovery Strategy

The study sought to find out the effectiveness of social support networks as an early recovery strategy against drought in Turkana Central Sub-County. The household heads were asked to state whether of social support networks was either sustainable or beneficial, as an early recovery strategy. Based on their perceptions, the results were as shown in Figure 6.4.

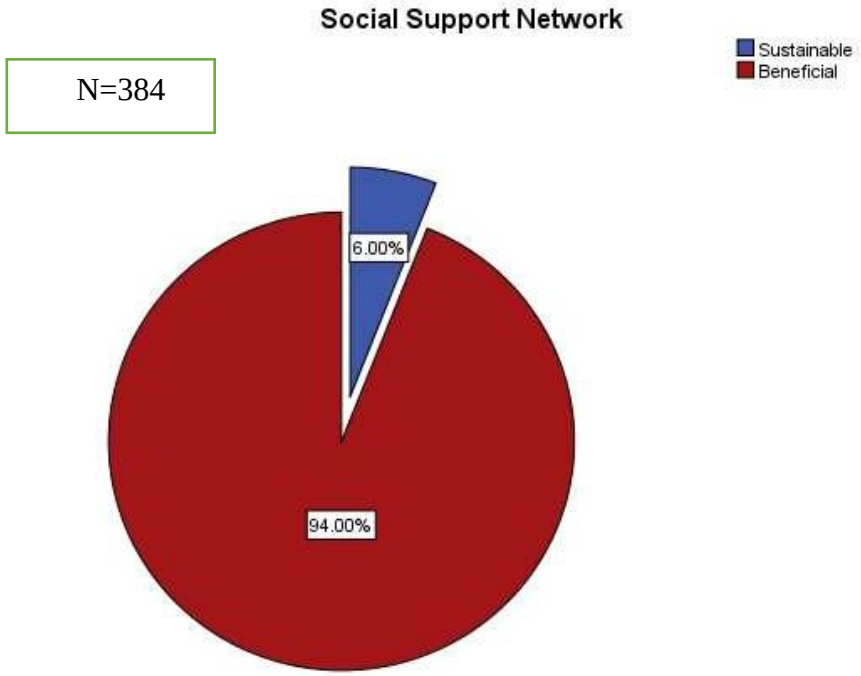

Figure 6. 4: Social Support Networks

Source: Field Data, 2019

The results in Figure 6.4 revealed that 94% (361) of the household heads indicated that

social support networks were beneficial as an early recovery strategy against drought while 6% (23) indicated that it was sustainable. The results revealed that social support was beneficial but not sustainable as an early recovery strategy against drought in the county.

During interviews, FGD and questionnaire administration, it was noted that there was evidence of social support from NGOs, Governments, friends, relative and welfare groups which some of the respondents depended on during drought period. However, this study noted that it was not highly effective as an early recovery strategy in Turkana County because of its seasonality.

The FGDs further revealed that that it was useful during drought as households were able to access goods and services, which would otherwise not be accessible due to drought. It was revealed that households accessed foodstuff from friends and relatives and in some cases, children were sent to their relatives for some time during drought period.

Therefore, the usefulness of social support was evident as it ensured family member can access a meal in day. It was also moderately important and beneficial. It was noted that some households received social support from welfare groups and women merry go round during drought. The researcher noted that, increase in CBOs and other social support groups are as a result of their importance in Turkana community during drought period. Members, especially women are able to get help from their group to educate their children, health issues and also to buy food for their household.

The study revealed that social support especially from the government, NGOs and well-wishers is important in Turkana due to the low socio-economic status in the county.

Majority of the household live below the poverty line and the effects of drought worsen the situation forcing them to depend on social support from government, NGOs and development partners.

The interview indicated that even during non-drought periods some households still depend on social support such as cash transfers for the most vulnerable members of society for survival. However, it was not sustainable to depend on social support.

During the interviews, one of Ward administrators opined that;

> Depending on social support is not an effective early recovery strategy against drought because you are under the mercy of the source of support. It also leads to the dependency syndrome and laziness among the community members. These coping strategies should be substituted with other coping/recovery strategies for sustainable development ' (Interview with Ward Administrator 20th June, 2019).

Based on the findings it was evident that social support was not sustainable in the long term and the results from the FGD revealed that some households had been crying for help in presence or absence of drought in the area. It was also noted that some form of social support such as getting food stuff on credit or borrowing money were not effective as they increase households 'debt burden. This forces them to spend large proportion of their income in repaying debt thereby forming a cycle of borrow-pay, which hinders investment in other early recovery strategies such as trade and livelihood diversification. The study further asked the discussant to rank effectiveness of various social support groups in Turkana central sub county.

CHAPTER SEVEN

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter provides a summary of major findings of the study derived from set objectives and draws general conclusions. The section further makes general recommendations based on the study findings and recommendations on issues that require further investigation or future research, as they are important but fell outside the scope of the study objectives and could not be addressed by the study.

7.1 Summary of Findings

In line with the first specific objective, the study sought to determine early recovery strategies towards drought occurrence among households in Turkana Central Sub County. The results revealed that many of the residents of Turkana central sub county relied more on crop farming as shown by the findings in Figure 4.3 which indicate that 58% (223) of the households relied on crop farming while 26% (100) relied on livestock keeping, 14% relied on social support while others at 2% relied on small businesses respectively. Some of the businesses embraced by the communities include; brewing of local brew and selling of charcoal/firewood as their main livelihood activity.

Additionally, the most important crops grown under irrigation agriculture were maize and sorghum, which comprise about 80% of irrigated crops in Turkana County. These crops were cultivated on small acres of land and were mainly for household consumption although some were to meet other financial obligations such as paying school fees. From the results in Figure 4.4 majority of the respondents cultivated maize as shown by 62%

while 20% relied on sorghum, 14% on cowpeas and other types of crops at 4% respectively. Maize, cowpeas and sorghum are the major crops cultivated by majority of the farms during the long rains season mainly in the Agro Pastoral livelihood zone. The respondents were asked whether they relied on one main activity of crop farming or agriculture as a survival strategy against drought. Majority at 84% seemed to be specialized either on crop farming at 58% or livestock at 26% respectively.

The second specific objective sought to examine the effects of drought on livelihood options among households in Turkana central Sub County. The findings from the study indicated that drought had serious implications on livelihoods as shown by the results in Figure 5.1 where it was revealed that, 51.5% of the respondents indicated that drought resulted to livestock mortality, while 25.5% said it resulted to food insecurity, 20% indicated water shortage, 3% poor nutritional diets respectively.

The study further revealed that the results that human activities had worsened the drought incidences in the study area. During the FGD interviews, it was confirmed that although drought had been in existence in the sub county for a very long time, the frequency of occurrence and severity had increased. However, human activities like felling down of trees for charcoal burning had aggravated the problem.

The study further sought to identify levels of vulnerability to drought in the sub-county by identifying the most affected groups. The results in Figure 5.2 revealed that majority of the most affected by drought were the elderly at 46%, disabled at 28%, pregnant and lactating mothers at 22% and orphans at 11% respectively. Other groups included the unemployed persons, widows and infants at 1% each. The study revealed that this group of people were

vulnerable to drought due to their socio-economic characteristics. The root cause of their vulnerability included lack of social support, lack of employment, high inflation, lack of sources of income, poor nutrition and poverty. It is worthwhile to note that Turkana central sub County registers low socio-economic indicators, which makes the residents vulnerable to the effects of drought.

Additionally, the study established that drought has serious implication on education with a number of school going children facing serious implications of drought. The results in Table 5.2 revealed that majority of the respondents were having children aged between 12 and 16 years of school going children as shown by 23.4% (90), 20.8% (80), 18.2% (70), 15.6% (60) respectively, while others had children aged 11,17 and 18 years had 5.8% (20), 2.6% (10) and 1.04% (4) in that order.

The effects of drought on education has long-term impact on the people of Turkana Central Sub-county as this would compromise on the quality of education and create a bleak future for these children whose ability to acquire education was immensely compromised by the effects of drought. The study further revealed that Drought affected crop production at 34.6% (133) of sampled households while pest and diseases affected of 15.0% (58). Other factors identified include poor farming practices at 17% (193) caused by late planting, poor agricultural extension services and nature of the soil. This led to issues of food insecurity which made people look for other ways of getting food for instance the results in Figure 5.5, showed that majority of the sampled household heads indicated that they were forced to purchase food on credit 30% and 26.67% sold their

agricultural assets. The results also revealed that 12% consumed seed stocks, 14.1% lease land and 19.17% sold productive assets.

In line with the third Specific objective, the study sought to evaluate the effectiveness of early recovery strategies in use against drought in Turkana Central Sub County. The Findings in Table 6.1 revealed that 58% (223) stated that crop farming was a sustainable early recovery strategy against drought with 42% (161) opining that crop farming was beneficial as an early recovery strategy.

This meant that majority of the household heads opined that crop farming could be used as both an early recovery strategy as well as a long-term mitigation measure when dealing with drought. Further, the results in Figure 6.1 revealed that 84% (322) of the household heads opined that livestock migration was beneficial while 16% (62) suggesting that it was sustainable. In this regard, nomadic pastoralism despite being a way of life, it was only beneficial to farmer but could not be relied upon a long-term recovery strategy against drought. Additionally, the findings in Figure 6.2 revealed that 56% (215) of the household heads opined that Education (their Children going to School) was a sustainable early recovery strategy against drought while 44% (169) suggested that it was beneficial. When asked to state whether informal trade was either sustainable or beneficial, as an early recovery strategy the results were as shown in Figure 6.3, 90 %

(345) of the household heads were of the opinion that informal trade was beneficial as an Early recovery strategy against drought, while 10 (39) said it was sustainable. Finally the study revealed social support was an a beneficial but not sustainable early recovery strategy against drought, this was shown by the results in Figure 6.4 which revealed that 94% (361) of the household heads indicated that social support networks was beneficial as an early

recovery strategy against drought while 6% (23) indicated that it was sustainable. The results revealed that social support was beneficial but not sustainable as an early recovery strategy against drought in the county

7.2 Conclusions of the Study

Based on the first specific objective, the study concludes that majority of the residents in Turkana Central sub-county had embraced and integrated crop farming as the main source of livelihood activity. Other sources relied on by the households included livestock keeping, small business enterprise, sending children to school to acquire education and other livelihood diversification activities.

Based on the second specific objective the study concludes that drought had a massive impact on the livelihood options in Turkana Central sub-county. Among these impacts included livestock mortality, scarcity of water, poor nutritional diets, poor agricultural yields from the farms and liquidation of assets in order for people to get means of survival. It further emerged that drought increased the level of vulnerability of specific affected groups of people and thus lowered the productivity of many members of the society in the area.

Based on the third specific objective, the study concluded that crop farming and sending children to school to acquire education were the most effective early recovery strategies against drought while livestock keeping through migration, social support network and petty trade were the least effective strategies against drought impacts.

The overall conclusion of the study was that that drought remains a potent threat to the fragile and climate sensitive sectors such as livestock keeping and crop farming in the study

area. In order to minimize these impacts and protect sources of livelihoods communities had embraced crop farming and sending children to school as the most effective strategies against drought communities while social support network, livestock migration and petty trade had been employed as short term coping strategies against drought.

7.3 Recommendations

Based on the findings and conclusions, the study makes the following recommendations;

First, the study recommends that there is need for further research on better crop varieties that are not only drought resistant, early maturing, resistant to pests and diseases but could also withstand low water stress levels which is a common characteristic of hot and dry areas like Turkana Central Sub County.

Secondly, the study recommends that in order to minimize the impact of drought on the community livelihood sources, there is need for better planning and implementation of effective drought management practices. Such strategies included provision and improvement of existing water sources for both domestic and livestock use during drought period. Other strategies include livestock destocking, deworming and vaccination campaigns. There is also need to scale up provision of safety nets initiatives such as cash transfers so as to cushion the most vulnerable of the community against drought. There is also need to engage and implement sustainable resource sharing peace agreements between different pastoral groups.

Finally, the study recommends that there is the need for both county and national governments to invest a significant proportion of their resources in crop farming through irrigation agriculture in order to address the aspect of food security among communities living in ASAL areas. Intensify research on better crop varieties suitable for such areas since majority view it as a sustainable livelihood option against drought. Government should also encourage pastoralists to send their children to school through construction of enough classrooms, improved learning environment and making the cost of education free for all children.

Areas for further research:

i. Effects of modern development such as oil exploration, construction of LAPSET, Land sub division for private use, land tenure system and ownership in Turkana County versus nomadic pastoralism of the Turkana community.

ii. Effects of social protections such as cash transfers on the perception of pastoralists on modern development versus social support

iii. Effects of the Chinese development in the form of donkey slaughter houses for export business that has substantially reduced and decimated the donkey population in Turkana County and yet it is an important animal used for transport purposes, provides meat and milk and is also used to pay dowry among the Turkana pastoralist communities.

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APPENDICES

APPENDIX 1: LETTER OF INTRODUCTION

Masinde Muliro University of Science and Technology School of Disaster Management and Humanitarian Assistance Department of Emergency Management Studies
P.O. Box 190 – 50100 Kakamega 7th July 2018
Dear Respondent,

SUBJECT: RESEARCH ON "EARLY RECOVERY STRATEGIES INFLUENCING SUSTAINABLE LIVELIHOOD OPTIONS AGAINST DROUGHT AMONG HOUSEHOLDS IN TURKANA CENTRAL SUB COUNTY, KENYA"

I am a postgraduate student pursuing a Masters of Science degree in Disaster Management and Humanitarian Assistance at Masinde Muliro University of Science and Technology. I am currently conducting a research study entitled ***"Early Recovery Strategies Influencing Sustainable Livelihood Options against Drought among Households in Turkana Central County, Kenya"***

I am kindly requesting for your assistance in responding to the attached questionnaire for my data collection. It will take you about 30 minutes to complete the questionnaire.

This study purposes to characterize the 2015/2017 prolonged drought and subsequently determine the effects on livelihood options in Turkana Central Sub County. The study goes further evaluate to the early recovery needs of the communities for both short-term and long-term development planning and resilience building.

You are kindly encouraged to be as honest as possible in giving the information.

Your responses will be kept in confidence and will only be used for the purpose of this study.

Thank you in advance. Yours faithfully

Godfrey Engor

REG NO.: CDM/G/04/13

APPENDIX 2: LETTER OF INTRODUCTION

Drought recovery study in response to the recent drought
(extending from 2015 to 2017) in Turkana Central Sub County

Each Head of the Household within a sentinel site to be administered this questionnaire. If they are in FGD they should comprise 10 persons (female and male separately) mainly pastoralists/herders, and others involved in businesses related to animal production ***(include youth and elderly).*** Before starting Interview, introduce yourself. Thank the interviewees for their time. Explain the purpose of the study and avoid raising expectations as far as possible.

General information

County: **Sentinel/Village name:**

Livelihood zone/Ward: **Household Head: Male (1)** o **/ Female (0)** o

Village: Ask Head of Household

1. How many People are living in your household? …….
2. How were you affected by recent drought of 2016/17? (livestock mortality, erosion of income base, food insecure, poor nutrition/diets, shortage of water for both livestock and humans)
3. What do you rely on as a main livelihood activity?

a) crop: …….b) livestock: ……., c) fisheries: …, d) forestry…… e) Poultry.....Others (specify)

Impact / Effect on Crops

4. What are the main crops you cultivated during 2016 season and how was it affected?

Main crops grown in the village	**Total Acres Cultivated Acres**	**Normal production (90 Kg Bags)**	**Current production (90 Kg Bags)**	**% of crop Affected by drought, disease, etc****	**Main Cause *****
Millet					
Maize					
Sorghum					
Other cereals					
Pulses (beans, bambara nut, cowpeas, pigeon peas, etc.)					
Oil crops (groundnuts, etc.)					
Vegetables (at field level)					
Fodder crops					

Cash crops					
Fruits					

** For each listed crop the proportion crop affected can be from 0 to 100%

*** Possible main causes for affected crop: 1) Drought, 2) Pests and diseases, 3) Lack of inputs, 4) Lack of labour, 5) Lack of cash, 6) Other, specify…….

5. Which crops do you grow under irrigation scheme?

List of crops grown	**Yes**	**No**	**None**	**Acreage**	**Location**	**Season of the Year**	**2016**	**2017**	**Yield in 90 kg bags**
Maize									
Sorghum									
Green grams									
Kales									

Cabbage									
Any other (Specify)									

General Remarks:

..……..

……

……..

Comments from the respondents:

……

……

……

……

6. How much of it is consumed at household level (in 90 Kg bags)?

.....….....

7. What proportion does irrigation farming food crops contribute to household food security in the village during normal years?

.....……

8. What proportion is irrigation farming contributing to household food security during the recent drought? ..... %

9. Do usually engage in agricultural casual labour in this village? Yes = 1
No

= 0

10. If yes to question 13 above, what is the wage per acre and the total area done in a season per household?

Casual labour activities normally	**Parameters**	
	Wage KSHS / Acre	**Average area done / season / household**
Land preparation by hand		
Planting		
Weeding		
Harvesting		
Other (specify)		

11. What are the main needs to restore crop production due to drought related problems (please fill the table below)?

Main needs to restore crop production		
Priorities	**Short term (August - Dec. 2017)**	**Medium / long term (Jan 2018 - Dec 2018)**

1st		
2nd		
3rd		
4th		
5th		
6th		

12. Do you usually vaccinate your animals?

Animal	**Number of animals vaccinated**	**From where do you get the vaccines?*** **Main source (one selection)**	**If no, why you don't vaccinate animals? ** ** **Main reason (one selection)**
Cattle			
Donkeys			
Camels			
Goat			
Sheep			

Pigs			
Poultry			

* Who provides the vaccine: a) National Government: b) County Government, c) local NGOs: d) international NGOs e) bought by themselves, f) animals too weak or in poor condition to receive vaccinations f) Others (specify):

**Reason for not vaccinating: a) Too expensive; b) Not available; c) Not needed d) Others, specify

13. What is the normal main source of animal water? River (1), pond (2), well (3), borehole (4), other (5), specify: ……..

14. What are the three main strategies, which the households are implementing to avoid further livestock losses. A) ……B) ..... C) …….

Code: 1) Supplementary Feeding, 2) Herds Migration, 3) Fodder Production, 4) Destocking,

5) Lease Grazing, 6) Others, Specify……

15. What are the main needs to restore livestock production due to drought related problems (please fill the table below)?

Main needs to restore livestock production		
Priorities	**Short term (July - Dec. 2017)**	**Medium / long term (From Jan 2018)**
1st		

2nd		
3rd		
4th		
5th		

Impact / effect on livelihood and coping mechanisms

16. What are the main sources of income for the households in this community?

Sources of income	**Priorities or rank**			**How much do you get by crop**	**Proportion of income source from total household income**
	1st	**2nd**	**3rd**		
Crop production					
Livestock or animal products					
Fishing					

Selling of firewood / grass/ other natural resources					
Employment (government or private sector)					
Daily labour (agriculture/livestock)					
Daily labour (non-agriculture)					
Petty trade					
Remittances					
Other (specify)					

17. What is the main source of and what is the proportion of the different sources for your staple food?

Sources	**Proportion during drought of 2015/17**	**Proportion in normal situation**
Own production		
Markets		
Gifts from family / neighbours		
Wild food		

Assistance		

18.

Sum of the different sources should be 100%

What coping mechanisms are you engaged into for the last 12 months?

(Please do not read out the coping mechanisms)

List of coping mechanisms	**Rank of the mechanism**
Rely on less preferred food	
Borrow food from neighbours	
Reduce number of meal a day	
Borrowing money for food purchase	
Purchase food on credit	
Restrict consumption for adults and provide more for children	
Barter system to access food	
Consume seed stocks as no more food stocks available	
Sell domestic assets (radio, furniture, etc.)	
Sell productive assets (tools, machinery, equipment, means of transport, etc.)	

Sell agriculture assets (animals, seed stocks, etc.)	
Sell land	
Remove children from school	
Do alternative / not commonly done activities	
Migrate (for another job in town)	
Relay on donations / gifts	

18. How do you cope with the lack of water during drought? (you can select more than one answer)

Buying additional water	o yes (1), o No (0)
Walking longer distances to get it	o yes (1), o No (0)
Receiving water from Government	o yes (1), o No (0)
Receiving water from other institutions	o yes (1), o No (0)
Others, specify	o yes (1), o No (0)

<u>Recovery or relief assistance received</u>

19. Have you received any relief support in response to the drought over the last twelve months? …….

20. If yes, what and from whom (i.e. Govt., NGOs, religious institutions, relatives, etc.)?

Type of support received	**Level of usefulness (ranking 1 very useful to 4 not useful at all)**	**Level of satisfaction (ranking 1 very satisfied to 4 not satisfied at all)**	**Main improvement to be undertaken on these interventions***	**From (Source e.g. Government, NGO, Govt., Relative…)**
Market incentive for livestock				
Subsidized seed provision				
Relief food assistance				
Water trucking				
Water supply				
Animal feed provision				
Transport support for animals				
Grazing support				

Capacity building on various technical sectors				
Others, specify				

*Code improvements: a) No enough quantity, b) late delivery, c) only for a few households, d) increase the price subsidy amount e) other, specify

21. What are the main actions needed to be taken in order to avoid future negative effects of drought on livelihoods (agriculture, livestock and fishery / aquaculture activities)?

Main actions to be taken in order to reduce effects of droughts in the future				
Actions needed	**Agriculture/Crops**	**Livestock**	**Fishery / aquaculture**	**Forestry**
1st				
2nd				
3rd				
4th				

5th				

22. How many school going children do you have?

23. How many stopped going to school as a result of 2016/17 drought?

24. How did the recent drought affect the health of your children under five years?

25. How did the recent drought affect the nutrition of your children under five in your household?

26. What has been the impact of recent drought on peace and security in your village?

Any Additional Info: ……

……

……

APPENDIX 3: FOCUS GROUP DISCUSSION GUIDE

Does drought occur in this area?

If yes, how often? Please establish a timeline

When droughts occur who is affected. Apportion the affected in proportions.

What are the major causes of drought in this area?

What predisposes the affected groups to droughts (root causes of vulnerability?)

How do different categories of people cope with drought in this area?

Are strategies effective in dealing with drought, if not why? What other strategies can be used?

Do you receive any external assistance during drought? If yes, what kind of assistance and from whom.

How has the external assistance received assistance received contributes to drought vulnerability reduction, if not what other support is needed to make you vulnerable to drought in future?

APPENDIX 4: KEY INFORMANT GUIDE

Name	
Organization	
Level of Education	
Area of specialization	
Number of the years in Organization	
Any other information	

What are the key activities of your organization?

What are the major hazards affecting this region?

Drought has been identified, as the Main factor affecting development in this region

from your view is this true position? And why?

What are the major effects of drought in the region?

What are the causes of the drought in the region?

In reference to 4 above, please rank the causes in order of importance

How does drought affect the different segment of the community? What are the trends?

Drought episodes have been increasing in the region for the last 30 years, what is the cause of this increase? How does the future look like?

Considering the response in 7 above, what are the main causes of the increase in order of the importance?

What actions can be taken to reduce drought vulnerability in the region?

What are the potential recovery measures to avoid the impact of future drought and enhance the resilience of the communities?

Any other information

APPENDIX 5: OBSERVATION CHECKLIST

Item to be Observed	Location	Judgment

Remarks

……

……

……

……

……

APPENDIX 6: KEY INTERVENTIONS AT DIFFERENT STAGES OF THE DROUGHT CYCLE

Area	Normal	Intervention	Alert	Emergency	Recovery
Water	Promotion of water harvesting and storage, training water associations, planning for new water sources, deepening planning		Strategic needs assessment, protection of strategic wells, repairing poorly working boreholes, desilting wells, future interventions	Implementing contingency plans including water supply (tinkering/water trucking), keeping strategic watering points functional, monitoring water availability	Improve water pans and develop new ones through food for work or cash for work (cashtransfer programming)
Food security and nutrition	Promote animal & drought resistant crops, improve extension services, develop strategic cereal banks, capacity building		Stock strategic reserves, data sources used to warn and alert donors & government, provide food to most affected	Food relief, activate rapid response teams, diversify income, & improved activity for health and nutrition	Replacing assets, providing tools and seeds, strengthen commu

Area	Normal intervention	Alert	Emergency	Recovery
Livestock production **Livelihoods**	With enough pasture & water, building up the herd, capacity building, strengthen social networks, develop livestock markets, conserve & protect pasture using traditional rules & range management approaches	Selecting animals for sale, herd separation & splitting, drying and smoking meat for later use, supplementary feeding, feed storage, alert donors and negotiate grants, control breeding,	Increased sale of animals or barter, migration in search of pasture, stop breeding, provide emergency water & feed esp. for lactating & breeding animals, work-for food/assets,	Review damage & documen t lessons, restockin g tradition ally, buying or through assistanc e, build pasture
Animal Health	Establish common approach to disease control, vaccinate, deworm, maintain cattle dips	Mass vaccination, deworming, equip drug stores, carry out cross border disease monitoring	Emergency disease control, target drought prone animals (calves, lactating, sick) for special treatment	Document and evaluate lessons learnt, re-stock drugstores, vaccinate and deworm, use feed supplement s

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

Source: NDMA, 2016

APPENDIX 7: APPROVAL OF PROPOSAL

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY
(MMUST)

Tel: 0702597360/61
: 0733120020/22
E-mail: deansgs@mmust.ac.ke
Website: www.mmust.ac.ke

P.O Box 190
50100 Kakamega
KENYA

Directorate of Postgraduate Studies

Ref: MMU/COR: 509079

29th January, 2019

Godfrey Engor
CDM/G/04/13
P.O. Box 190-50100
KAKAMEGA

Dear Mr. Engor,

RE: APPROVAL OF PROPOSAL

I am pleased to inform you that the Directorate of Postgraduate Studies has considered and approved your Masters proposal entitled: ***"Early Recovery Strategies Influencing Sustainable Livelihood Options Against Drought Among Households in Turkana County, Kenya."*** and appointed the following as supervisors:

1. Dr. Ferdinand Nabiswa	Department of Emergency Management Studies
2. Dr. Edward Mugalavai	Department of Disaster Management & Sustainable Development

You are required to submit through your supervisor(s) progress reports every three months to the Director of Postgraduate Studies. Such reports should be copied to the following: Chairman, School of Disaster Management Graduate Studies Committee and Chairman, Department of Disaster Management and Sustainable Development. Kindly adhere to research ethics consideration in conducting research.

It is the policy and regulations of the University that you observe a deadline of two years from the date of registration to complete your Master's thesis. Do not hesitate to consult this office in case of any problem encountered in the course of your work.

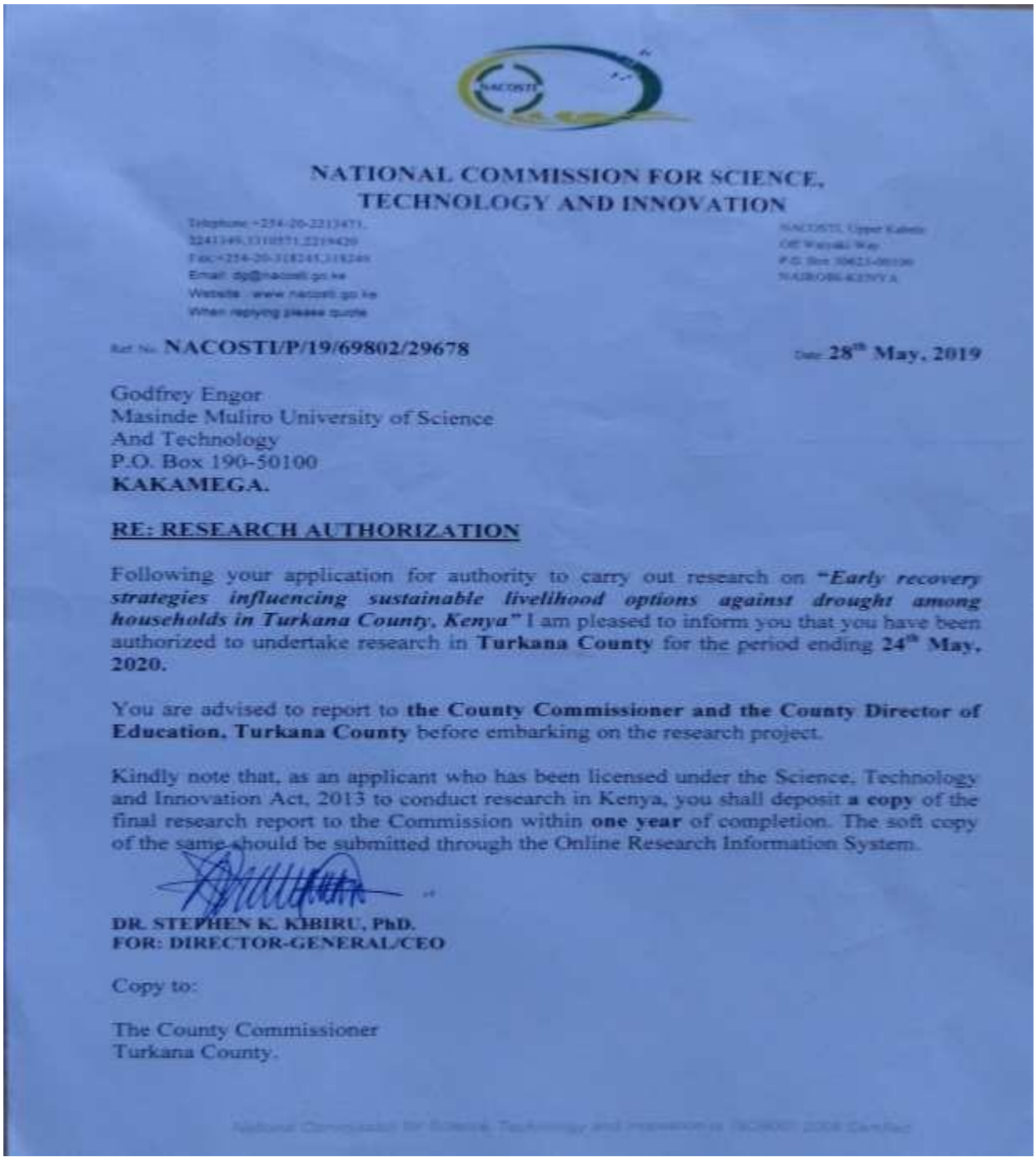
We wish you the best in your research and hope the study will make original contribution to knowledge.

Yours Sincerely,

DEAN
SCHOOL OF GRADUATE STUDIES
MASINDE MULIRO UNIVERSITY
OF SCIENCE & TECHNOLOGY

Prof. John Obiri
DIRECTOR, DIRECTORATE OF POSTGRADUATE STUDIES

APPENDIX 8: RESEARCH AUTHORIZATION



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

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Website : www.nacosti.go.ke
When replying please quote

NACOSTI, Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref No. **NACOSTI/P/19/69802/29678**

Date: **28th May, 2019**

Godfrey Engor
Masinde Muliro University of Science
And Technology
P.O. Box 190-50100
KAKAMEGA.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Early recovery strategies influencing sustainable livelihood options against drought among households in Turkana County, Kenya"*** I am pleased to inform you that you have been authorized to undertake research in **Turkana County** for the period ending **24th May, 2020.**

You are advised to report to **the County Commissioner and the County Director of Education, Turkana County** before embarking on the research project.

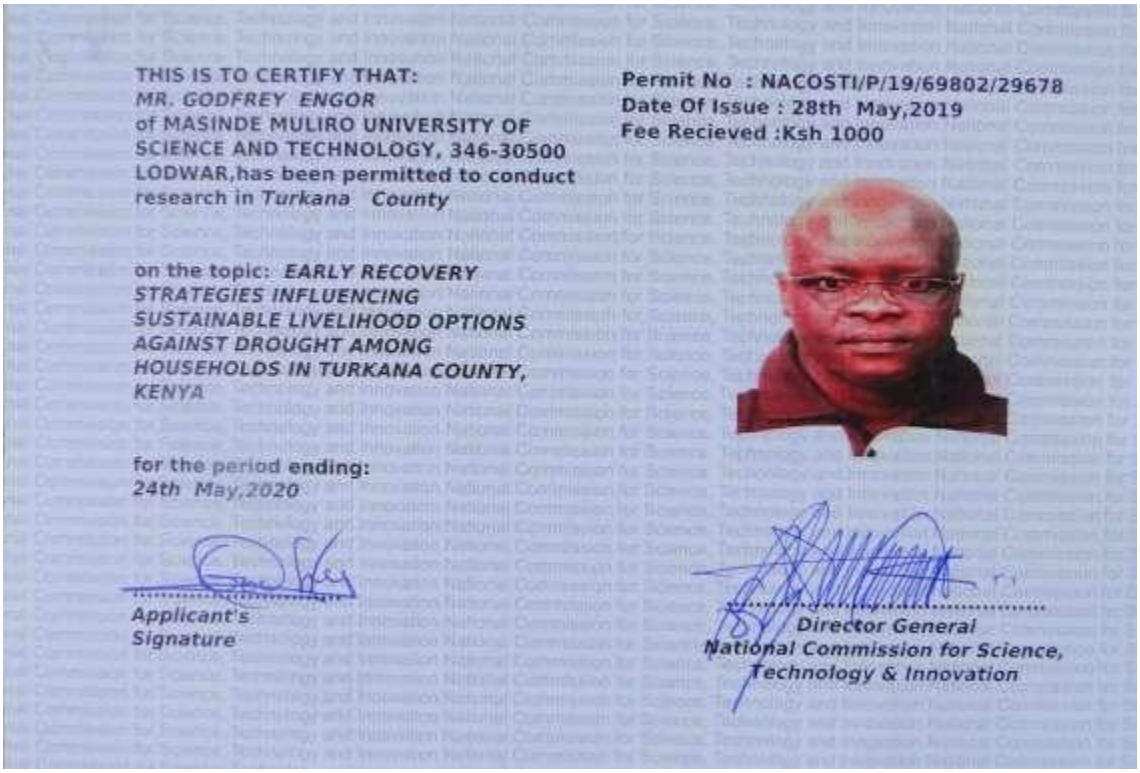
Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

DR. STEPHEN K. KIBIRU, PhD.
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Turkana County.

APPENDIX 9: RESEARCH PERMIT



THIS IS TO CERTIFY THAT:
MR. GODFREY ENGOR
of MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY, 346-30500 LODWAR,has been permitted to conduct research in *Turkana County*

on the topic: *EARLY RECOVERY STRATEGIES INFLUENCING SUSTAINABLE LIVELIHOOD OPTIONS AGAINST DROUGHT AMONG HOUSEHOLDS IN TURKANA COUNTY, KENYA*

for the period ending:
24th May,2020

Applicant's Signature

Permit No : NACOSTI/P/19/69802/29678
Date Of Issue : 28th May,2019
Fee Recieved :Ksh 1000

Director General
National Commission for Science, Technology & Innovation