

**INFLUENCE OF PASTORALISTS' DROUGHT MANAGEMENT
PRACTICES ON THEIR LIVELIHOODS: A CASE OF ISIOLO NORTH SUB-
COUNTY**

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**A Research Project Submitted in Partial Fulfillment of the Requirements for the
Award of Degree Master of Arts in Project Planning and Management of the
University of Nairobi**

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DECLARATION

This research project is my original work and has not been submitted for award of a degree at any other University.

Signed í í í í í í í í í í í í í í í í Date í í í í í í í í í í í í í í í í

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DEDICATION

This research project is dedicated to my loving parents, Mr. and Mrs. Golicha, my siblings Dida, Morme, Karu, Daki, Tume, Sharu, and my Lovely Wife Isene and daughter Badaso. I also wish to dedicate this study to all project managers, in their quest to carry out successful projects, I hope this study helps in the achievement of your project objectives.

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ABBREVIATIONS AND ACRONYMS

ASALs	Arid and Semi-Arid Lands
DRR	Disaster Risk Reduction
EWS	Early Warning Systems
FAO	Food and Agriculture Organization
KNBS	Kenya National Bureau of Statistics
LEWS	Livestock Early warning System
MCA	Member of County Assembly
MP	Members of Parliament
NGOs	Non-Governmental Organizations
SCMDRR	Strengthening Community Managed Drought Risk Reduction
SPSS	Statistical Package for Social Sciences
UNDP	United Nations Development program
WHO	World Health Organization

ABSTRACT

The pastoralists communities mostly inhabiting the ASALs regions have been affected by drought since their economic activity is livestock keeping which is affected by drought due to lack of rainfall that reduces water and forage availability. The current ability of pastoralists to respond to drought is limited increasing frequency of drought, increasing population, a dwindling resource base, conflict, changes in access to land and water, as well as the impact of other shocks such as flooding and disease outbreaks. Despite the numerous studies documented on the disaster risk project management, the political, economic and social marginalization of most pastoralists, decades of adverse national policies which have restricted their access to key natural resources, increased frequency and intensity of climate shocks such as drought, and endemic conflict have all contributed to significantly undermine their resilience. The purpose of this study was to investigate the influence of pastoralist drought management practices on their livelihoods in Isiolo North Sub-County, Kenya. This study sought to investigate the effects of drought contingency planning, drought relief strategy, rehabilitation mechanism and policies for drought resilience on pastoralists' livelihoods in Isiolo North Sub-County. The research was designed as a cross sectional descriptive study. The target respondents included household heads and key informants who include local leaders (usually local chiefs, elders, community/clan leaders), livestock officers, NDMA, politicians and County Government officials), pastoralists from Isiolo North Sub- County and civil society personnel. According to Krejcie and Morgan (1970), a sample corresponding to the target population of 14,325 is 375 households. In addition, five government technical staff and five stakeholders' key informants were included making a total sample of 384 respondents. The researcher relied on questionnaires for household heads while the key informants were interviewed. Qualitative data was analyzed using frequencies percentages, means and standard deviations. Multivariate regression was undertaken to test the relationship between the variables and enable the researcher generalize results from the sample to the population. Tables and figures were used to present the data. The study found that most of the areas in Isiolo North Sub County are frequently struck by drought and water scarcity putting the pastoralists at a great drought disaster. The study deduces that the pastoralists are familiar with drought contingency planning. Drought relief strategy affects drought disaster risk reduction in Isiolo North. The pastoralists are knowledgeable about rehabilitation mechanism as a mitigation strategy. The study ascertained that rehabilitation mechanism as a mitigation strategy is not carried at the right time of the drought cycle. The study recommends the community, planners, professionals and the implementers of drought disaster risk management need to realize and rise to the awakening that drought affected people have the learning and the strength to develop coping and survivability capacities. There is a need to enhance community communication and feedback mechanism in the county. The study also recommends that the government of Kenya and development agencies working in the area need to invest in the provision of credit facilities to the pastoralists to assist them in coping with droughts. The study recommends funds should be allocated for effective supplementary feeding programmes.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Project management process helps organizations to execute designated projects effectively and efficiently. According to Sandro (2015), project management is the discipline of defining and achieving targets while optimizing (or just allocating) the use of resources (time, money, people, materials, energy, space, etc.) over the course of a project (a set of activities of finite duration). This implies that one of the most important functions of Project management is to ensure project success (Project Management Institute, 2013). Despite the globalization and much acquired knowledge for organizations to engage in project management, the use of project management tools and techniques does not automatically guarantee project success.

Project management practitioners and researchers (Prabhakar, 2008; Kutsch & Hall, 2010; Heldman, 2013; Wachuru, 2013; Sandro, 2015) are concerned with why some projects are perceived as failures even when they have met all the traditional standards of success, that is completed on time, completed within budget, and meeting all the technical specifications and yet others are considered successful even after failing to be completed on time and not completed within budget. The society within which project managers operates, believes in project success and has increasingly become less and less tolerant of failures thus end up exerting a lot of pressure on project managers to minimize the possibilities of project failures (Kishk & Ukaga, 2008). This increasing pressure on project managers for successful project delivery has forced all those who are involved in projects to concern themselves with related project risks and how they can be effectively managed.

Boddy (2006) confirms that almost all projects including construction projects are exposed to the threats of cost overrun, delayed schedule, failure and desertion and there is likelihood of failing to meet the quality standards and the set objectives of the project. According to the Standish Group's Chaos Report (2009), only 32% of all surveyed projects are considered to be successful and are delivered on time, on budget, with the required features and functions. As with many tasks, the management of a project

involves the planning, organization and control of a large number of complex factors, activities and their interrelations.

Eighty four percent of Kenya's territory is arid and semi-arid lands, commonly known as the Arid and Semi-Arid Lands. In these territories, more than 10 million people live, that is slightly more than 25 percent of Kenya's population (YazanElhadi, 2012). The economic activity practiced in this region is pastoralism (Mugo, 2009). At the same time, these areas comprise the most marginalized parts of the country. For very many years, drought and famine has become a common and recurring phenomenon in many parts of Kenya especially in the ASALs areas. The pastoralists communities mostly inhabiting the ASALs regions have been affected by drought since their economic activity is livestock keeping which is affected by drought brought by the lack of rainfall that reduces water and forage availability

Pastoralism is an ancient form of livelihood and is considered as the most efficient use of the dry lands (Fratkin, 2012). In the world at the moment, there are nearly 200 million pastoralists working tirelessly to generate income where conventional farming is limited or not possible. In sub-Saharan Africa, pastoralism is a way of life for over 20 million people (Morton, 2008). Majority of pastoralists live in dry and remote areas. Their livelihoods depend majorly on livestock or livestock products for a living. Pastoralist people in Sub-Saharan Africa raise domestic animals including camels, sheep, goat, cattle and donkeys which are sources of milk, meat, blood, trade and transport (Franklin, 2011).

Keddy (2007) elaborates drought as a recurrent feature of the climate occurring virtually in all climatic zones whose characteristics vary significantly among regions differing from aridity in that it is temporary whereas aridity is a permanent characteristic of regions with low rainfall. Drought is a weather-related natural hazard which may affect vast regions for months or years with protracted impacts on food production reducing life expectancy and the economic performance of large regions or entire countries (ISDR, 2009). Drought is more than a physical phenomenon or natural event whose impact results from the relation between a natural event and demands on water supply and often exacerbated by human activities. Significant environmental, agricultural, health, economic and social consequences signifies drought periods.

The current demand for data on the magnitude of pastoralism faces a legacy of unsystematic attention to pastoral systems by standard mechanisms of appraisal (UNDP, 2011). According to UNISDR (2007), disaster risk reduction interventions need to build capacity to withstand hazards both before and after they occur. Although there are distinct DRR interventions and activities, DRR is also about systematically incorporating risk reduction considerations into all development and humanitarian policy and programming. According to Randall (2008) although networks of pastoral herding households are the backbone of pastoral systems, the social and economic importance of pastoral systems (their magnitude), today is not a linear function of the number of people in these households, or of their livestock holdings.

Development and disaster management practitioners use risk analysis or assessment methods when drawing up project plans and making operational decisions. The recurrence of severe drought is a cause of human suffering and a major blockage to poor livestock development in sub-Saharan Africa, particularly in pastoral and agro-pastoral systems (HPG, 2006). Disasters induced by drought account for about ninety percent of all disasters in the Region. Drought sets off a vicious cycle of socioeconomic impacts beginning with crop-yield failure, unemployment, erosion of assets, decrease in income, worsening of living conditions, poor nutrition, and, subsequently, decreased coping capacity, and thus increasing vulnerability of the poor to another drought and other shocks as well as the risk of political instability and, in some cases, conflict (Walter, 2004).

Sophisticated and dynamic strategies such as tracking pasture and water in time and space and maintaining high levels of mobility across large tracts of land, allow pastoralists to effectively cope with the threats and risks that characterize their environment and to maintain a viable production and livelihoods system (Huho & Kosonei, 2014). There have been previous cases of unreliable seasonal forecast and no specific information on projected impacts with the data itself, not appropriately shared among the stakeholders. This has left both the government and communities ill-prepared to tackle subsequent droughts despite having previous experiences in droughts. The combination of all of these factors turns shocks such as droughts and other type of

hazards into catastrophic losses for the most vulnerable groups. In Kenya, the frequency and severity of drought has been on the increase due to climate change. The Arid and semi-Arid Lands (ASALs), especially Northern Kenya (Isiolo, Marsabit, Mandera and Samburu) are the most vulnerable (Cordaid & IIRR, 2011). The current ability of pastoralists to respond to drought is limited not only due to the increasing frequency of drought, but also due to increasing population, a dwindling resource base, conflict, changes in access to land and water, as well as the impact of other shocks such as flooding and disease outbreaks.

Kenya is a drought-prone country, primarily because of its peculiar eco-climatic conditions. According to Action Aid (2012) although dissected by the equator in its southern half, Kenya contains only a few pockets of high and regular rainfall (>2000mm). Arid and semi-arid lands (ASALs) cover 80% of the territory. In these areas, where annual rainfall varies from 200 to 500 mm, periodical droughts are part of the climate system. Given this kind of climatic condition, it is only proper to explore the effects of drought in the country and to suggest what could be done to cope with this perennial problem. Drought is by far the most common disaster in the dry lands in the Eastern and Northern Kenya. It affects more people more frequently than any other disaster in the arid and semi arid areas in Kenya and in the horn-of Africa region. Pastoralism in the dry counties and specifically Isiolo has been the most economically productive and environmentally sustainable use of marginal landscapes and dry lands where the majority for whom livelihood relies on pastoral livestock production and related activities (Huho & Kosonei, 2014).

Emergency interventions that tend to be implemented in response to drought are very effective in terms of saving lives, but they are not designed to address the chronic poverty or vulnerability that characterize the arid and semi-arid lands (Muhuba, 2013). Drought-related policies and plans should emphasize risk reduction (prevention, mitigation and preparedness) rather than relying on drought relief. In Kenya, Isiolo North Sub- County is one of the Counties most hit by drought disaster. Most of the surface water sources dry up and congestion is witnessed in all livestock strategic boreholes. The impacts of drought have been felt by the community from the individual level to the social level.

Affected areas have struggled in the face of the drought with the refugee influx from neighboring counties further intensifying the crisis. With an effective drought disaster management strategy the impacts of the drought disaster could be mitigated.

Isiolo County lies between longitude 36050øEast and latitude 0005 North and 20 North. Isiolo County constitutes two constituencies; Isiolo North and Isiolo South. The county is divided into nine (9) administrative divisions namely; Central, Oldonyiro, East, Merti, Cherab and Kom divisions. The main ethnic groups include; Somali, Borana, Turkana, Ameru and others. Isiolo County has a population of 143,000people with central Division having 41,496 people (KPHC, 2009), it is one of the Kenyan marginal districts which has persistently faced the problem of food insecurity expressed by the peoples inability to access enough food and has continued to rely on relief food from the government and other organizations almost every year (GoK, 2001).

Central division is classified into four livelihood zones, i.e. pastoralism, Agro-pastoralism, wage, charcoal/fuel wood. Pastoralism is the dominant economic activity as the land has low agricultural potential (Gufu, 2016). This situation could be attributed to rising poverty levels where according to constituency level poverty estimates, Isiolo constituency contributed 0.3% to total National poverty and has a population of about 69% below poverty line (KNBS, 2000), poor agricultural technologies and over reliance on rain-fed food production besides persistent droughts. These results to low production levels, which cannot sustain the ever expanding population. For instance, population in the County increased by 68% between 1989 and 2000, while maize production increased by a mere 27% in the same period (GoK, 2009).

Scarcity of arable land and pasture is a daily challenge for the people of Isiolo, phenomena that is witnessed from the constant community conflicts that plague the county. The Borana are nomadic pastoralists, moving from one area to another - within the county and in neighboring counties in search of pasture and water for their goats, camels and cows. According to Vision 2030ø plans Isiolo will host a major Resort City, an international airport and a railway line linking Lamu to Lokichogio and Ethiopia. However, while significant developments are planned for Isiolo, a wave of violent

conflict has swept the city in recent years. The conflicts and violence in Isiolo appear to be the usual traditional pastoral communities' competition for pasture and grazing land.

1.2 Statement of the Problem

Pastoralists' livelihoods strategies have evolved over centuries to adapt to hot and dry climate with low and erratic rainfall, typical of the arid and semi-arid lands. According to Action Aid (2012) pastoralist communities are predisposed to disasters by a combination of factors such as poverty, aridity, settlement in areas prone to drought. Due to increasing global interdependence, there is need for all actors to at least share information and where appropriate act in tandem with government strategies where they exist or facilitate improvement of such strategies. Wamugi and Muchemi (2011) in their study on strengthening community managed drought risk reduction in northern Kenya and Southern Ethiopia (SCMDRR) noted that the migration of pastoralists in Northern Kenya and Southern Ethiopia is a systematic process that is largely dependent on traditionally accepted clan grazing ranges. Muhuba (2013) in an assessment of community based drought cycle management as a strategy for disaster risk reduction in Wajir County found that of the various coping strategies used, the community opted to move their animals and families to other places in search of pasture during drought.

Musimba (2014) investigated the role of community participation in drought risk management in Kilifi County, Kenya and found that there was a significant role of community participation in drought risk management as the process was implemented by the community themselves although in most of the cases the criteria was predetermined and dominated by experts who assertively considered the contribution of community. Despite the numerous studies documented on the disaster risk project management, the political, economic and social marginalization of most pastoralists, decades of adverse national policies which have restricted their access to key natural resources, increased frequency and intensity of climate shocks such as drought, and endemic conflict have all contributed to significantly undermine their resilience. It was in this light that the study sought to carry out an investigation into the influence of pastoralist drought management practices on their livelihoods in Isiolo North Sub-County, Kenya.

1.3 Purpose of the Study

The purpose of this study was to investigate the influence of pastoralists' drought management practices on their livelihoods in Isiolo North Sub-County, Kenya.

1.4 Objectives of the Study

This study sought to address the following issues:

- i. To investigate the influence of drought contingency planning on pastoralists' livelihoods in Isiolo North Sub-County
- ii. To explore the influence of drought relief strategy on pastoralists' livelihoods in Isiolo North Sub-County
- iii. To ascertain the influence of rehabilitation mechanism on pastoralists' livelihoods in Isiolo North Sub-County
- iv. To establish the influence of policies for drought resilience on pastoralists' livelihoods in Isiolo North Sub-County

1.5 Research Questions

This study also sought answers to the following questions;

- i. What is the influence of drought contingency planning on pastoralists' livelihoods in Isiolo North Sub-County?
- ii. To what extent does drought relief strategy influence pastoralists' livelihoods in Isiolo North Sub-County?
- iii. In what ways does rehabilitation mechanism influence pastoralists' livelihoods in Isiolo North Sub-County?
- iv. What is the influence of policies for drought resilience on pastoralists' livelihoods in Isiolo North Sub-County?

1.6 Significance of the Study

Pastoral communities in arid and semi-arid regions of Africa live with the expectation of drought. They continue to suffer, and increasingly suffer, catastrophic losses of livestock (capital and savings) during drought. The impact of drought is particularly acute for poorer members of communities with smaller livestock holdings and less developed social support networks. There is no doubt that livelihood interventions in emergencies

are more complex than food aid responses, and that greater capacity is required to design and implement them. Robust drought-preparedness plans can help national and international actors to react swiftly to early warnings of crisis, and mount coordinated responses. A good plan includes appropriate programming options and triggers for action, and predetermined roles and responsibilities amongst different actors.

It is hoped that the findings of the study would benefit the various groups who are directly involved when losses occur due to disaster. It is hoped that the recommendations of the findings would enable the government and other stakeholders to put in place mechanisms to mitigate losses in case of drought disaster risks. This has the advantages of realizing more resilience, livelihoods of the pastoralists and economic growth at rapid rates.

The findings of the study and recommendations are hoped to arouse the disaster management consciousness in the arid and semi-arid areas in Kenya and beyond. This can help them to avoid risks in the event drought disaster strikes and this drastically reduces losses. It is hoped that the various relief organizations such as Action Aid, world vision and other NGOs may benefit from reduced cases of losses from the disaster risks. This would then enable them to invest the money in other areas of community development such as building of schools as well as other amenities as a way of helping the realization of the social pillar of Kenya's Vision 2030.

The policy makers within the livestock sector may rely on the recommendations to come up with relevant policies for curbing and mitigating losses caused by drought disasters in the Country. The government through the County governments is hoped to get the actual picture and situation about the necessary strategies to check incidences of drought disaster.

It is hoped that future researchers may use the findings of the study as a basis for further research. This can reduce unnecessary duplications and improve the quality of research being carried out in the country. It can also provide ready data for reference to various scholars.

1.7 Delimitations of the Study

The study focused on pastoralist management of drought on their livelihoods with a focus on case of Isiolo North Sub- County. Conceptually, the study covered four aspects of pastoralist management for livelihoods of pastoralists, these are: drought contingency planning, policies for resilience, drought relief strategy and drought rehabilitation mechanism. Geographically, the study covered Isiolo North Sub- County, one of the dry counties in Kenya and mostly inhabited by pastoralist communities. The study covered pastoralists and Key Informants from Isiolo North Sub- County.

The study involved all the stakeholders in livelihoods of pastoralists in Isiolo. The reason for this was that disaster cuts across all the stakeholders of a given population. The researcher used the transmittal letter from the University to gain entry into the various respondents place of work as well as stakeholders and assure the respondents that the information they would provide would strictly be used for academic purposes only. The researcher also used a pilot test to weed out questions that may pose a challenge to the various respondents. To increase the response rate, the researcher went back several times until a sufficient response is achieved.

1.8 Limitations of the Study

The limitation of this study was the use of cross sectional descriptive research design which has its own inherent limitations in that it only investigates causation through analysis of past events; the investigator is not able to control attitudes of respondents which likely affect research findings. At times, respondents might have given socially accepted answers to avoid offending the researcher. However, efforts were made in explaining to the respondents on the importance of the study and requesting the respondents to be sincere and honest.

Another limitation was likely to be low literacy levels amongst the pastoral communities which might make it hard for the respondents to understand the questions posed, however effort was made by the researcher to explain questions in the local languages. Movement and migration by the pastoralist might also hinder access to the respondents in the target

group's locations when required. The researcher however made use of the local elders to reach the respondents.

The study was also likely to be faced with logistical problems owing to the hostile weather conditions in the area and ruggedness of the terrain and infrastructure in the entire County. These conditions were likely to hinder access to some respondents in an attempt to get information regarding effects of pastoralist management on livelihoods of pastoralists. The researcher countered these problems by employing research assistants to criss-cross the selected districts in search of respondents as well as making arrangements to meet the respondents during the community meetings which are usually held in designated areas and are easily accessible. This ensured that the research assistants got many respondents in the systematic areas without getting to travel through the villages in search of the respondents in the rugged terrain.

Further, the researcher was also likely to encounter problems of time as the research was being undertaken in a short period which would limit time for doing a wider research. However the researcher countered this limitation by carrying out a comprehensive research of the County which enabled generalization of the study findings to such other counties with the same settings as that of Isiolo North Sub- County.

1.9 Basic assumptions of the Study

The researcher assumed that the respondents would be honest, cooperative, factual (objectivity) and trustworthy in their response to the research instruments and would be available to respond to the research instruments in time. It was also the assumption of the researcher that the authorities in Isiolo North Sub- County would grant the required permission to collect data from the staff and the other stakeholders. The study further makes the assumption that there would be no serious changes in the composition of the target population that would affect the effectiveness of the study sample.

1.10 Definition of Significant Terms

Drought contingency planning: To ensure long term sustainable funding, contingency planning links with all stages of drought risk management and are treated as part of the development process. The contingency planning process, guidelines and evaluation affect effective drought preparedness and response at community levels. Inter-agency coordination, timeliness of the plans, decision making tools and drought cycle management play a critical role in ensuring that the disaster risk is reduced significantly in the area. Coordinated national drought resilience policies include comprehensive monitoring, early warning and information systems, impact assessment procedures, risk management measures, drought preparedness plans, and emergency response programs.

Drought Relief Strategy: Drought relief schemes as part of a national effort assist affected to deal with disaster risks. These strategies include alternative feeding, controlled grazing, veterinary interventions support, and water provision during drought and livestock supplementary feeds. Emergency relief provides a safety net for those elements of society that are most vulnerable while promoting self-reliance and the principles of a national drought policy based on the concept of risk reduction. As a result, external assistance becomes more fully integrated into the areas prone to drought disaster as survival strategies.

Rehabilitation mechanism: Rehabilitation actions in the event of drought provided support in the formulation of policies and plans for development in the pastoral areas. The mechanisms applied include direct livestock purchase, capacity building, agro-marketing and livestock micro financing. Measures to anticipate and cope with drought by focusing on long-term drought-resilience in addition to short-term response are in light of the evolving climate conditions.

Resilience: This is the capacity of a system, community, or society potentially exposed to hazards to adapt, by resisting or changing, in order to reach and maintain an acceptable level of functioning and structure. This is determined by the degree to which the social system is capable of organizing itself to increase its capacity for learning from past disasters for better future protection and to improve risk reduction measures.

1.11 Organization of the Study

This research project is organized in five chapters. Chapter one introduces the research and presents the statement of problem, objectives, and research questions. The chapter also shows the significance, delimitations, limitations and basic assumptions of the study. Chapter two encompasses the literature review on the various aspects concerning influence of pastoralist drought management on livelihoods of pastoralists. This involves bringing out the gaps and enhancing knowledge on influence of pastoralist drought management on livelihoods of pastoralists with a focus on drought contingency planning, policies for resilience, drought relief strategy and rehabilitation mechanism. Chapter three discusses the methodology that was used to collect and analyze data while showing the target population, the sample population, data collection instrument and data analysis. Chapter four presents the research findings and discussion of the findings while chapter five provides the summary of the findings from chapter four, gives the discussions and conclusions and makes recommendations of the study based on the objectives of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter is an extensive review on available, related literature of the theoretical and empirical literature to the problem being investigated. The review is undertaken to bring out the gaps and enhance knowledge on influence of pastoralist drought management on livelihoods of pastoralists. The submissions and thoughts of various authors on influence of pastoralist drought management on livelihoods of pastoralists will be reviewed and discussed under the following sub headings: drought contingency planning, policies for resilience, drought relief strategy and drought rehabilitation mechanism. The other sections presented in this chapter include theoretical framework and finally chapter summary.

2.2 Review on Pastoralists' Livelihoods

Drought phenomenon in most cases triggers emergency responses when the impact on local people is severe. The impacts depend upon the local peoples vulnerability to such shocks, and hence the need to understand the vulnerability to droughts as a prerequisite of designing preparedness, mitigation and relief policies and programmes. Globally, pastoralism is a global phenomenon, practiced from the Asian steppes to the Andean regions of South America and from the mountainous regions of Western Europe to the African savannah (FAO, 2011). It is practiced on 25 per cent of the world's land area, provides 10 per cent of global meat production, and supports an estimated 200 million pastoral households and herds of nearly a billion camelids, cattle and smaller livestock, in addition to yaks, horses and reindeer.

Across the continents the way pastoralism is practiced varies greatly, from the highly technologically advanced pastoral systems of Australia or the USA to partially subsistence systems in parts of Africa. The degree of social and political support for pastoralism is equally diverse, with some African governments strongly opposed to it, whilst many European countries increasingly promote mobile pastoralism in order to manage and conserve biological diversity. The current system thus has two problems: a lack of response to early-warning information, in which stakeholders prefer to see hard

evidence of an actual crisis (as opposed to an emerging crisis) before responding; and a late and inadequate response to the prevailing situation as provided by the bi-annual assessment reports.

Those agencies with their own contingency or emergency response funds were able to intervene earlier than those without access to such funds (Mainlay & Tan, 2012). Although contingency plans exist for the Districts where the ALRMP is operational, the quality of the plans varies, as does the ability to implement them in the event of a drought, though both the plans and the institutional structures are currently being strengthened through the EC-funded Drought Management Initiative. It is in this regard that the Government of Kenya (GoK), with support from EC, is establishing a national Drought Contingency Fund, a multi-donor basket where relevant stakeholders will contribute. On top of these projections, any incidence of extreme weather events like droughts would further be hit food production in the region.

The reductions in food production would have severe consequences most directly for smallholder farmers and agro-pastoralists, who rely on farming for income, and for all those who purchase such crops. Kenya (2009) describes Kenya's disaster profile as being dominated by drought disasters that disrupt people's livelihoods, destroy infrastructure, divert planned use of resources, interrupt economic activities and retard development. Kenya (2009) records that 1999-2001 drought disaster response costs were more than would otherwise be the case if sufficient efforts had been put in place for effective disaster management. Drought disaster risk management involves systematic analysis and manage of the effects of droughts through reduced exposure, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events (ISDR, 2005). Community participation refers to members of the public taking part in the analysis and management of threats posed by drought and developing survivability capacities.

Goyet (2009) challenges the myth that drought affected population would be too shocked and helpless to take responsibility for their own survival as superseded by the reality that many find new strength during emergencies. Communities affected by drought disasters have a role to play in disaster risk management and should be given the maximum

opportunity to participate in risk reduction and response programmes. People are involved to solve their own problems and cannot be forced to participate in projects which affect their lives but should be given the opportunity for involvement as it is a basic human right and a fundamental principle of democracy (Mainlay & Tan, 2012). Citizens are involved in community needs assessment where the community expresses opinions about desirable improvements, prioritizing goals and negotiating with agencies for synergy building where they are engaged to plan and design interventions through formulation of appropriate objectives, setting goals, criticizing plans based on traditional knowledge of disaster risk management.

2.3 Pastoralists' Drought Management Practices and their Livelihoods

Mendelsohn (2011) indicated that less developed regions are more likely to be vulnerable to climate change, due to the weaker capacity of local residents to adapt and recover from the impacts. This would in turn prevent acute disaster by reducing disaster risk at the community level, through identification of the risks and translating the knowledge into preventive actions. Drought affects more people than any other disaster in Africa (Rekacewicz, 2012) and its consequences is 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. Rural areas are more vulnerable to drought because the rural economy is tied to the agriculture sector, which has lower technology and where climate change is a factor whose substitutability is very limited (Whittingham, 2011).

UNDP (2011) illustrates that in the ASALs of Sub-Saharan Africa, it is likely that the forces of extreme weather events and aridity became more frequent and intense as a result of climate change thereby undermining and offsetting much of the progress already achieved in meeting the United Nations Millennium Development Goals and contribute to the continued downward spiral of poverty and environmental degradation. Oxfam (2011) elaborates that climate in the Horn is experiencing an increase in the rates of drought and that drought-related shocks used to occur every ten years, and they are now occurring every five years or less. Among Borana communities of Ethiopia, whereas droughts were recorded every 6-8 years in the past, they now occur every 1-2 years which

is now the case over the entire East Africa region (Burundi, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, Somalia, Sudan, Tanzania and Uganda) and come with inevitable uncertainties associated with localized impacts.

Even with moderate increases in the length of crop growing period in some patches of the region, agricultural productivity could decline dramatically due to climate change in the decades ahead as temperatures increase and rain patterns change. The causes of vulnerability and poverty in Kenya's ASALs stem not only from recurrent drought but also conflict and insecurity, together with inadequate services associated with inappropriate development policies, and years of economic and political marginalization. However effective disaster management may be, it cannot replace the need for long-term development. Hisdal and Tallaksen (2010) believe that drought is by no means unusual or unnatural; their conclusion is that drought is by far the most costly to our society in comparison to all the natural disaster. The level of response to district-level early warning and assessment reports tends to be very low.

At national level, forward-looking early warning reports are issued to alert the government, donors and other actors. However, it is the bi-annual seasonal assessments that actually trigger the appeal process that leads to an emergency response. The usefulness of the seasonal assessments in relation to decision-making has been questioned because they take a long time to be released, so their content tends to be backward-looking rather than forward-looking. This study sought to investigate the influence of drought contingency planning drought relief strategy, rehabilitation mechanism and policies for drought resilience on pastoralists' livelihoods in Isiolo North Sub-County.

2.3.1 Drought Contingency Planning and Pastoralists' Livelihoods

Contingency planning is a management tool used to analyze the impact of potential crises and ensure that adequate and appropriate arrangements are made in advance to respond in a timely, effective and appropriate way to the needs of the affected population (IASC, 2007). It is a management process that analyses specific potential events or emerging situations that might threaten society or the environment and establishes arrangements in advance to enable timely, effective and appropriate responses to such events and

situations. Accordingly, drought contingency planning is a systematic process of integrating drought risk management from well designed, coordinated and funded drought contingency plans. The emphasis in drought contingency planning is in formalizing and enforcing the process from clarity in the roles of different individuals, communities and institutions in managing drought risks.

According to UNISDR (2009), the percentage of persons affected by drought in the African continent between 1970 and 2008 is nearly 80 percent. According to Wilhite et. al., (2005), past attempts to manage drought and its impacts has been ineffective, poorly coordinated, and untimely. In addition, the intrinsic value of drought management as a strategy, rather than as an operation, remains relatively unexplored (Caritas Czech Republic, 2009). Drought contingency planning as a decision making and fund raising tool for drought risk management, evolved from the 1970s to date. A number of models emerged since then to move the drought risk management into the agenda of governments and funding agencies. However, as many drought crisis management have exposed, more emphasis is in funding drought responses and less overall drought preparedness and early warning.

According to Levine, Crosskey and Abdinoor (2011), the concept of drought cycle management as a planning, decision making, funding and management tool in drought management has proven futile in actual drought risk management. While the drought cycle management, a cyclic process that defines what actions to be taken in different stages of a drought, the plans themselves are static rather than dynamic with less or little changes in the specific stages of drought. This is particularly true in the designing of contingency plans during alert stages of drought cycle for activation (in similar way) during alarm and emergency stages of the drought cycle. Concentrating on development and mitigation activities has, therefore, been very difficult as focus is on short term repeated measures rather than larger scale ó long term drought risk management.

Though drought contingency plans have various activities to support drought risk reduction by including minimal preparedness, response and recovery actions, there is very little link between preparedness, early warning and early action/ response. Contingency planning has not helped people to be on time because it had not told people

when action would be needed (Levine *et. al.* (2011)). In fact, most drought contingency plans are response oriented with little emphasis on mitigation. This could be associated with technical capacity of those involved in contingency planning or timing and duration for its development is too short and not part of a bigger drought risk reduction strategy. Drought contingency plans are themselves insufficient to coordinate interagency drought contingency planning for effective preparedness and response. This is largely true in that most drought contingency plans are not only geographical focused but at times thematically defined. A good part of drought contingency plans reviewed are focused mostly on livestock.

The past practices however have largely focused on interventions after drought with little investments in strengthening the communities' capacities to manage risks on their own. Existing drought contingency plans, especially in northern Kenya and southern Ethiopia are usually ad hoc with little local level inputs and largely top down based on government's departmental level staffs' perception of the community needs. There is need to reverse this approach and focus on contingency plans that originate from the local population, and inbuilt into district and national level drought disaster plans (Mainlay & Tan, 2012). This would in turn fit into regional and international strategies and policies thereby integrating the planning systems into coherent strategic plans that would in future be ecosystem based and consequently create higher impact. If this is not handled properly most of the drought contingency plans will react rather proactively to complex livestock and non livestock livelihood based responses. The most significant gap is that agencies' policies and mandates for drought contingency planning are more policy-led than operationally driven.

2.3.2 Drought Relief Strategy and Pastoralists' Livelihoods

The first guiding principle in any drought management programme should be the recognition that the occurrence of variability and unreliability of rainfall is the expected course of events in arid and semi-arid zones such as those experienced in Northern Kenya. According to UNDP (2011) coping with variable rainfall and drought therefore, has to be a major aim of any pastoral systems support programme. A prerequisite for support programmes is a clear understanding of the nature of, and responses to drought.

As a result, fluctuations in livestock holdings and the subsistence production and income they provide for their owners are inevitable. Ndikumana (2010) noted that while pastoralists in Eastern Africa demonstrated an ability to describe their environment and indeed to recognize drought, they were unable to utilize that information in a predictive manner. There are also interrelations between mitigation measures, relief and rehabilitation.

Relief is ideally be targeted on particularly vulnerable sections of the population that cannot be reached by mitigation measures. It is also argued that restocking after drought will make livestock purchase as a mitigation measure easier. Scientists at times have been equally inept at tracking the dry-land environment in a predictive manner (Ndikumana, 2010). Early warning systems (EWS) instituted by national governments have over time focused on crop production and thus utilize indicators which are geared more towards crop production than drought prone areas. The justification behind early warning is that it allows government and donors to intervene promptly and avoid humanitarian crises by early intervention to mitigate the impact of drought (Barton, 2001). The mitigation of the impact of drought on pastoral communities' livelihoods will be dependent upon a range of activities, and/or strategies, not all being required under each circumstance, some supported by the government, others by donors and, perhaps most important of all, by the communities themselves (Swift, 2011).

Such initiatives have contributed in the segregation of the pastoral zones. According to Ndikumana (2010), institution of a reliable Livestock Early warning System (LEWS) which focus on the pastoral areas requires reliable indicators which are focused on the needs of pastoralists and can be translated into appropriate and timely action; coping mechanisms which are effective, enabling rapid response to indicator advisories and making provision for recovery; and a well-established and coordinated disaster management network at the local, regional, national and even international levels (since pastoralists do not necessarily respect inter-national borders) in order to effectively communicate the warning, and facilitate coping mechanisms and the recovery process. There are specific policy areas where states, at either local or national level can

contribute to drought resilience among the pastoral communities, and enabling the functioning of specific mitigation strategies.

Pastoral associations should have a role to play in various ways including conflict resolution, negotiated tenure regimes for dry-season and drought-time grazing, communal management of water resources, the protection of grazing rights, access to and management of the natural resources, the delivery of human/livestock health services, revenue collection by charging for grazing rights and water use and collective livestock trade and marketing (Barton, 2011). These policy areas include pastoral institutions building, support of pastoral marketing, infrastructure and security. The current weakness of formal policies and structures allows for an approach to the current drought response system that 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 rather than also contributing towards preventing disaster or assisting in recovery through support to livelihoods.

Both of these notions contribute towards the persistence of an institutional dependency on food aid, in which the system has become geared towards food aid delivery; this is further supported by influential economic and political power structures that work to maintain the status quo. Such short-term thinking goes against existing good practice and conceptual models. Livelihoods are clearly evolving, but pastoralism remains the dominant production system in the ASALs and underpins its regional economy. In some counties it provides employment and food security to more than 70 per cent of households (UNDP, 2011). It also makes an important contribution to natural resource management and sound stewardship of the natural environment. There have always been strong social and economic ties between mobile and settled populations; these are being cemented still further as the diversification of urban livelihoods is tending to focus on value addition within the livestock sector. However, pastoralism has never been afforded the policy and institutional support which will allow it to flourish to the full, despite evidence of pastoralists' adaptability both to climate variability and emerging economic opportunities.

The African Union's Policy Framework for Pastoralism in Africa requires domesticating in the Kenyan context and measures taken to support mobility, a key drought management strategy (African Union, 2010). In terms of implementation, the capacity to identify, design, plan, coordinate and implement timely livelihoods interventions is limited by a poor understanding of pastoral livelihood systems by some senior decision-makers and a lack of consensus on what constitutes sectoral mitigation, emergency and recovery activities. This results in a lack of capacity to prepare proposals quickly at the national level, and implementation is further hampered by rigid planning systems and cumbersome financial procedures among key ministries and UN coordinating agencies, and ó in some districts ó a lack of implementation capacity, both in terms of coverage and technical expertise. Although early warning knowledge is extremely important, the focus must be on the mechanism by which such knowledge is translated into coping mechanisms to the pastoral system (Ndikumana, 2010).

An appropriate indicator that is translatable into timely action ensures protection through appropriate mitigation and promotion of the recovery of the pastoral economy. Retrospectively, most EWS have elicited a response in terms of provision of food entitlement (food aid), which in fact signals that the monitoring indicator and/or its translation into action were inappropriate (Ahmed et al., 2001). Assuming that funding is available, one way in which more timely interventions can be achieved in the non-food sectors is through following the example of the success of the food sector, in which plans and templates already exist, making the task of putting together proposals and appeals much easier and faster in the event of an emergency. However, the non-food aid actors in Kenya have first to demonstrate that there are effective, appropriate and beneficial livelihoods interventions which can be implemented as preparedness, mitigation, emergency and recovery measures to address drought impacts.

2.3.3 Rehabilitation Mechanism and Pastoralists' Livelihoods

Livestock markets are essential for supporting pastoral livelihoods. Therefore, it is imperative for governments to establish markets in pastoral areas to enable smooth running of livestock trade. Marketing interventions during drought episodes should commence just before the onset of drought, since at this time pastoralists will sell their

livestock at good prices and therefore boost their purchasing power (Barton, 2011). There are however, some macro-economic and sectoral policies e.g. external trade policies on livestock and livestock products and subsidies on crop inputs and feed that constrain pastoralism. Large areas of most ASAL districts of northern Kenya, for instance, are subject to restricted access and utilization due to resources use conflicts (Barton et al, 2011). Improved security is a prerequisite for more efficient grazing land-use and especially drought-time grazing in the region. Many of the areas of worst security happen to be in the remote ranges used for drought-time grazing.

Preparation for the provision of security should be a key consideration in drought contingency preparation and also in government's general policy towards pastoral areas (Barton, 2011). Pastoral communities have mechanisms for coping with and recovering from drought. Understanding these strategies and practices is essential for the development of policy, infrastructure and support services that enhance their ability to survive the drought. Although a lot of work has been done in this area on various aspects such as development interventions, conflict management, drought occurrences, early warning systems, drought coping strategies, there is little information on the post-drought period in general and on the recovery strategies in particular. Strengthening and rebuilding of these appropriate post-drought recovery strategies, therefore, need to be emphasized. During droughts, pastoralists are usually faced with changes in terms of trade that adversely affect the purchasing power represented by their herds. This is because where drought conditions also touch the farming sector; there will be a reduced quantity of grain available to be marketed (Levine *et. al.* 2011).

Moreover, demand by farming communities for livestock products is likely to fall, due to reduced productivity in the agricultural sector as a result of drought and poor condition of animals coupled with the relative fall in income and demand for livestock products such as milk and meat, in contrast to grain. According to Berkes and Jolly (2011) directly negotiated agreements between pastoralist groups are critical and this should be initiated and enforced by the government. Coping mechanisms are the actual responses to crisis on livelihood systems in the face of unwelcome situations, and are considered as short-term responses (Berkes & Jolly, 2011). Adaptive strategies are the strategies in which a region

or a sector responds to changes in their livelihood through either autonomous or planned adaptation (Campbell, 2008). Coping mechanisms may develop into adaptive strategies through times. However, it is difficult to make a clear distinction between coping mechanisms and adaptations; this study considers both schemes as coping strategies.

2.3.4 Policies for Drought Resilience and Pastoralists' Livelihoods

According to Abdulfatah (2012) addressing the root causes of recurrent crises is not only better, especially for the people concerned, than only responding to the consequences of crises, it is also much cheaper. When the world is experiencing an economic and budgetary downturn, the budgets of both partner countries and donors are coming under increased pressure to show that they deliver the maximum impact for the funds that are made available. There are close linkages among these components. Specific policies for resilience are not only closely related to mitigation, but are also necessary for specific mitigation measures.

Accordingly, strategies to guarantee access to specific grazing reserves during drought periods must be developed in the general policy on pastoral land tenure, and the effectiveness of emergency marketing interventions may be severely limited by a lack of marketing infrastructure and price distortions in end markets (Barton *et al*, 2001). Despite recent improvements to early warning and contingency planning systems, drought management in Kenya has continued to take a reactive, crisis management approach rather than an anticipatory and preventive risk management approach. Late response leads to an over-reliance on emergency food aid, which may deepen dependency, disrupt socio-economic activities and undermine existing marketing systems, thereby weakening rather than strengthening resilience.

Failure to act promptly and appropriately on early warning information, coupled with a lack of contingency finance, contributes significantly to drought emergencies (Blench & Marriage, 2008). At the moment, drought risk mitigation measures have rarely been linked to existing international and regional strategies like the Hyogo Framework for Action 2005-2015 and the Programme of Action for the Implementation of the Africa

Regional Strategy for Disaster Risk Reduction (2006-2015). There have been some efforts at international, regional and national levels to address the challenges of increasing drought risks, but more needs to be done to improve coordination on aspects like drought monitoring, predictions, early warning and disaster preparedness programmes. An appropriate disaster mitigation plan requires that there be a comprehensive early warning system that is based on multiple physical and social indicators and indices that can guide and facilitate implementation of appropriate coping and mitigation actions (Cordaid and IIRR, 2011). At the moment, existing early warning systems are largely lacking in content. The data and information products are often not user friendly and the target users are often not trained in the application of this information to decision making process.

There have been previous cases of unreliable seasonal forecast and no specific information on projected impacts with the data itself, not appropriately shared among the stakeholders. This has largely left both the government and communities ill-prepared to tackle subsequent droughts despite having previous experiences in droughts. Governments have the primary responsibility for sustainable development and appropriate disaster risk reduction policy (Gallopín, 2006). Drought-related policies and plans should emphasize risk reduction (prevention, mitigation and preparedness) rather than relying on drought relief. Drought management is a cross-cutting issue that requires collaborative action by a range of public and private sector agencies at national, county and community levels. There are many actors implementing and coordinating drought management initiatives, resulting in duplication, confusion, lack of synergy, and poor accountability. This degree of complexity calls for policy, institutional and legal frameworks capable of aligning initiatives to the government's development plans and harmonizing approaches and strategies in different areas.

Due to increasing global interdependence, there is need for all actors to at least share information and where appropriate act in tandem with government strategies where they exist or facilitate improvement of such strategies. According to ISDR (2009), drought management system includes policies and strategies, an early warning system, a funded contingency plan and an overall drought coordination and response structure. Main

stakeholders involved in drought management in Kenya include the GoK and its line ministries, various development partners and non-governmental organizations (NGOs). At the end of the 2008-2009 droughts, which badly affected livestock based communities in the Kenyan drylands, the delegation of the European Union considered it opportune to review how effectively the above-described drought management structures mitigated and alleviated the negative impacts of the drought.

Late 2009 the EU delegation thus called for a review to contribute to improved effectiveness and efficiency of the drought management system in Kenya by strengthening the capacity to intervene with livestock based interventions in an appropriate, effective and timely fashion (Muhuba, 2013). The current weakness of formal policies and structures allows for an approach to the current drought response system that 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 rather than also contributing towards preventing disaster or assisting in recovery through support to livelihoods. Both of these notions contribute towards the persistence of an institutional dependency on food aid, in which the system has become geared towards food aid delivery; this is further supported by influential economic and political power structures that work to maintain the status quo. Such short-term thinking goes against existing good practice and conceptual models.

2.4 Theoretical Framework

Theoretical framework is a structure that can hold or support a theory of research work. According to Rocco and Plankhotnik (2009), a good research should be grounded in theory. A theory is a coherent group of tested propositions commonly regarded as correct that can be used as principles of explanation and prediction for class of phenomena. Different theories have been employed to help bring clarity to the study of the influence of risk management on project completion. This study is grounded on Bordieu's theory and Community Empowerment Model.

2.4.1 Bordieu Theory of Cultural, Social, and Symbolic Capital

Bordieu's theory emerged from French sociologist, anthropologist, and philosopher Pierre Bourdieu (1930 ó 2002). Bordieu's theory offers a way to examine the cultural, social, and symbolic capital within a community. Social capital means resources that one can acquire through their network of mutual relationships with others in order to secure benefits. Cultural capital is the non-financial social assets that are inherited and/or granted through academic credentials and qualifications and Symbolic Capital is the source of power one uses against those who are less powerful. Bordieu argue that individually each of us is impacted by our social location (s) which influence the judgement of taste meaning that the places we associate ourselves with have significance on what we opt for. Since CMDRR is built on the three pillars of appreciation of indigenous knowledge, local capacities and proactive planning to reduce risk and capacity development of community organizations, then it means that the implementers of CMDRR ought to be fully aware of the capital the community members and hold in order to understand the appropriate approach to promote participation in drohgt management.

2.4.2 Community Empowerment Model

Empowerment is one of the important pillars in development and it has been used in many disciplines including health (WHO, 1986; Baum, 2008), education (Wallerstein & Edwards, 1988) and in political, gender, economical and community development (Laverack, 2009; Tesoriero, 2010). In the most general sense, empowerment refers to the ability of people to gain understanding and control over personal, social, economic, and political forces in order to take action to improve their life situations (Baum, 2008). As a significant public health concept, Baum (2008) describes empowerment as the ability of people to gain understanding and control over personal, social, economic, and political forces in order to take action to improve the healthy living. As a methodology and the theory, community empowerment has developed significantly in the past three decades. It is described to comprise both processes and outcomes (Tesoriero, 2010) which themselves may lead to community development.

The above attributes reinforce the notion that organisations empower individuals as part of the organizational process. An empowering organization recognizes and incorporates necessary linkages among members, such as interest groups, status groups, and formal subunits. Additionally, an empowered organization also has influence within the larger system of which it is a part. Thus, empowerment at the organizational level incorporates both processes that enable individuals to increase their control within the organization, and the organization to influence policies and decisions in the larger community. The concept of the organization as both empowered and empowering helps provide the link between the organization level and the individual and community levels of empowerment.

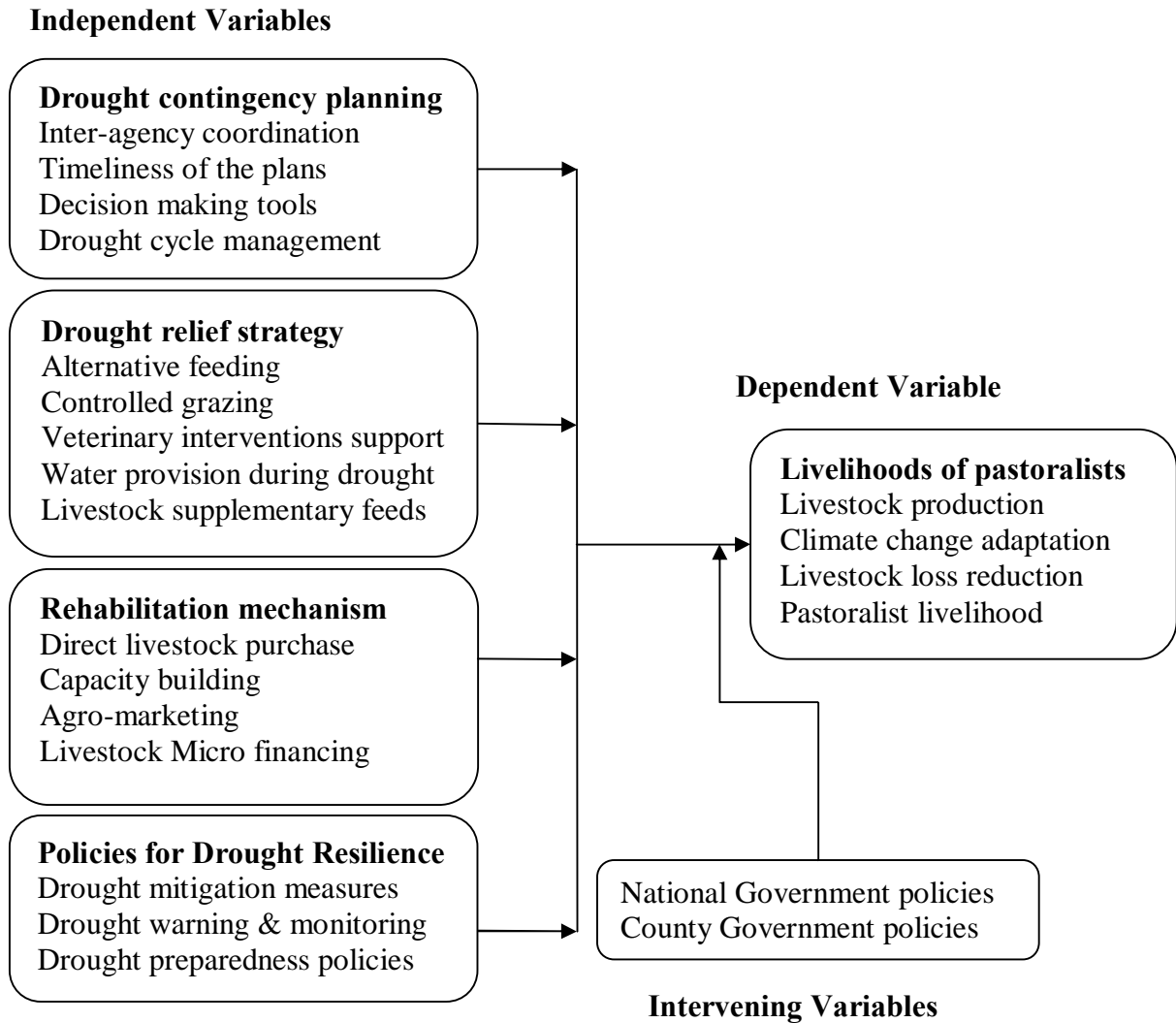
At the community level, an empowered community makes it possible for individuals and organizations to apply their skills and resources in collective efforts to meet their respective needs. As such an empowered community has the ability to influence decisions and changes in the larger social system. Braithwaite and Lythcott (1989) support this argument and describe that empowerment at the community level is connected with empowerment at the individual and organizational levels. In practical sense, and as McMurray (2007) states, empowerment brings back power to the people by improving people's participation, increasing individual and community control over various programs that impact their development and also improves a sense of local ownership and collaboration.

2.4.3 The conceptual Framework

To guide the assessment on pastoralist management of drought as a strategy of disaster risk reduction in Isiolo North Sub- County the interrelationship between variables discussed in the literature review is presented in the conceptual framework model shown in Fig. 2.1. A conceptual framework is a tool researcher's use to guide their inquiry; it is a set of ideas used to structure the research, a sort of a map (Kothari, 2004). It is the researcher's own position on the problem and gives direction to the study. It may be an adaptation of a model used in a previous study, with modifications to suit the inquiry. Aside from showing the direction of the study, through the conceptual framework, the researcher can be able to show the relationships of the different constructs that he wants

to investigate. As shown in figure 2.1, the independent variables include drought contingency planning, policies for resilience, drought relief strategy and rehabilitation mechanism, while the dependent variable will be drought livelihoods of pastoralists.

Figure 2.1:



Source: Author, 2018

Figure 2.1: Conceptual Framework

2.5 Research gaps

Kanwar (2008) observes that catastrophic hazards, characterized by limited or lack of warning may result in catastrophic outcomes, hence viable mitigation actions that can be taken (at the local level) are those of preparedness, i.e. instituting plans and programs to cope with potential disruption or destruction of physical and social systems. Changes in

the distribution of livestock ownership within the pastoral economies, as well as increased investment in dryland livestock by all sectors of society, meant that the relevance of pastoral production strategies is no longer limited to herding households or even to pastoral groups. According to ISDR (2009) drought leads to significant environmental, agricultural, health, economic and social consequences. It is a complex slow onset hazard that allows mitigation and preparedness.

Drought phenomenon in most cases triggers emergency responses when the impact on local people is severe. The impacts depend upon the local peoples vulnerability to such shocks, and hence the need to understand the vulnerability to droughts as a prerequisite of designing preparedness, mitigation and relief policies and programmes. This would in turn prevent acute disaster by reducing disaster risk at the community level, through identification of the risks and translating the knowledge into preventive actions (Zwaagstra, Sharif, Wambile, de Leeuw, Said, Johnson, Njuki, Ericksen & Herrero, 2010).

The performance and output of a pastoral livestock system depend on how livestock keepers manage the relationship between their livestock and the environmental resources, so that the former transform the latter into a desired stream of goods and services. According to UNISD (2013), disasters are a major problem worldwide and a serious threat to pastoral farming. Their impacts are diverse: as well as loss of life, injury and disease and the destruction of property and other assets, disasters can also cause social and economic disruption, loss of infrastructure and other services and damage to the environment. In an increasingly integrated world economy built on networks of global supply chains, disasters in one country can easily affect others, and a shock or disruption to one part of the supply chain, such as a production plant or distribution centre, can have a ripple effect throughout the whole chain. Community based approaches to development are becoming more common place as the development community come to realise the benefits of this approach (Uitto & Shaw, 2016).

Pastoralists' livelihoods strategies have evolved over centuries to adapt to hot and dry climate with low and erratic rainfall, typical of the arid and semi-arid lands. According to IUCN (2015), pastoralism is found to contribute significantly to the GDP of many

developing country economies: for example, about 20% of GDP in Kyrgyzstan, 30% in Mongolia, 8.5% in Uganda and 10% in Mali. According to Action Aid (2012) pastoralist communities are predisposed to disasters by a combination of factors such as poverty, aridity, settlement in areas prone to drought. Due to increasing global interdependence, there is need for all actors to at least share information and where appropriate act in tandem with government strategies where they exist or facilitate improvement of such strategies. However, climate change has recently brought some new challenges and forecast implications especially for the arid land ecosystems. This study sought to establish the influence of pastoralists' drought management practices on pastoralists' livelihoods in Isiolo North Sub-County, Kenya.

2.6 Summary of Literature Review

This chapter looked into the theoretical literature, conceptual framework and the empirical review relating to the objectives of this study. The chapter provides a general discussion of the literature reviewed and this was necessary in order to see what had been done in this field and to assist in attaining of the research objectives. From the review, there is a growing need to understand the influence of pastoralists' drought management practices on pastoralists' livelihoods in Isiolo North Sub-County, Kenya. However, there is a dearth in literature on the influence of pastoralists' drought management practices on pastoralists' livelihoods in Isiolo North Sub-County, Kenya. The next chapter is focused on discussing the research methodology utilized in this study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter sets out various stages and phases that were followed in completing the study. It involves a blueprint for the collection, measurement and analysis of data. The research identified the procedures and techniques that were used in the collection, processing and analysis of data. Specifically the following subsections were included; research design, location of the study or site description, target population, unit of analysis and unit of observation, sample size and sampling procedure, method of data collection, validity and reliability of research instruments, data analysis and presentation and ethical consideration

3.2 Research design

A research design is the plan, structure and strategy of investigation conceived so as to obtain answers to research questions. The research was designed as a cross sectional descriptive study. Cross-sectional studies, also known as surveys, are a useful way to gather information on important health-related aspects of people's knowledge, attitudes, and practices. The purpose of a survey is to explore and describe a phenomenon. According to Cooper and Schindler (2011), surveys are more efficient and economical. They help the researcher to know much about opinions and attitudes of the respondents. Cross sectional survey also seeks to obtain information that describes existing phenomenon by asking individuals about their perceptions, attitudes, behaviors or values with the aim of assessing the influence of pastoralist drought management practices on pastoralists' livelihoods in Isiolo North Sub-County.

3.3 Target Population

Target population is the specific population about which information is desired. Target population is the specific population about which information is desired. According to Mugenda and Mugenda (2012), target population is the members of a real or hypothetical set of people, events or objects the researcher wishes to generalize the results of the research. The target respondents included pastoralists from Isiolo North Sub- County. This population is spread across the constituency in Isiolo North Sub- County.

In this study the households are recognized as the basic unit of analysis which include more than one individual (although a single individual can also constitute a household), who share economic activities necessary for the survival of the household and for the generation of wellbeing for its members. The rural poor, dependent on pastoralism constitutes the target population while the unit of analysis will be the household with the household head serving as the unit of observation for the study. According to Kenya National Bureau of Statistics (KNBS, 2009) the Isiolo North Sub-County had a population of 143,294 at the end of year 2009 making a total of 14,325 households in the Sub-County spreading across the entire County. According to the County Government (2017) 75% of the families in Isiolo North Sub- County are dependent on pastoralism for their upkeep. For the purpose of this study, the household heads of approximately 14,325 in each of the five districts were involved.

The study also selected key informants who include local leaders (usually local chiefs, elders, and community/clan leaders), livestock officers, arid and semi-arid land officials, politicians (like MCAs, MPs and County Government officials), pastoralists from Isiolo North Sub- County and civil society personnel (e.g. NGOs and politicians like MCAs, MPs and County Government officials). This was done through the County governments who assisted the researcher to identify those persons who had lived in the area for more than ten years. All these data sources constitute the units of analysis.

3.4 Sample Size and Sampling Procedure

This research used purposive sampling. In this study the researcher selected strata~~s~~ which included government officials from relevant departments including water, livestock, drought management, provincial administration among others, NGOs officials who worked in the county in last sequence of droughts, officials and community chairpersons from the constituencies in the County who are directly involved in pastoralist drought management. This study employed purposive sampling technique to sample locations for data collection in the County. The purpose of choosing this method was to avoid bias and ensuring a representative sample is selected. Households studied were randomly selected.

Owing to the large population of the households, the study made use of Krejcie and Morgan Sampling method to select the corresponding sample for such a big population. According to Krejcie and Morgan (1970), a sample corresponding to the target population of 14,325 is 384. This implied that a total of 375 households were sampled. To avoid biasness, 187 households were selected randomly and conveniently from each of the constituencies. No sample frame was prepared for the key informants and focus group discussion participants. Key informants are people perceived to have particular insight or opinions about the topic under study.

In this study, the main criteria for selecting the key informants was their extensive knowledge of the cultural practices related to drought, both today and in the past, and their length of stay in the study site. As such, five government technical staff and five stakeholdersø key informants were drawn using purposive sampling technique for administration of data collection instruments. Accordingly a total of 384 respondents were selected to participate in this study. The distribution of the sample is as shown in Table 3.1.

Table 3.1: Sample Population

Category	Number (Population)	Sample Size
Pastoralist households	14,325	374
Government technical staff (livestock officers, arid and semi-arid land officials, local chiefs, elders, community/clan leaders)	50	5
Stakeholdersø key informants (MCAs, MPs, NGOs society personnel)	50	5
Total	14,424	384

3.5 Data Collection

Data was collected using both quantitative and qualitative methods including documents review, questionnaire administration to the various stakeholders, key informant interview and Focused Group Discussions. The researcher relied on self-administered questionnaires. A questionnaire is a research instrument that gathers data over a large sample (Kombo & Tromp, 2006). The advantages of using questionnaires are that the person administering the instrument has an opportunity to establish rapport, explain the purpose of the study and explain the meaning of items that may not be clear.

Questionnaires give respondents freedom to express their views or opinions and also to make suggestions. Questionnaires are also anonymous. Anonymity helps to produce more candid answers than it is possible in an interview. On the other hand, the disadvantages of questionnaires include that the researcher has no control over participant interpretation, they can at times realize low response rates, there is usually uncertainty about who actually filled out the questionnaire, and they can be rendered useless with non-literate, illiterate populations or hard-to-reach populations. The researcher sought a research permit from the University of Nairobi and thereafter wrote letters to the authorities in Isiolo North Sub- County to be allowed to do the study. The selected samples were visited and the questionnaires administered to the respondents. The respondents were assured that strict confidentiality would be maintained in dealing with their identities. The completed questionnaires were collected at the agreed time.

Individuals who are participating in the drought management programs were interviewed on issues relating to influence of pastoralist drought management on pastoralists' livelihoods in Isiolo North Sub-County. These included livestock officers, arid and semi-arid land officials, politicians (like MCAs, MPs and County Government officials) and civil society personnel (e.g. NGOs). Key informants and community leaders were also invited while community members, group of men, women and youth constituted focus group discussions. Each of these groups was handled as a separate entity.

3.6 Validity and Reliability of Research Instruments

Cooper and Schindler (2011) indicate that a pilot study is conducted to detect weaknesses in design and instrumentation and to provide proxy data for selection of a probability sample. The pilot study was conducted using 20 respondents drawn from other counties (e.g. Turkana County) where pastoralists were drawn to participate. It is only during pre-testing that the researcher will be able to assess the ease of use of the instrument. Any sensitive, confusing or biased items will be identified and modified or omitted. Pretesting permits refinement before the final test. This is the researcher's best opportunity to revise scripts, look for control measures and scan the environment for factors that confound the results. This involved checking whether the questions are clear and revoking any positive

or negative response. It also helped to find out whether the questions are measuring what is expected.

3.6.1 Validity

Obwatho (2014) defines validity as the degree by which the sample of test items represents the content the test is designed to measure. Content validity which was employed by this study is a measure of the degree to which data collected using a particular instrument represents a specific domain or content of a particular concept. Mugenda and Mugenda (2012) contend that the usual procedure in assessing the content validity of a measure is to use a professional or expert in a particular field. To establish the validity of the research instrument the researcher sought opinions of scholars and experts including the supervisor. This allowed modification of the instrument thereby enhancing validity. Furthermore, the study assessed the responses and non-responses per question to determine if there was any technical dexterity with the questions asked.

3.6.2 Reliability

Reliability was also confirmed by pre-testing the questionnaire with a selected sample from one of the projects. It is an indication of the stability and consistency with which the instrument measures the concept and helps to assess the "goodness" of measure. Mugenda and Mugenda (2012) views reliability as a measure of the degree to which a research instrument yields consistent results or data after repeated trials. A researcher should consider the sources of error likely to be present in the study while choosing measure of reliability. In this study reliability was ensured by pre-testing the questionnaire with a selected sample. The pre-test exercise took place at the convenient of both the researcher and the respondents. The pretest was conducted by both the principle researcher and the research assistants to enhance clarity of the questionnaire.

Mugenda and Mugenda (2012) reported that the accuracy of the data collected largely depends on the data collection instrument in terms of validity and reliability. This instrument was reviewed based on the pre-test experience. Internal consistency method will be tested using Cronbach's Alpha. Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. A "high" value of

alpha is often used as evidence that the items measure an underlying (or latent) construct. Reliability with a predetermined threshold of 0.7 is considered acceptable. That is, values above 0.75 indicated presence of reliability while values below signified lack of reliability of the research instrument.

The pilot study was carried among 20 respondents purposively chosen from Samburu County and reliability tested using a Cronbach's Alpha. A reliability of above 0.7 was achieved and this was considered reliable as recommended by Sydorenko (2012) who recommended that a reliability test which yields a coefficient greater than or equal to 0.7 is sufficient enough. The respondents were also informed that the research is meant for academic purposes only and that the study would have no intention of using the information for personal gains. The respondents were not required to indicate their names and participation in the study was on voluntary basis.

3.7 Data Analysis and Presentation

After the data is collected there was cross-examination to ascertain their accuracy, competences and identify those items wrongly responded to, spelling mistakes and blank spaces. Quantitative data was then entered into the computer for analysis using the Statistical Package for Social Sciences (SPSS). The frequencies and percentages were obtained. Tables were used to present the data while descriptive statistics such as percentages and frequencies were used to answer research questions. Qualitative data was analyzed according to the themes in the research objectives. The results of the analyzed quantitative data were presented by use of tables. Qualitative data collected from key informants were analyzed and presented as confirmation to the quantitative data collected from the community. There was further processing for presentation of results in a variety of graphs and charts using Ms Excel. Content data was presented in prose form.

Inferential statistics were undertaken to test the relationship between the variables and enable the researcher generalize results from the sample to the population. To examine the extent of influence of the independent variables on the dependent variable, the multiple linear regression analysis will be applied. The empirical model used in the study is a multivariate regression model presented as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$$

Where Y is livelihoods of pastoralists, X₁= drought contingency planning, X₂= drought relief strategy, X₃ = rehabilitation mechanism and X₄ = policies for drought resilience. Further, β₁, β₂, β₃ and β₄ = Regression Coefficients and ε = Error term. The multiple R square (R squared) was used to measure the goodness of fit of the overall model. The model measured the amount of variation in the dependent variable (livelihood) explained by the overall model and ranged between 0 and 1. The closer it was to 1 then the more significant moderating effect and thus the better the model. Conclusions were then drawn from the findings and recommendations made.

3.8 Ethical Consideration

The five principles guiding ethics in research are scientific merit, equitable selection of subjects, seeking informed consent, confidentiality and avoidance of coercion as indicated by Kothari (2008). Prior to commencing the field data collection exercise, the researcher will seek approval through a letter of recognition from the University of Nairobi. Due to sensitivity of some information collected, the researcher holds a moral obligation to treat the information with utmost propriety. The researcher treated the information gathered as strictly confidential information and only used it for academic purposes. In addition, the information given was not disclosed the respondents' identities. Those respondents who would not be willing to fill in the questionnaires were not forced to do so.

Since the respondents were likely to be reluctant to disclose some information, the researcher needed to reassure the respondents of confidentiality of the information given. The research was based on voluntary participation; participants were not under duress in any way to answer any questions they feel uncomfortable about. Participants were fully informed about the procedures involved in the research and their consent was sought before commencing.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter presents research findings and discussion of the findings. It presents the response rate, sample characteristics, and descriptive analysis of the data. The chapter is divided into different sections. The main section presents descriptive statistics featuring the survey response rate; demographic profiles of respondents that took part in the study; the confirmatory frequency/percentage analysis and the description of the variables. The percentages, means, frequencies, standard deviations, are computed and presented. The other section presents the results of the test of hypotheses and the discussion of research findings. The descriptive data presented forms the basis for hypotheses testing and further inferences. The chapter further presents the findings from the tests drawn from the objectives. Attempts are made to explain why the findings are the way they are and to what extent they are consistent with or contrary to past empirical findings and theoretical arguments. The discussion of the findings is guided by objectives of the study.

The specific objectives were to investigate the influence of drought contingency planning on pastoralists' livelihoods in Isiolo North Sub-County, to explore the influence of drought relief strategy on pastoralists' livelihoods in Isiolo North Sub-County, to ascertain the influence of rehabilitation mechanism on pastoralists' livelihoods in Isiolo North Sub-County and to establish the influence of policies for drought resilience on pastoralists' livelihoods in Isiolo North Sub-County. To enhance quality of data obtained, structured and unstructured types of questions were included. The data obtained was fed into SPSS version 22.0 and the output was used to compute the ratios needed to conduct an assessment on pastoralist management of drought as a strategy of disaster risk reduction where the context of focus was Isiolo North Sub-County. The information and data obtained were presented in form of frequency tables.

4.2 Response Rate

Response rate is the extent to which the final data sets includes all sample members and is calculated as the number of respondents with whom interviews are completed and divided by the total number of respondents in the entire sample including non-

respondents. From the target population, a sample of 384 respondents was selected from in collecting data with regard to influence of pastoralists' drought management practices on pastoralists' livelihoods in Isiolo North Sub-County, Kenya. The questionnaire return rate results are shown in Table 4.1.

Table 4.1: Response Rate

Sub county	Responded		Not Responded		Total	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Pastoralist households	323	84.1	51	13.3	374	97.4
Government technical staff (livestock officers, NDMA, local chiefs, elders, community/clan leaders)	5	1.3	0	0.0	5	1.3
Stakeholders' key informants (MCAs, MP, NGOs society personnel)	5	1.3	0	0.0	5	1.3
Total	333	86.7	51	13.3	384	100

As shown in Table 4.1, 333 out of the 384 questionnaires distributed among the stakeholders were received back from the respondents fully filled which accounts to 86.7% response rate. On the other hand 13.3% (51) of the questionnaires were received incomplete and therefore were not considered in the analysis. Of the 333 responses received during the study, 323 of them (comprising of 84.1%) were collected from pastoralist households in Isiolo North Sub County, 5 (1.3%) of the respondents were drawn from government technical staff (livestock officers, arid and semi-arid land officials, local chiefs, elders, community/clan leaders) while another 5 (1.3%) of the respondents were obtained from stakeholders' key informants (MCAs, MP, NGOs society personnel in the Sub County. The response rate demonstrates a willingness of the respondents to participate in the study.

According to Mugenda & Mugenda (2003) 50% response rate is adequate, 60% is good, while 70% and above is rated to be very good. This also collaborates with Bailey's (2000) assertion that a response rate of 50% is adequate, while a response rate greater than 70% is very good. This implies that based on this assertion, the response rate in our

case of 86.7% is therefore very good. From the foregoing, the response rate provides adequate data to proceed with the analysis. The use of self-administered method, personal visits, and follow-up telephone calls to the respondents, explaining the purpose of the study and its usefulness to the pastoral community improved the response rate. This was supplemented with a letter of introduction to the area authorities from the University and a letter of authority to conduct the research.

4.3 Social and Demographic Characteristics

4.3.1 Gender Distribution

One of the parameters that were to be determined was the gender of the respondents. While the gender of the respondents may not have a direct impact on the objectives of the study, there is need to ensure that the gender composition is as near as possible to equal numbers. The respondents sampled gave a result as per Table 4.2.

Table 4.2: Gender of the Respondents

Gender	Frequency	Percentage
Male	222	66.7
Female	111	33.3
Total	333	100.0

Majority of the responses were obtained from the male respondents. From the study, 66.7% of the respondents comprised of male respondents, while 33.3% of them were female respondents. As such, the various households in Isiolo North Sub-County have both male and female heads; however the male are more than the female. The high percentage (66.7%) of male respondents is attributed by the community roles of men acting as the household heads and key decision makers in the households, making it possible to be easily reached during household survey such as the current one. However, a significant 33.3% of female respondents are good, female drive animals to drink water, thus, among the first to be accessed during drought management strategies meaning they are knowledgeable on certain issues regarding these pastoralist management of drought as a strategy of disaster risk reduction significant to this study.

4.3.2 Categorization of the Respondents

On the distribution of the respondents in various categories, an overwhelming majority of the respondents were community member/pastoralist household heads. The other participants of this study included the local elders (27), community/clan leaders (27), local chiefs (4), livestock officers (3), while the smallest proportion comprised of other stakeholders in other institutions such as NGOs and the county government. The economy of the arid district is dominated by mobile pastoralism, while in the better watered and better serviced semi-arid areas a more mixed economy prevails, including rain fed and irrigated agriculture, agro-pastoralism, small businesses based on dry land products and conservation or tourism related activities.

4.3.3 Age Distribution

This study sought to investigate the composition of the respondents in terms of age brackets. This aspect was aimed at understanding how the respondents were distributed across the various age brackets and consequently their opinions on the topic of study.

Table 4.3: Age Brackets of the Respondents

Age Bracket	Frequency	Percentage
21-30 years	43	12.9
31-40 years	70	21.0
41-50 years	127	38.1
Above 50 years	93	27.9
Total	333	100.0

According to Table 4.3, majority (38.1%) of the respondents indicated that their ages fell between 41 and 50 years, 27.9% of the respondents recapped that they were aged above 50 years, 21.0% of them indicated that they were aged between 31 and 40 years, while 12.9% of the respondents were between 21 and 30 years of age. From the results depicted in Figure 4.1, the respondents were well distributed in terms of age and that they are active in advancements and productivity and hence can contribute constructively in this study on the pastoralist management of drought as a strategy of disaster risk reduction in Isiolo North Sub-County, Kenya.

4.3.4 Level of Education

The respondents were asked to indicate the highest level of education attained. The target population comprised of people in different qualifications. This difference might contribute to differences in the responses given by the respondents.

Table 4.4: Highest Level of Education

Academic Level	Frequency	Percentage
Primary	98	29.4
Secondary	207	62.2
College	27	8.1
Total	333	100.0

The outcome depicted in Table 4.4 show that majority of the respondents were literate and hence understood the information sought by this study. That is, 62.2% of the respondents indicated that they had attained a secondary school level of education, 29.4% of them had acquired a primary level of education, while 8.1% of the respondents reiterated that they had acquired college level of education. These outcomes imply that majority of the respondents had at least a secondary level of education and hence understood the information sought by this study. These findings further imply that all the respondents were academically qualified and also familiar with their duties and could dispense them effectively in terms of professional work ability and performance.

4.3.5 Size of Nuclear Families

The study further sought to establish the size of the nuclear families of the pastoralist communities. Table 4.5 shows the results obtained.

Table 4.5: Size of the Nuclear Family

Size of the Family	Frequency	Percent
2 members	18	5.5
3-5 members	30	8.8
6-8 members	198	59.3
9-11 members	72	21.9
More than 11 members	15	4.5
Total	333	100

From the results depicted in Table 4.5, majority (59.3%) of the respondents indicated that their nuclear families consisted of 6-8 members, 21.9% of them indicated that their nuclear families had 9-11 members, 8.8% of the respondents indicated that their families were made up of 3-5 members, 5.5% of them had families consisting of 2 members, while 4.5% of the respondents indicated that their families had more than 11 members. According to the foregoing results, majority of the nuclear families in Isiolo North consist of at least six (6) family members. From the results, it was evident that livestock keeping in Isiolo North encompass various family sizes consisting of varying members and ages whose responsibilities and exposure vary significantly.

4.3.6 Continuous Duration of Residing in Isiolo North

The respondents were asked to indicate the duration that they had been residing in Isiolo North Sub County. The outcomes are as depicted in Table 4.6.

Table 4.6: Duration of Residing in Isiolo North

Duration of Residing in Isiolo North	Frequency	Percent
Born here	267	80.4
Less than 5 years	0	0
5-10 years	0	0
11-15 years	9	2.6
16-20 years	27	8.2
Over 20 year	30	8.8
Total	333	100

According to the results shown in Table 4.6, 80.4% of the respondents were born in the area, 8.8% of the respondents indicated that they had lived in the area for a period of over 20 years, 8.2% of them had been residing in the area for a period of 16-20 years, while 2.6% of the respondents had been living in Isiolo North for a period of 11-15 years. These results imply that most of the respondents participating in this study had been residing in Isiolo North for a long period of time thus they were conversant of the

information sought by the study regarding pastoralist management of drought as a strategy of disaster risk reduction.

4.4 Drought Disaster Reduction Management

4.4.1 Frequency of Drought

The main objective of this study was to conduct an assessment on pastoralist management of drought as a strategy of disaster risk reduction where the context of focus was Isiolo North Sub-County. As such, the respondents were required to indicate the type and number of livestock that are kept in their households. The study established that an overwhelming majority of the respondents kept goats, sheep, cattle and camels. The other types of animals kept by the pastoralists in Isiolo North include poultry and donkeys in small numbers. These findings evidently depict that the study population comprised of all possible livestock keepers hence the views expressed on this study were comprehensive and representative.

With regard to understanding of drought, the key informants and the focus group discussions were categorical on that the community in Isiolo North Sub-County was faced with severe droughts frequently and much intervention of drought disaster risk reduction programs would help a great deal. An overwhelming majority of the key Informants as well as the focus group discussions indicated that they understand drought as a prolonged period of abnormally low rainfall, leading to a shortage of water. Others added that it is a period of dryness especially when prolonged; specifically: one that causes extensive damage to crops or prevents their successful growth.

Table 4.7: Frequency that Pastoralists Experience Drought in their Areas

How Often	Frequency	Percentage
Never	0	0.0
Rarely	0	0.0
Occasionally	25	7.5
Frequently	197	59.2
Always	111	33.3
Total	333	100.0

On how often the pastoralists experience drought/water scarcity in the areas of study, 59.3% of the respondents unanimously indicated that their areas frequently experience

drought/water scarcity, 33.3% of them recapped that they always experience drought/water scarcity, while 7.4% of the respondents indicated that they occasionally experience drought/water scarcity in their area. These results imply that most of the areas in Isiolo North Sub-County are frequently struck by drought and water scarcity putting the pastoralists at a great drought disaster.

Most of the key informants and focus groups confirmed that most people suffered from effects of drought and really needed the intervention of the program to enable them manage to sustain their lifestyles and keep their families healthy and well fed. Those who did not feel any negative effect might have been those with children working and therefore needed not to depend on the pastoral activities for their livelihoods.

On how drought affected the interviewees' lives as a person or household, the key informants and group discussion members reiterated that drought has had an impact on water sources, pastures and food production which reduces life expectancy and the economic performance of pastoralists in the region. Others echoed that pastoralists lose their animals to the vagaries of climate, diseases, absence of water and pasture, and they have no choice except to retire to agricultural villages. The high frequency and recurrence of drought have scuttled their traditional mechanisms for early warning and would welcome any advanced form of information that would help the respond to drought well to minimize the loss of their livestock.

4.4.2 Drought Disaster Risk Management Interventions

Table 4.8 shows the results on whether there are drought disaster risk management interventions in the various areas studied in Isiolo North Sub-County.

Table 4.8: Availability of Drought Disaster Risk Management Interventions

Response	Frequency	Percent
Yes	169	50.8
No	120	36.1
I don't know	44	13.1
Total	333	100

From the study, 50.8% of the respondents agreed that there are drought disaster risk management interventions in their areas, as compared to 36.1% of those who indicated

that there are no drought disaster risk management interventions in their areas. A small proportion (13.1%) of the respondents reiterated that they didn't know of availability of drought disaster risk management interventions in their areas.

4.4.3 Sources of Water

Drought risk is a product of a region's exposure to the natural hazard and its vulnerability to extended periods of water shortage. In the light of this statement the respondents were required to indicate the most common source of water used by households in their areas. Table 4.5 shows the results obtained by the study.

Table 4.9: Common Source of Water used by Households

Source of Water	Frequency	Percentage
Water pans	207	62.3
Tap	27	8.2
Well	197	59.3
River	44	13.1
Borehole	98	29.5

From the study, 62.3% of the respondents indicated that the most common sources of water in their areas were water pans, followed by 59.3% of those who indicated that they mainly obtained water from well, 29.5% of them indicated that their main source of water was boreholes, 13.1% indicated that they mainly obtained water from the river, while only 8.2% of the respondents indicated that their main source of water was tapped water. These results imply that there are no reliable sources of water to cushion the pastoralists against drought. Drought is more than a physical phenomenon or natural event whose impact results from the relation between a natural event and demands on water supply and often exacerbated by human activities.

4.4.4 Managing the Drought Problem

The study sought to ascertain how the pastoralists get out of the drought problem. The results are as shown in Table 4.10.

Table 4.10: How the Pastoralists Get Out of the Drought Problem

Source of Assistance out of Drought	Frequency	Percentage
Family (Own initiatives)	36	10.8
Assistance from relatives	24	7.2
Friends	12	3.6
Relief from the authorities	114	34.2
Others (none)	147	44.1
Total	333	100

On how the pastoralists get out of the drought problem, 44.1% of the respondents indicated that they neither got assistance on how to get out of the drought problem, 34.2% of the respondents recalled that they obtained relief from the authorities, 10.8% of them reported that they got out of the drought problem through family or own initiatives, 7.2% of the respondents indicated that they got assistance on how to get out of the drought problem with the assistance from relatives, while 3.6% of them obtained drought relief assistance from friends residing outside the area. Series of historic droughts in the regions cause serious environmental and societal effects, claiming lives, destroying livelihoods and rendering scores depended on relief assistance thus negatively impacting economies, agriculture, livestock and human populations. Drought kills millions of animals, and reduces millions of people to destitution and reliance on food relief.

On the traditional practices put in place to recover from drought, the key informants indicated that the pastoralists prepare for drought and epizootics by lending their animals to relatives or friends in exchange for looking after some of their animals in return. Members of the group discussions indicated that as natural response to range heterogeneity, pastoralists move their herds sequentially across a series of environments such that each reaches its peak carrying capacity at the time of visit. The adaptive advantage of mobility for pastoral producers in areas of low and uncertain rainfall is that herds are able to move to make the most of localized rainfall, avoiding the risk of relying

on rainfall received within a confined area. It also became clear that cattle raiding in some places is one method of restocking a herd. In addition, animals were also distributed through loans and exchanges with other herders reducing the effects of localized droughts, raids and diseases on stock and at the same time creating and re-enforcing social ties between households.

4.5 Drought Contingency Planning in Drought Disaster Reduction

4.5.1 Familiar with Drought Contingency Planning

To investigate the effects of drought contingency planning on drought disaster risk reduction in Isiolo North Sub-County, the respondents were required to indicate the extent to which the pastoralists are familiar with drought contingency planning. Table 4.11 shows the results.

Table 4.11: Extent to which pastoralists are familiar with drought contingency

Extent	Frequency	Percent
To a little extent	6	2
To a moderate extent	144	43
To a great extent	162	49
To a very great extent	21	6
Total	333	100

Based on the results as tabulated in table 4.7, 49% of the responses were indicating that the pastoralists are familiar with drought contingency planning to a great extent, 43% of them indicated to a moderate extent, 6% of them comprised of opinion that the pastoralists are familiar with drought contingency planning to a very great extent, whereas 2% of the respondents recapped that the pastoralists are familiar with drought contingency planning to a little extent. These results imply that there is a high familiar with drought contingency planning among the pastoralist community in Isiolo North.

4.5.2 Drought Contingency Planning on DDR Reduction

The respondents were required to indicate their opinion on the effectiveness of drought contingency planning on drought disaster risk reduction in Isiolo North Sub-County. Table 4.12 shows the outcomes of the study.

Table 4.12: Effectiveness of Drought Contingency Planning on DDR Reduction

Effectiveness	Frequency	Percentage
Moderately effective	77	23
Much effective	127	38
Very much effective	130	39
Total	333	100

Majority of the respondents (comprising 38.5% of the population studied) rated the drought contingency planning to be very much effective on drought disaster risk reduction in Isiolo North, another 38.5% of them rated the drought contingency planning on drought disaster risk reduction in Isiolo North to be much effective, while 23.1% of them rated the drought contingency planning on drought disaster risk reduction in Isiolo North to be moderate effective. These results imply that the drought contingency planning approaches are relatively effective in drought disaster risk reduction in Isiolo North.

The key informants and the focus group discussions revealed that so many people experienced a lot of improvement in pastoralism management due to drought contingency planning. This then forced them to come together and work it out to success. Even after the program, they might have remained together just to continue with the started work of this program and use it to their advantage. The other group may have been affected and experienced no improvement at all maybe because none was willing to bring the family members together or because there was a great disparity among the members beyond repair by just a new introduced program in the community.

4.5.3 Pastoralists are involvement in Drought Contingency Planning

The study sought to ascertain the extent to which the pastoralist communities are involved in drought contingency planning as a drought disaster risk reduction in Isiolo North Sub-County. The results are as depicted in Table 4.13.

Table 4.13: Extent to which Pastoralists are involved in Drought Contingency

Extents	Frequency	Percent
To a little extent	6	2
To a moderate extent	132	40
To a great extent	180	54
To a very great extent	12	4

Total	333	100
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From the study, 54% of the respondents indicated that pastoralist communities are involved in drought contingency planning as a drought disaster risk reduction to a great extent, 40% of the respondents indicated that pastoralist communities are involved in drought contingency planning as a drought disaster risk reduction in Isiolo North to a moderate extent, 4% of them indicated to a very great extent, while 2% of the respondents indicated that pastoralist communities are involved in drought contingency planning as a drought disaster risk reduction in Isiolo North to a little extent. These results imply that there is a high level of involvement of the pastoralist communities are involved in drought contingency planning hence can enhance drought disaster risk reduction disaster. This is because contingency plans generated at the community level are expected to form the basis for district/regional contingency plans.

On the drought contingency planning activities that the pastoralist communities are involved in as a drought disaster risk reduction in Isiolo North Sub-County, the respondents recapped that they are involved in drilling of contingency boreholes used during drought, strengthening the existing village committees through capacity building, offloading and storage of food aid, facilitating distribution, targeting and registration of the vulnerable household and identification of water trucking points, source of information of cases of sick persons and identify malnourished children.

4.5.4 Factors affecting Drought Contingency Planning

Table 4.9 below represents factors affecting drought contingency planning in Isiolo North Sub-County.

Table 4.14: Factors affecting the Drought Contingency Planning

Factors affecting the drought contingency planning							Mean
	No extent	Little extent	Moderate extent	Large extent	Very large extent	Total	
Inter-agency coordination	0	4.2	37.5	53.1	5.2	100.0	3.5937
Timeliness of the plans	0	5.2	36.5	50.0	8.3	100.0	3.6146
Decision making tools	0	3.1	49	43.8	4.2	100.0	3.4896
Drought preparedness	0	6.3	37.5	51	5.2	100.0	3.5521

Fund management	0	1.0	46.9	46.9	5.2	100.0	3.5625
Drought cycle management	0	6.3	45.8	43.8	4.2	100.0	3.4583
Response and recovery actions	0	5.2	38.5	50	6.3	100.0	3.5729

Majority of the respondents indicated that timeliness of the plans affect the drought contingency planning as a strategy of disaster risk reduction in Isiolo North to a great extent as shown by a mean score of 3.6146, as well as inter-agency coordination shown by a mean score of 3.5937, response and recovery actions shown by a mean score of 3.5729, fund management shown by a mean score of 3.5625 and drought preparedness shown by a mean score of 3.5521. On the other hand they recapped that decision making tools and drought cycle management affect the drought contingency planning as a strategy of disaster risk reduction in Isiolo North to moderate extents as shown by mean scores of 3.4896 and 3.4583 respectively. Droughts may result in catastrophic outcomes, hence viable mitigation actions that can be taken (at the local level) are those of preparedness, i.e. instituting plans and programs to cope with potential disruption or destruction of physical and social systems. The impacts depend upon the local peoples vulnerability to such shocks, and hence the need to understand the vulnerability to droughts as a prerequisite of designing preparedness, mitigation and relief policies and programmes. This would in turn prevent acute disaster by reducing disaster risk at the community level, through identification of the risks and translating the knowledge into preventive actions.

4.5.5 How Contingency Planning is perceived to affect Disaster Risk Reducion

Drought contingency planning is a systematic process of integrating drought risk management from well designed, coordinated and funded drought contingency plans. With regard to Isiolo North Sub-County, the respondents were required to indicate their level of agreement with these statements on drought contingency planning as a strategy of disaster risk reduction.

Table 4.15: Effects of Drought Contingency Planning for Disaster Risk Reduction

Statements on drought contingency planning							Mean
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total	
Drought contingency plans are response oriented with little emphasis on mitigation	0	4.2	34.4	53.1	8.3	100.0	3.6563
Contingency planning has not helped people to be on time because it had not told people when action would be needed	0	3.1	50	42.7	4.2	100.0	3.4792
There is very little link between preparedness, early warning and early action/ response	0	5.2	34.4	55.2	5.2	100.0	3.6042
Drought contingency plans are insufficient to coordinate interagency drought contingency planning	0	4.2	37.5	53.1	5.2	100.0	3.5937

From the results depicted in Table 4.15, majority of the respondents agreed that drought contingency plans are response oriented with little emphasis on mitigation as shown by mean scores of 3.6563, there is very little link between preparedness, early warning and early action/ response as shown by mean scores of 3.6042 and drought contingency plans are insufficient to coordinate interagency drought contingency planning as shown by mean scores of 3.5937, while contingency planning has not helped people to be on time because it had not told people when action would be needed as shown by mean scores of 3.4792. According to these results, Community contingency planning is achieved through the participatory disaster risk assessment process.

4.6 Drought Relief Strategy and Drought Disaster Risk Reduction

4.6.1 Knowledge of Drought Relief Strategy

The second objective of the study was to explore the impacts of drought relief strategy on drought disaster risk reduction in Isiolo North Sub-County. In this regard, the respondents were required to indicate whether the pastoralists are knowledgeable about drought relief strategy.

Table 4.16: Pastoralists are Knowledgeable about Drought Relief Strategy

Responses	Frequency	Percent
Yes	225	67.0
No	108	33.0
Total	333	100.0

According to the study, 67.0% of the respondents indicated that the pastoralists are knowledgeable about drought relief strategy, while 33.0% of them indicated that they do not. A prerequisite for support programmes is a clear understanding of the nature of, and responses to drought. In terms of implementation, the capacity to identify, design, plan, coordinate and implement timely livelihoods interventions is limited by a poor understanding of pastoral livelihood systems by some senior decision-makers and a lack of consensus on what constitutes sectoral mitigation, emergency and recovery activities. This results in a lack of capacity to prepare proposals quickly at the national level, and implementation is further hampered by rigid planning systems and cumbersome financial procedures among key ministries and UN coordinating agencies, and ó in some districts ó a lack of implementation capacity, both in terms of coverage and technical expertise.

4.6.2 Effectiveness of Relief Strategy on Drought Disaster Risk Reduction

The study was inquisitive of the effectiveness of drought relief strategy on drought disaster risk reduction in Isiolo North Sub-County. Table 4.17 shows the results obtained.

Table 4.17: Effectiveness of Relief Strategy on Drought Disaster Risk Reduction

Effectiveness	Frequency	Percentage
less effective	13	4
Effctive	43	13
Moderately effective	176	53
Very much effective	100	30
Total	333	100

From the study, 53% of the respondents reiterated that the drought relief strategy on drought disaster risk reduction in Isiolo North has been moderately effective, 30% of them indicated that the implementation has been very effective, 13% of the respondents indicated effective while 4% of the respondents indicated that the drought relief strategy

on drought disaster risk reduction in Isiolo North Sub-County has been less effective. The results are as depicted in Figure 4.6. These results are a clear indication that the drought relief strategy on drought disaster risk reduction in Isiolo North Sub-County is quite effective.

4.6.3 Approaches in the Drought Disaster Reduction Strategy

The respondents were also requested to indicate the extent to which various activities of drought relief strategy influence drought disaster risk reduction in Isiolo North Sub-County. Table 4.18 shows the results obtained.

Table 4.18: Influence of Drought relief strategy on Drought Disaster reduction

Approaches of drought relief strategy						Total	Mean
	No extent	Little extent	Moderate extent	Large extent	Very large extent		
Preserving fodder for animals	0	1	42.7	52.1	4.2	100.0	3.5938
Alternative feeding of animals	0	6.3	42.7	44.8	6.3	100.0	3.5104
Controlled grazing	0	2.1	47.9	45.8	4.2	100.0	3.5208
veterinary interventions support	0	5.2	36.5	50	8.3	100.0	3.6146
water provision during drought	0	6.3	45.8	43.8	4.2	100.0	3.4583
livestock supplementary feeds	0	5.2	38.5	50	6.3	100.0	3.5729

From the study, majority of the respondents reiterated that veterinary interventions support influences drought disaster risk reduction in Isiolo North to a great extent as shown by a mean score of 3.6146, preserving fodder for animals influences drought disaster risk reduction in Isiolo North to a great extent as shown by a mean score of 3.5938, livestock supplementary feeds influences drought disaster risk reduction in Isiolo North to a great extent as shown by a mean score of 3.5729, controlled grazing influences drought disaster risk reduction in Isiolo North to a great extent as shown by a mean score of 3.5208 and that alternative feeding of animals influences drought disaster risk reduction in Isiolo North to a great extent as shown by a mean score of 3.5104, while water provision during drought influences drought disaster risk reduction in Isiolo North to a moderate extent as shown by a mean score of 3.4583.

4.7 Rehabilitation Mechanism in Drought Disaster Risk Reduction

4.7.1 Knowledge of Rehabilitation Mechanism in Drought Mitigation

Rehabilitation mechanisms also affect drought disaster risk reduction in Isiolo North Sub-County. To ascertain the extent to which rehabilitation mechanism affects drought disaster risk reduction in Isiolo North Sub-County, the study thus sought to establish whether the pastoralists are knowledgeable about rehabilitation mechanism as a mitigation strategy.

Table 4.19: Pastoralists Knowledge on Drought Rehabilitation Mechanism

Response	Frequency	Percentage
Yes	193	58
No	140	42
Total	333	100

According to the results depicted in Figure 4.19, 58.0% of the respondents reported that indeed the pastoralists are knowledgeable about rehabilitation mechanism as a mitigation strategy while 42% of them indicated that the pastoralists are not knowledgeable about rehabilitation mechanism as a mitigation strategy in Isiolo North.

4.7.2 Effectiveness of Process of Rehabilitation Mechanism in Drought Mitigation

On whether the rehabilitation mechanism as a mitigation strategy is carried at the right time of the drought cycle, all the respondents (making a proportion of 100%) recapped disagreement on that rehabilitation mechanism as a mitigation strategy is carried at the right time of the drought cycle. The study further sought to establish the respondents' rating on the effectiveness of the whole process of rehabilitation mechanism as a drought mitigation strategy in Isiolo North Sub-County.

Table 4.20: Effectiveness of Rehabilitation Mechanism in drought mitigation

Effectiveness	Frequency	Percent
Very effective	27	8.2
Moderately effective	126	37.7
Effective	21	6.6
Less effective	159	47.5
Total	333	100

According to the results shown in Table 4.20, 47.5% of the respondents indicated that the whole process of rehabilitation mechanism as a drought mitigation strategy in Isiolo North can be rated to be less effective, 37.7% of them rated the process to be moderately effective, 8.2% of the respondents rate the process of rehabilitation mechanism in Isiolo North to be very effective, while 6.6% of the respondents reported that the whole process of rehabilitation mechanism as a drought mitigation strategy in Isiolo North is effective.

The key informants indicated that since the local market is not dynamic and reaching the outside market to do trade with is not easy, the locals find the option of migrating to other places in search of pasture the easier option. The other factor contributing to migration is that even if they opted to slaughter for local consumption, the meat will be too much for one family since every family owns at least one type of animal or the other.

4.7.3 Effectiveness of Approaches Influencing Drought Disaster Risk Reduction

The respondents were further required to rate the effectiveness of various approaches that influence drought disaster risk reduction in Isiolo North Sub-County. Table 4.21 shows the results.

Table 4.21: Effectiveness of Approaches influencing Drought Disaster Reduction

Intervention							Total	Mean
	Very much effective	Much Effective	Fairly effective	Less effective	Not effective			
Direct livestock purchase	19.7	1.6	0	57.4	21.3	100.0	3.5902	
Transport subsidy for livestock traders	2.5	30	32.5	32.5	2.5	100.0	2.975	
Micro financing livestock traders	22.6	41.3	6.7	27.1	2.3	100.0	3.548	
Water harvesting	5	27.5	30	27.5	10	100.0	2.9	
Income generation	8.2	16.4	9.8	50.8	14.8	100.0	3.4754	
Capacity building	0	17.5	32.5	32.5	17.5	100.0	2.5	
Agro-marketing	13.1	11.5	3.3	59	13.1	100.0	3.4754	
Food security	16.4	8.2	3.3	59	13.1	100.0	3.4426	

From the study, majority of the respondents restated that direct livestock purchase and micro financing livestock traders are much effective in influencing drought disaster risk reduction in Isiolo North Sub-County as shown by mean scores of 3.5902 and 3.5480

respectively. In addition, the respondents recapped that income generation, agro-marketing, food security, transport subsidy for livestock traders, water harvesting and capacity building are fairly effective in influencing drought disaster risk reduction in Isiolo North Sub-County as shown by mean scores of 3.4754, 3.4754, 3.4750, 3.4426, 2.9750, 2.9000 and 2.5000 in that order. Relief should ideally be targeted on particularly vulnerable sections of the population that cannot be reached by mitigation measures. Restocking after drought will make livestock purchase as a mitigation measure easier.

4.8 Policies for Drought Resilience and Pastoralists’ Livelihoods

4.8.1 Extent to which drought resilience policies influence pastoralists’ livelihoods

The study further sought to establish the influence of policies for drought resilience on pastoralists’ livelihoods in Isiolo North Sub-County. In this regard the respondents were required to indicate the extent to which policies for drought resilience influence the livelihoods of pastoralists in the Sub-County.

Table 4.22: Influence of Policies for Drought Resilience on Pastoralists’ Livelihoods

Extents	Frequency	Percentage
Moderate extent	104	31.3
Great extent	177	53.1
Very great extent	52	15.6
Total	333	100

Majority (53.1%) of the respondents reiterated that policies for drought resilience influence the livelihoods of pastoralists in the Sub-County to a great extent. In addition, 31.3% of them indicated to a moderate extent, while 15.6% of the responses showed that policies for drought resilience influence the livelihoods of pastoralists in the Sub-County to a very great extent. The results imply that policies for drought resilience have a great influence on the livelihoods of pastoralists in the Sub-County.

4.8.2 Policies for Drought Resilience influencing the livelihoods of pastoralists

The respondents were further required to rate the extent to which various aspects of policies for drought resilience influence the livelihoods of pastoralists in Isiolo North Sub-County. The results are as depicted in Table 4.23.

Table 4.23: Policies for Drought Resilience influencing the livelihoods of pastoralists

Aspects of Policies for Drought Resilience	Very great extent	Great extent	Moderate extent	Little extent	No extent	Mean
Drought mitigation measures	11.0	31.7	52.4	4.9	0.0	3.488
Drought warning & monitoring	8.5	51.2	34.1	3.7	0.0	3.573
Drought preparedness policies	19.5	46.3	26.8	7.3	0.0	3.780

From the study, majority of the respondents reiterated that drought preparedness policies influence the livelihoods of pastoralists in Isiolo North to a great extent as shown by a mean score of 3.780 and drought warning and monitoring influence the livelihoods of pastoralists in Isiolo North to a great extent as shown by a mean score of 3.573. however, drought mitigation measures influence the livelihoods of pastoralists in Isiolo North to a moderate extent as shown by a mean score of 3.488. The key informants and focus group discussion members were requested to indicate the major challenges faced during the post drought period. The members of the focus groups reported that, a fall in fodder (depending on how serious the drought is) may spark several effects such as changes in wealth, fall in herd productivity and long distance migration. They further added that a drought, which lasts for several years, can result in severe variations in the proportions of the herd, which at any particular time are giving milk or are dry.

According to the community leaders interviewed, most cattle conceive and give birth only during the periods of sufficient rains. In a dry year, animals suffer both a lower rate of conception, probably due to a tardy and incomplete return to peak bodyweight during the rains, and higher rates of miscarriage and stillbirth in the subsequent period of pregnancy and calving, due to the high level of stress experienced by animals as the dry season proceeds. Thus, drought in one year will lead to lower calving rates in the

following year. This fall in the number of new calves entering the herd is further aggravated by high mortality rates among young stock.

On how they cope with the challenges during the post drought period, some of the key informants interviewed reported that pastoralists and external agents respond to the situation in a variety of ways. As was found out during the study, the recovery period is more severe for the poor members of the community as most of their capital is lost during the drought, and dependence on the external agents is therefore very high. For the richer members, the recovery is not much harder as they can afford to restock from cash saved in the banks or livestock loaned to others during the drought.

The study was inquisive of the decision makers on resource management and when to migrate. The key informants and discussion groups confirmed that decision on resource management and when to migrate involved broad based consensus, policymakers and lead contribution from the Office of the President (Arid Lands Resource Management Programme); International development organizations such as UNDP; Ministry of Environment; and other stakeholders.

On the traditional practices help pastoralists to adapt to droughts in relation to water and pasture management, the interviewees indicated that they practice traditional pastoral production systems, gathering of wild products, traditional open wells, micro-catchments, traditional uses of the natural resource base and cross-border mobility. From the interviewees insights, the various development agencies working in the area that assist pastoralists most both directly and indirectly include Action Aid, other NGOs, EWS set up to serve donor and UN food aid institutions, the Government of Kenya.

The key informants and group discussion members described the efforts by the government and development agencies in the area in terms of facilitation of the coping and recovery strategies to be effective in management of drought disaster risk. Through trainings and response mechanisms by the government and the agencies, the high frequency and recurrence of drought have scuttled their traditional mechanisms for early warning and would welcome any advanced form of information that would help the respond to drought well to minimize the loss of their livestock.

On what the government can do better in order to reduce pastoralists' vulnerability to drought, the interviewees recalled that The Government policy should support the development of EWS and preparation of disaster preparedness and prevention plans in a participatory manner at the local level. The government should design approaches to reduce conflict, strengthen reciprocity agreements and enhance traditional law, including its integration into State law. These activities will be enhanced where government supports community driven development and builds capacity at all levels for its success. There is need for the government and development partners working in the area to substantially strengthen pastoralist advocacy and substantially invest in human capital, infrastructure and range management techniques in pastoral areas in order to improve range management and reduce pastoralists vulnerability to drought.

On how the development organizations facilitate the recovery of the pastoral household During the post drought recovery, the interviewees reiterated that pasture and water availability in the area are at sufficient levels to support animals but most of the households have already exhausted their livestock resources either through forced sales or death during drought. In the inter-drought cycle, the post-drought recovery phase comes between the drought period and the high-density phase. According to the local leaders, the post drought period is characterized by increasing rates of milk output due to a growing stocking rate of cows; aggressive and opportunistic production values being manifested by households seeking to rapidly rebuild their cattle herds; intensive efforts to cultivate cereals to make up for milk deficit per unit area; extensive recovery of the grass layer from previous heavy grazing, the extent of recovery being dependent on rainfall; increased sales of milk from peri-urban households needing grain to cover large deficits in energy foods; increased sales of small ruminants to buy grains; and traditional groups being honored allowing unrestricted access.

The interviewees were further required to suggest how strategies for coping with and recovery from drought can be strengthened in the Country. According to the key informants, training on drought mitigation should be emphasized for the pastoralist to be enlightened on the consequences of improper treatment of the livestock and their benefit if properly treated. The government should put in place veterinary interventions measures

that will enhance drought mitigation to prevent loss of animals during drought. The group discussion members also recapped that modern approaches and intervention measures taken should be communicated effectively so as to benefit the community as well to save the County and the Country at large. The government should commit itself in distribution of drugs so as to effectively mitigate drought and challenges facing management of water and other points of water should fully be resolved to ensure that there is effective supply of water to all without favoritism.

4.9 Inferential Analysis

To establish the relationship between the independent variables and the dependent variable, the study conducted multiple regression analysis. The model summary for the regression is shown in Table 4.24.

Table 4.24: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.908 ^a	.825	.789	0.752

Predictors: (Constant), Drought contingency planning, policies for resilience, drought relief strategy and rehabilitation mechanism

According to Table 4.24, the four variables that were studied (drought contingency planning, policies for resilience, drought relief strategy and rehabilitation mechanism) explain 82.5% of the livelihoods of pastoralists as represented by the R^2 . This thus means that the variables (drought contingency planning, policies for resilience, drought relief strategy and rehabilitation mechanism) contribute 82.5% to the livelihoods of pastoralists while other aspects not studied in this study contribute 17.5% of livelihoods of pastoralists.

The Analysis of variance (ANOVA) was used to determine whether there was a regression relationship between the study variables. The F-ratio in the ANOVA table tested whether the overall regression model was good and fit for the data. The results obtained are presented in Table 4.25.

Table 4.25: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16.928	4	4.232	3.804	.000(a)
	Residual	65.272	328	0.199		
	Total	82.200	332			

Predictors: (Constant), drought contingency planning, drought relief strategy, rehabilitation mechanism, policies for resilience

Dependent Variable: Livelihoods of pastoralists

From the ANOVA statistics in Table 4.25, the processed data had a significance level of 0.000 which shows that the model is fit to predict the relationship between the independent and the dependent variables. The F calculated at 5% Level of significance was 3.804. Since F calculated is greater than the F critical (F-Critical= 1.99 at 4, 328), this shows that the overall model was significant i.e. there is a significant relationship between various strategic positioning studied and livelihoods of pastoralists. Statistical tests of ANOVA reveal that the four variables are crucial for livelihoods of pastoralists.

Table 4.26: Multiple Regression Analysis

		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
(Constant)		4.454	0.449		9.9198	0.045
Drought contingency planning		0.376	0.125	0.387	3.0080	0.042
Drought relief strategy		0.316	0.076	0.034	4.1579	0.018
Rehabilitation mechanism		0.333	0.109	0.400	3.0550	0.036
Policies for resilience		0.497	0.149	0.233	3.336	0.045

The regression model ($Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4$) therefore becomes;

$$Y = 4.454 + 0.376X_1 + 0.316X_2 + 0.333X_3 + 0.497X_4$$

Keeping the independent variables (drought contingency planning, drought relief strategy, and rehabilitation mechanism and policies for resilience) constant, the livelihoods of pastoralists would have a coefficient of 4.454. From the results, the regression coefficient for drought contingency planning is 0.376. This had a significant value of 0.042 which is less than 0.05 depicting the significance of the relationship

between drought contingency planning and livelihoods of pastoralists. The regression model as well shows that drought relief strategy is positively related to livelihoods of pastoralists.

The regression coefficient for this was obtained to be 0.316 with a significant value of 0.018 less than 0.05 indicating a significant effect of drought relief strategy on livelihoods of pastoralists. Thus, a unit growth in drought relief strategy would result to 0.316 times increase in livelihoods of pastoralists. Further, rehabilitation mechanism was seen to have a positive effect on the livelihoods of pastoralists. This is shown by the regression coefficient of 0.333 with a significance value of 0.036 which is less than 0.05 the critical value at the 5% level of significance. This therefore shows that given a unit increase in rehabilitation mechanism would result to 0.333 increase in livelihoods of pastoralists. Finally, a unit increase in policies for resilience would lead to a 0.497 increase in livelihoods of pastoralists. According to these findings, policies for resilience contributes more to the increase of livelihoods of pastoralists followed by drought contingency planning, and then rehabilitation mechanism, while institutional drought relief strategy the least to the livelihoods of pastoralists.

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes whole study process from the introduction to the end of data analysis. The study sought to carry out an assessment on pastoralist management of drought as a strategy of disaster risk reduction with a focus on Isiolo North Sub-County, Kenya. Having collected and analyzed data in chapter four, this chapter is aimed at presenting a summary, the study objectives, research methodology and findings. This chapter provides the summary of the findings from chapter four, and it also gives the discussions and conclusions and recommendations of the study based on the objectives of the study. The various sections presented in this chapter are based on the research objectives which were: To investigate the effects of drought contingency planning on drought disaster risk reduction in Isiolo North Sub-County; To explore the impacts of drought relief strategy on drought disaster risk reduction in Isiolo North Sub-County; and to ascertain the extent to which rehabilitation mechanism affects drought disaster risk reduction in Isiolo North Sub-County.

5.2 Summary of Findings

The purpose of the study was to conduct an assessment on pastoralist management of drought as a strategy of disaster risk reduction Isiolo North Sub-County. The study found that the economy of the arid sub county is dominated by pastoralism, while in the better watered and better serviced semi-arid areas a more mixed economy prevails, including rain fed and irrigated agriculture, agro-pastoralism, small businesses based on dry land products and conservation or tourism related activities. Majority of the nuclear families in Isiolo North consist of at least six (6) family members. In addition, livestock keeping in Isiolo North encompass various family sizes consisting of varying members and ages whose responsibilities and exposure vary significantly. The study found that majority of the livestock kept include goats, sheep, cattle and camels, while the least livestock reared by the pastoralists in Isiolo North include poultry and donkeys.

The study also found that most of the areas in Isiolo North Sub-County are frequently struck by drought and water scarcity putting the pastoralists at a great drought disaster. Accordingly, there are drought disaster risk management interventions in the various areas studied in Isiolo North. Drought was found to have a huge negative effect on the pastoralists. Loss of pasture which causes fall in herd productivity, long distance migration and changes in wealth distribution was a major effect of drought on pastoral household; loss of water and loss of income are the main effects of drought on pastoral. From the study, drought risk is a product of a region's exposure to the natural hazard and its vulnerability to extended periods of water shortage. Accordingly, the most common sources of water in the County are dams, followed by well then boreholes, river and finally tapped water. This is an implication that there are no reliable sources of water to cushion the pastoralists against drought. The study established that majority of the pastoralists didn't obtain any relief to get out of the drought problem, others obtained relief from the authorities, family or own initiatives, assistance from relatives and from friends residing outside the area.

The study also found that the pastoralists are familiar with drought contingency planning to a great extent. The drought contingency planning was found to be very much effective on drought disaster risk reduction in Isiolo North. The pastoralist communities are involved in drought contingency planning as a drought disaster risk reduction to a great extent. There is a high level of involvement of the pastoralist communities are involved in drought contingency planning hence can enhance drought disaster risk reduction disaster. This is because contingency plans generated at the community level are expected to form the basis for district/regional contingency plans. The pastoralists are involved in drilling of contingency boreholes used during drought, strengthening the existing village committees through capacity building, offloading and storage of food aid, facilitating distribution, targeting and registration of the vulnerable household and identification of water trucking points, source of information of cases of sick persons and identify malnourished children. It was clear from the study that drought contingency plans are response oriented with little emphasis on mitigation, there is very little link between preparedness, early warning and early action/ response and drought contingency plans are insufficient to coordinate interagency drought contingency planning. However,

it was unclear on whether contingency planning has not helped people to be on time because it had not told people when action would be needed. The study found that there are various aspects that affect the drought contingency planning as a strategy of disaster risk reduction in Isiolo North. They include timeliness of the plans, inter-agency coordination, response and recovery actions, fund management and drought preparedness with great extents, while decision making tools and drought cycle management affect the drought contingency planning as a strategy of disaster risk reduction in Isiolo North to moderate extents.

The study further found that drought relief strategy affects drought disaster risk reduction in Isiolo North. From the results, majority of the pastoralists are knowledgeable about drought relief strategy, the drought relief strategy on drought disaster risk reduction in Isiolo North has been moderately effective implying that the drought relief strategy on drought disaster risk reduction in Isiolo North Sub-County is quite effective. Veterinary interventions support, preserving fodder for animals, livestock supplementary feeds, controlled grazing and alternative feeding of animals influence drought disaster risk reduction in Isiolo North to a great extent. On the other hand, water provision during drought influences drought disaster risk reduction in Isiolo North to a moderate extent.

The study finally found that the pastoralists are knowledgeable about rehabilitation mechanism as a mitigation strategy. The study established that rehabilitation mechanism as a mitigation strategy is not carried at the right time of the drought cycle. From the study, the whole process of rehabilitation mechanism as a drought mitigation strategy in Isiolo North was rated to be less effective. The study found that direct livestock purchase and micro financing livestock traders are much effective in influencing drought disaster risk reduction in Isiolo North, while income generation, agro-marketing, food security, transport subsidy for livestock traders, water harvesting and capacity building are fairly effective in influencing drought disaster risk reduction in Isiolo North.

5.3 Conclusions

The study concludes that most of the areas in Isiolo North Sub-County are frequently struck by drought and water scarcity putting the pastoralists at a great drought disaster. There are drought disaster risk management interventions in the areas. Drought risk is a

product of a region's exposure to the natural hazard and its vulnerability to extended periods of water shortage. The most common sources of water in the County are water pans, followed by well then boreholes, river and finally tapped water. The pastoralists didn't obtain any relief to get out of the drought problem, others obtained relief from the authorities, family or own initiatives, and assistance from relatives and from friends residing outside the area.

The study also deduces that the pastoralists are familiar with drought contingency planning. The drought contingency planning was found to be very much effective on drought disaster risk reduction in Isiolo North. The pastoralist communities are involved in drought contingency planning as a drought disaster risk reduction. There is a high level of involvement of the pastoralist communities in drought contingency planning hence can enhance drought disaster risk reduction disaster. According to the findings, drought contingency plans are response oriented with little emphasis on mitigation, there is very little link between preparedness, early warning and early action/ response and drought contingency plans are insufficient to coordinate interagency drought contingency planning. The study concludes that timeliness of the plans, inter-agency coordination, response and recovery actions, fund management and drought preparedness affect the drought contingency planning as a strategy of disaster risk reduction in Isiolo North. Communities employ different strategies for coping with loss of access to strategic resources. In addition, civil society organizations have played a critical role in the search for lasting peace between the two communities as well as in helping the communities cope with the impacts of conflict. At times the pastoralists take the risk and travel to the rangelands, prepared for the prospect of violence, especially during droughts when they have no alternatives.

The study further concludes that that drought relief strategy affects drought disaster risk reduction in Isiolo North. The study deduces that the pastoralists are knowledgeable about drought relief strategy and the drought relief strategy on drought disaster risk reduction in Isiolo North has been moderately effective. The drought relief strategy on drought disaster risk reduction in Isiolo North Sub-County is quite effective. From the study findings, it was clear that Veterinary interventions support, preserving fodder for

animals, livestock supplementary feeds, controlled grazing and alternative feeding of animals influence drought disaster risk reduction in Isiolo North. Community level dialogue when pursued under the right circumstances is a tremendous instrument for creating and maintaining peace. If we operate with the general assumption that people who talk to each other would rarely fight; or at the very least would not allow misunderstandings to deteriorate into physical confrontation, then ipso facto, maintaining a dialogue between communities should serve the same purpose. At other times they seek the support of government in the form of security as they water and pasture their livestock. Education and the influence of modernization is also having an impact on the viability and continued relevance of pastoralist. Civil society organizations including religious organizations, women and youth should take a lead in peacebuilding initiatives, explore more traditional and customary of establishing the root causes of conflict hence more attention is given to local problem solving method.

The study finally concludes that the pastoralists are knowledgeable about rehabilitation mechanism as a mitigation strategy. The study ascertained that rehabilitation mechanism as a mitigation strategy is not carried at the right time of the drought cycle. Accordingly, the whole process of rehabilitation mechanism as a drought mitigation strategy in Isiolo North was established to be less effective. The study deduces that direct livestock purchase and micro financing livestock traders are much effective in influencing drought disaster risk reduction in Isiolo North, while income generation, agro-marketing, food security, transport subsidy for livestock traders, water harvesting and capacity building are fairly effective in influencing drought disaster risk reduction in Isiolo North. The most important factors in the success of an intervention are willingness of parties to engage in dialogue, adequate preparation by the facilitators, ensure that parties understand what is at stake and the ground rules are clear meaning everyone to be on the same page and minimal outside influence.

5.4 Recommendations

There is need for the government and development partners working in the area to substantially strengthen pastoralist advocacy and invest in human capital, infrastructure and range management techniques in pastoral areas in order to improve range

management and reduce pastoralists' vulnerability to drought. The study recommends that government should put in place veterinary interventions measures that will enhance drought mitigation to prevent loss of animals during drought within the County. The community, planners, professionals and the implementers of drought disaster risk management need to realize and rise to the awakening that drought affected people have the learning and the strength to develop coping and survivability capacities. The county and national governments should play a leading role in coordinating drought risk reduction to ensure that the basic fundamental rights of the citizens are guarded and upheld. The government agencies need to take a leading role in civic education and develop a common public engagement framework that recognizes the role of community participation to synergize the ambitions of the development partners to make them fruitful.

There is a need to enhance community communication and feedback mechanism in the county. The county information and communication infrastructure was wanting and the available channels of communication do not effectively deliver information to the communities. Further, there is need to the government to strengthen the autonomous adaptation processes of the pastoralists to improve their capacity to cope with and recover from drought. The pastoralists have local communal and household strategies that they use to manage drought and such mechanisms need to be recognized by the government in planning and policy formulation and implementation. The study recommends that approaches and intervention measures taken by the government be communicated effectively so as to benefit the community as well to save the county and country. Further the study recommended that government should commit itself in distribution of drugs so as to effectively mitigate drought.

The study also recommends that the government of Kenya and development agencies working in the area need to invest in the provision of credit facilities to the pastoralists to assist them in coping with droughts. During good season, the pastoralists can convert some of the stock in to cash and deposit with credit providers. Such cash can be used in the post drought period to purchase animals for restock. The study recommends that water should be availed to all pastoralists. Further, the study recommended that

challenges facing management of water and other points of water should fully be resolved to ensure that there is effective supply of water to all without favoritism.

The study recommends funds should be allocated for effective supplementary feeding programmes. Accordingly, the study recommended that training on drought mitigation should be emphasized for the pastoralist to be enlightened on the consequences of improper treatment of the livestock and their benefit if properly treated.

5.5 Suggestions for future research

It is evident from the study that it is necessary to conduct further studies to identify the role of pastoralist management of drought in disaster risk reduction in a different setting in Kenya. Similarly, another study should deeply evaluate the metrics of successful community participation on disaster risk management. Based on the findings of this study, it may be necessary to evaluate the effects of indigenous drought early warning systems on drought risk management.

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APPENDICES

Appendix I: Introduction Letter

The Respondent,

Dear Sir/Madam,

Re: Request for Research Data

I am a Postgraduate student at the University of Nairobi pursuing a Degree of Master of Arts in Project Planning and Management. My research project topic is **“INFLUENCE OF PASTORALISTS’ DROUGHT MANAGEMENT PRACTICES ON PASTORALISTS’ LIVELIHOODS: A CASE OF ISIOLO NORTH SUB-COUNTY”**

In order to carry out the research, you have been selected to form part of those to provide the necessary data. The data will be gathered through research questionnaire with the undersigned. The focus of my research will be on drought contingency planning, policies for resilience, drought relief strategy and rehabilitation mechanism and this will involve use of questionnaires administered to local chiefs, elders, community/clan leaders, livestock officers, arid and semi-arid land officials, politicians, society personnel and pastoralists in Isiolo North Sub- County.

I kindly request you to participate in this study by assisting in filling the questionnaire and providing with any other relevant information. The information collected will be treated with utmost confidentiality and is for academic purpose only. The findings and recommendations of the research will be availed to you upon completion of the research.

Student : Ture Golicha

Supervisors : Dr. Luketero Wanyonyi

Appendix II: Research Questionnaire

This research is in partial fulfillment of requirements for a degree in Masters of Arts from the University of Nairobi and I will be most grateful if you could kindly complete this questionnaire. This questionnaire consists of two major parts. Kindly answer all the questions by ticking in the appropriate box or filling the spaces provided. The questionnaire below has been set in relation to the objectives of the study. Any issue that may need any clarification will be discussed by the researcher during administration of the questionnaire or when picking the completed questionnaire. The information given here will only be used for purposes of this study and will be treated with utmost confidentiality. Your cooperation will be highly appreciated.

PART A: GENERAL INFORMATION

1. Name of your area

2. Tick your gender?

Male Female

3. What is your category as a respondents

Community member/pastoralist <input type="checkbox"/>	Local chiefs <input type="checkbox"/>
Local elder <input type="checkbox"/>	Community/clan leader <input type="checkbox"/>
Livestock officer <input type="checkbox"/>	MP <input type="checkbox"/>
MCA <input type="checkbox"/>	Society personnel <input type="checkbox"/>
Others (Specify <input type="text"/>) <input type="checkbox"/>	

4. Indicate your age category:

Below 20 years <input type="checkbox"/>	41-50 years <input type="checkbox"/>
21-30 years <input type="checkbox"/>	Above 51 years <input type="checkbox"/>
31-40 years <input type="checkbox"/>	

5. What is your highest level of education?

Post Graduate <input type="checkbox"/>	College Diploma <input type="checkbox"/>
Graduate <input type="checkbox"/>	College Certificate <input type="checkbox"/>
Secondary school level <input type="checkbox"/>	Primary school level <input type="checkbox"/>
Didn't go to school <input type="checkbox"/>	Other (specify <input type="text"/>) <input type="checkbox"/>

6. What is the size of your nuclear family?

- | | | | |
|--------------|--------------------------|----------------------|--------------------------|
| 1 (alone) | <input type="checkbox"/> | 2 members | <input type="checkbox"/> |
| 3-5 members | <input type="checkbox"/> | 6-8 members | <input type="checkbox"/> |
| 9-11 members | <input type="checkbox"/> | More than 11 members | <input type="checkbox"/> |

7. How long have you lived in this area?

- | | | | |
|-------------|--------------------------|-------------------|--------------------------|
| Born here | <input type="checkbox"/> | Less than 5 years | <input type="checkbox"/> |
| 5-10 years | <input type="checkbox"/> | 11-15 years | <input type="checkbox"/> |
| 16-20 years | <input type="checkbox"/> | Over 20 year | <input type="checkbox"/> |

PART B: PASTORALISTS’ DROUGHT MANAGEMENT PRACTICES AND PASTORALISTS’ LIVELIHOODS

8. Kindly indicate the type and number of livestock that are kept in the household?

Type	Amount/Number
Cattle	
Sheep	
Goats	
Camels	
Donkeys	
Poultry	
Others (Specifyí)	

9. How often do you experience drought/water scarcity in this area?

- | | | | |
|--------------|--------------------------|------------|--------------------------|
| Always | <input type="checkbox"/> | Frequently | <input type="checkbox"/> |
| Occasionally | <input type="checkbox"/> | Rarely | <input type="checkbox"/> |
| Never | <input type="checkbox"/> | | |

10. Are there drought disaster risk management interventions in this area?

- | | | | | | |
|-----|--------------------------|----|--------------------------|-------------|--------------------------|
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | I donø know | <input type="checkbox"/> |
|-----|--------------------------|----|--------------------------|-------------|--------------------------|

11. What is the most common source of water used by households in this area?

- | | | | |
|------|--------------------------|----------|--------------------------|
| Dam | <input type="checkbox"/> | Tap | <input type="checkbox"/> |
| Well | <input type="checkbox"/> | River | <input type="checkbox"/> |
| Tank | <input type="checkbox"/> | Borehole | <input type="checkbox"/> |

12. In case of drought how do pastoralists get out of the problem?

- | | | | |
|--|--------------------------|-----------------------------|--------------------------|
| Family (Own initiatives) | <input type="checkbox"/> | Assistance from relatives | <input type="checkbox"/> |
| Friends | <input type="checkbox"/> | Relief from the authorities | <input type="checkbox"/> |
| Others (Specifyí) | | | <input type="checkbox"/> |

interagency drought contingency planning					
Other (Specifyí)					

18. To what extent do the following aspects of drought contingency planning affect the pastoralists' livelihoods in Isiolo North Sub- County? Use a scale of 1 to 5 where 1= no extent, 2= little extent, 3= moderate extent, 4= large extent and 5 is to a very large extent.

Aspects affecting the drought contingency planning	1	2	3	4	5
Inter-agency coordination					
Timeliness of the plans					
Decision making tools					
Drought preparedness					
Fund management					
Drought cycle management					
Response and recovery actions					
Other (Specifyí)					

DROUGHT RELIEF STRATEGY AND PASTORALISTS' LIVELIHOODS

19. Are the pastoralists knowledgeable about drought relief strategy?

Yes

No

20. What is the effectiveness of drought relief strategy on pastoralists' livelihoods in Isiolo North Sub- County?

Very much effective

Much effective

Moderate effective

Less effective

Not effective

21. To what extent do the following activities of drought relief strategy influence pastoralists' livelihoods in Isiolo North Sub- County? Use a scale of 1-5 where 5 is to a very large extent, 4 is to a great extent, 3 is medium extent, 2 is small extent and 1 is no extent at all.

Approaches of drought relief strategy	1	2	3	4	5
Preserving fodder for animals					

Alternative feeding of animals					
Controlled grazing					
veterinary interventions support					
water provision during drought					
livestock supplementary feeds					
Other (Specifyí í í í í í í í í í í í í í í í)					

22. Which aspects of drought relief strategy in disaster risk reduction do you think should be strengthened pastoralists' livelihoods in this County? Explain

í
í
í í

REHABILITATION MECHANISM AND PASTORALISTS' LIVELIHOODS

23. Are the pastoralists knowledgeable about rehabilitation mechanism as a mitigation strategy?

Yes [] No []

24. Is rehabilitation mechanism as a mitigation strategy carried at the right time of the drought cycle?

Yes [] No [] I don't know []

25. How would you rate the effectiveness of rehabilitation mechanism on pastoralists' livelihoods in Isiolo North Sub- County?

Very much effective [] Much Effective []
Fairly effective [] Less effective []
Not effective []

26. How do you rate the effectiveness of the following approaches influence pastoralists' livelihoods in Isiolo North Sub- County?

Appendix III: Key Informants Interview Guide for Key Informants

1. What is your understanding of drought?
2. How has drought affected your life as a person or household?
3. What traditional practices do you put in place to recover from drought?
4. During the post drought period, what are your major challenges?
5. Who makes decision on resource management and when to migrate?
6. How do you cope with the challenges during the post drought period?
7. What has been the most significant change in the way you manage droughts resulting from the information and training(s) received
8. What traditional practices help you to adapt to droughts in relation to water and pasture management?
9. Which Development agency working in the area assist you most both directly and indirectly?
10. How would you describe the efforts by the government and development agencies in this area in terms of facilitation of the coping and recovery strategies?
11. What do you think the government can do better in order to reduce pastoralists' vulnerability to drought?
12. During the post drought recovery, how do the development organizations facilitate the recovery of the pastoral household?
13. Which development organizations are actively involved in helping the pastoralists in this district?
14. How can strategies for coping with and recovery from drought be strengthened in the Country?
15. What are some of the policy issues that need to be addressed to reduce vulnerability of the pastoral household to drought?