



UNIVERSITY OF NAIROBI

**ASSESSING THE OPPORTUNITIES AND CHALLENGES IN THE UTILIZATION OF
DROUGHT EARLY WARNING INFORMATION AS AN ADAPTATION STRATEGY TO
CLIMATE CHANGE BY COUNTY GOVERNMENTS IN KENYA: A CASE STUDY OF
ISIOLO COUNTY GOVERNMENT**

BY

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REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE
IN CLIMATE CHANGE**

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DECLARATION

I hereby declare that this dissertation is my original work and has not been presented in any University or learning institution for any academic award. Where other people's work has been used, this has properly been acknowledged and referenced in accordance with the University of Nairobi requirements.

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ABSTRACT

Kenya is among the countries in the developing world which is frequently impacted by droughts and other climate hazards. Whereas these hazards can be prevented or mitigated, in most cases the magnitude of their impacts are enormous leading to disastrous situations. Therefore, availability of early warning systems plays an essential role in informing preparedness initiatives and hence saving livelihoods, protecting lives and critical infrastructures especially among the most vulnerable communities in the ASALs.

This study sought to determine the opportunities and challenges brought forth by the devolved Government structures in drought response in Isiolo County. The researcher used both qualitative and quantitative methods in collecting research data which was analyzed using statistical package SPSS. The target respondents for this study were the Government officials, NGOs and humanitarian organizations who are currently implementing drought response programs in the County. The respondents were purposefully selected based on their expertise and involvement in drought response activities in their respective organizations. The study established that the drought early warning information was available and received on a regular basis; however, the major challenge was its utilization. The findings also revealed that the County Government was better placed in drought response, however due to institutional and political barriers, most of the responses were uncoordinated and inefficient in most instances.

The study recommended that the County Government of Isiolo to put in place necessary policies and legislations to enhance drought early warning information sharing and dissemination. In order to strengthen the capacities of the County Government in drought response, by ensuring that the appropriate institutional frameworks for technical and financial efficiency are functional and suitable to trigger early response to the impending drought hazards. Further research needs to be conducted on availability and utilization of the available Early Warning Information on other extreme weather events such as floods in Isiolo County. It is also imperative to conduct a follow up study on how the opportunities brought about by devolution in the utilization of drought early warning information to determine its impacts on the communities affected by drought in Isiolo County.

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LIST OF ACRONYMS

ACF	Action Against Hunger
ASALs	Arid and Semi-Arid Lands
CEC	County Executive Committee
CARE	Cooperative for Assistance and Relief Everywhere
CORDAID	Catholic Organization for Relief and Development Aid
CSO	Civil Society Organization
DEF	Degree of Freedom
DEWS	Drought Early Warning Systems
ECBP	Emergency Capacity Building Project
E.G	For example
EWI	Early Warning Information
EW	Early Warning
EWS	Early Warning System
ET AL	And others
ETC	And the rest
EURO	European currency
FAO	Food and Agriculture Organization
FEWSNET	Famine Early Warning System NET
GIEWS	Global Information and Early Warning Systems
GOK	Government of Kenya
HOA	Horn of Africa
ICPAC	IGAD Climate Prediction and Application Centre
IGAD	Intergovernmental Agency for Development
IPCC	Inter-governmental Panel on Climate Change
ISID	Indigenous strategies and Institution for Development
KLMC	Kenya Livestock Marketing Council
KMD	Kenya Meteorological Department
KNBS	Kenya National Bureau of Statistics
KRCS	Kenya Red Cross Society
KSH	Kenya shillings

LRA	Long-term Risk Assessment
LVIA	Lay Volunteers International Association
MCA	Members of County Assembly
MID-P	Merti Integrated Development Programme
NATO	National Atlantic Treaty Organization
NDMA	National Drought Management Authority
NMS	National Meteorological Services
NGOs	Non-Governmental Organizations
OCHA	UN Office for Coordination of Humanitarian Affairs
PDNA	Post- Disaster Needs Assessment
SIG	Significance
SRA	Short-term Risk Assessment
STD-DEV	Standard Deviation
UK	United Kingdom
UN	United Nations
UNDP	United Nation Development Programme
UNEP	United Nations Environmental Programme
UNESCO	United Nations Educational, Scientific and cultural Organization
UNISDR	United Nations International Strategy for Disaster Risk
US	United States
USAID	United States Agency for International Development
WFP	World Food Programme
WMO	World Meteorological Organization

CHAPTER ONE: INTRODUCTION

1.0 Introduction

Kenya is faced with many natural hazards among them droughts, floods and diseases. Whereas most of the negative impacts of the hazards can be prevented or mitigated, in many cases they transform into disaster because of inadequate preparedness and responses in terms of early actions. Climate related hazards can be anticipated well in advance and early warning information provided for early response. (Gombos *et al.*, 2013). The role of providing early warning information on hazards related issues to the Governments, and stakeholders has been taken up by several agencies at international, regional, national and local levels. For communities to be able to respond effectively to a hazard, they need to better understand the hazard risks and be well equipped to be able to manage the impacts of these risks on their lives and livelihoods.

Changes in climate are observed globally and regionally and their impacts are severe on the vulnerable communities regarded in the world. These impacts affect the core aspects of survival for human beings such as food security and water. For instance, climate change has immensely reduced agricultural production in Sub-Saharan Africa due to extreme weather events such as recurrent droughts and floods (Hassan and Nhemachena, 2008; Deressa *et al.*, 2008). In Africa, the adverse impacts of climate change are most evident in sectors such as agriculture, water, livestock and environment among others thus hindering sustainable development (Huq *et al.*, 2006). These sectors are very crucial to the survival of communities who mainly depend on rain fed agriculture as their main source livelihood.

The 2017 drought in Kenya affected 23 out of 47 Counties resulting to in 2 million people in need of food aid. The number of severely malnourished pregnant mothers and children was estimated at 350,000 and approximately 175,000 children dropped out of school due to the drought impacts that included, (OCHA, 2017) food and water resources dwindles, the availability of water, food pastures for both human beings and animals become a challenge. The prices of food increases for instance maize, has risen by a third in the past year (FAO, 2017) which resulted to household food insecurity.

Droughts are becoming more frequent and severe in Kenya where the communities especially in the arid and semi-arid lands (ASALs) experience at least drought each year. Frequent droughts prolong the long dry seasons making it difficult for the communities to bounce back after each drought period.

The Government of Kenya declared drought a national disaster in February 2017 (GOK, 2017). This represents approximately 20% of the population in pastoral areas and 18% in marginal agricultural areas (NDMA, 2017). This situation was even worse in the Horn of Africa with countries like Somalia and Ethiopia encountering bigger challenges with 2.9 million and 5.6 million requiring emergency food aid in the two countries respectively (WFP, 2017).

Whereas the impacts of 2017 drought spilled over to 2018 in some Counties, this has not the first time the Country had faced such a major drought crisis. The October 2010 to April 2011 drought in Kenya resulted in to severe humanitarian crisis (Lautze *et al.*, 2012; Lott *et al.*, 2013; Mosley, 2012). Major impacts were experienced on lives and livelihoods of vulnerable communities who depended on climate sensitive production systems such as small holder farmers and pastoral livelihoods.

The impacts of climate change are already being felt in the communities of the ASALs and therefore adaptation measures are of urgent priority in these fragile ecosystem. It is important to manage the risks of the disasters that are associated with the changes in climate to avoid future disaster events. Communities that are aware of the risks can be able to anticipate these risks and better manage their problems in case of disasters. The ability to know these risks means that communities have better understanding of their situations, are able to assess the risks and the possible scenarios in case of a disaster event.

For a community to be better prepared, early warning information should be available in advance of hazards and utilized effectively for preparedness actions. For instance, the Government of Kenya established the National Drought Management Authority following the 2010 to 2011 drought to ensure a coordinated effort to manage drought risk in the future.

From a scientific perspective, understanding better the atmospheric phenomena as well as oceanic interactions is imperative to help in predicting the conditions which lead to drought. However, Governments should come up with proactive strategies and programs for drought preparation and respond early enough to mitigate the impacts of droughts.

In the Horn of Africa (HOA), Early warning systems are in place both at regional and national levels. For instance, the IGAD Climate Prediction and Application Center (ICPAC), which is the WMO designated regional climate and the national meteorological services (NMS) provide seasonal climate forecasts for the region and countries every quarter and advise the authorities and stakeholders to take affirmative actions to deal with anticipated risks. The Kenya National Drought Management Authority also provides the County Governments and respective stakeholders with monthly bulletins on the drought situation in the area with specific actions to be taken by relevant sectors in anticipation of the identified risks. The monthly bulletin is informed by data and indicators collected by field officers/focal persons at community level and this is relayed to NDMA for analysis, interpretation alongside bulletin preparation and the bulletin dissemination.

In the Horn of Africa region, the USAID funded project, FEWSNET in collaboration with regional and national climate information service agencies, provides the Horn of Africa countries with early warning information on food security and seasonal climate forecast for the countries in the HOA. This information is supposed to be disseminated through regional bodies and agencies such as IGAD, African Union and East African community alongside UN bodies (UNISDR, FAO, UNDP among others) for collective actions with the aim of mitigating the adverse impacts of a disaster event. Therefore, this study aimed at analyzing the gaps that exist in the utilization of drought early warning information by the Isiolo County Government as a strategy to adapt to the changes in climate.

1.1 Statement of the Problem

Even though early warning information is available at local, national and regional level, the communities are increasingly exposed and caught unaware by climate hazards and eventual disaster events in Kenya, especially in arid and semi-arid Counties such as Isiolo. Early warning information on early warning in most cases does not reach those who need it most thus leading to its underutilization. In other cases, the information reaches the communities at the right time, but this information is not translated into actions that enhance preparedness among the affected communities. Interpretation of early warning information is also guided in many cases by perception of risks by the Government and other stakeholders which eventually impacts on how the information is interpreted and utilized. To deal with such challenges, researchers have come to agreement that more work must be done at the national level to customize forecasts to the local context and provide appropriate interpretations (Thomson *et al.*, 1998).

In Kenya, the situation has not been better either. For instance, EW mandate is conducted by different departments at national level. There is no existence of a single early warning bulletin. Specialized agencies like National Drought Management Authority (NDMA) provide early warning information on droughts situation in the ASALs only. Lack of a multi-hazard EW bulletin might cause confusion and inaction due to inadequate, clear and consistent message which causes delays in taking timely action by the Government and other stakeholders.

Risk management is an important process in risk mitigation and prevention. It is considered as a continuous and proactive process which is based on generally applied with management principles. The most important reason for risk management process is reduction of the risks involved to acceptable levels.

Traditionally government and donors are reactive to drought rather than pro-active. This situation has led to so many challenges for instance in effective response, poor targeting of the most at risk and poor coordination among donors and humanitarian actors. A sustainable approach to managing drought risks involves consistency in developing, updating and utilizing early warning system to trigger a timely response.

Early warning systems should involve a wider spectrum of stakeholders- including government NGOs, CSOs and donor community. Having an independent EWS can affect the utilization bringing on board issues of acceptability and trust among the stakeholders. Field visit with decision makers e.g. ministries, Donor delegations, ambassador etc. is essential for these stakeholders to understand the situation on the ground before taking an action.

With the establishment of the devolved government structures, opportunities for resource mobilization to trigger early actions are anticipated. However, this is not the case in most ASAL counties including Isiolo, who have been struggling with the impacts of frequent and severe droughts.

This study therefore analyzed the opportunities available for early response at County level and identified the challenges faced by the County Governments in utilizing the drought early warning information available.

1.2 Research Questions

This research seeks to answer the following questions.

1. What are the existing drought early warning systems utilised in Isiolo County?
2. What opportunities are available for early responses to drought by the Government of Isiolo County?
3. In what ways does socio-cultural, political and institutional challenges affect the uptake of early warning information and early responses in Isiolo County?
4. How can County Government of Isiolo and other humanitarian actors ensure sustainability of drought early information in triggering early response?

1.3 Objective of Study

The sections below give the study objectives.

1.3.1 Overall Objective

The overall objective of the study was to assess the opportunities and challenges in the utilization of drought early warning information as an adaptation strategy to climate change by County Government of Isiolo.

1.3.2 Specific Objectives

The specific objectives of the study were to:

- i. Assess the existing/available drought early warning information and how it is utilised in Isiolo County.
- ii. Determine the opportunities brought about by devolution in responding to drought crisis in Isiolo County.
- iii. Establish the socio-cultural, political and institutional challenges faced by County Government that impede the drought early warning responses.
- iv. Explore sustainable solutions for utilization of the drought early warning information by County Government of Isiolo for early action to avert drought crisis in the County.

1.4 Justification of the Study

In Kenya, drought experienced in 2017 had devastating impacts with an estimated 2.7 Million individuals requiring relief aid immediately as early as February 2017. The food insecurity crisis affected 27 out of the 47 Counties of Kenya. Economic losses arising from 2008 through 2011 was estimated at cost of Ksh. 968.6 billion (U S\$12.1 billion) with an overall cost of recovery and reconstruction of Ksh. 156.2 billion (US\$1.7 billion) for the period 2012to2016 (PDNA, 2008-2011 report).

Inadequate funding has been a limitation to partners from scaling up multi-sectorial interventions in order to help communities that are severely impacted by drought. A drought being a slow onset hazard and disaster event can be anticipated and mitigated through early actions following receipt of timely drought early warning information can reinforce early actions for effective responses in saving lives and livelihoods of the most vulnerable communities in the ASALs of Kenya.

Devolution has availed resources and improved coordination. The decision makers are now seen nearer to where the problems are being experienced and therefore regarded as an opportunity for marginalized Counties like Isiolo to prepare and respond more effectively to drought crisis which are frequent. This is because the with effective early warning and early action systems, the County of Isiolo can be able to mitigate the adverse impacts of droughts and therefore save lives and livelihoods, secure critical community infrastructure and break the cycle of drought crisis the region. This is in line with the achievement of IGAD heads of state Nairobi declaration 2011 on ending drought emergencies.

1.5 Scope and Limitation of the Study

The focus of this research study was to assess the opportunities and challenges for drought early warning responses by County Government of Isiolo and relevant humanitarian organizations. The study involved the Government ministries and departments at the County level. The study examined the range of early warning information available in the County, contributing, information dissemination, and the response actions and their effectiveness.

This study did not therefore involve the communities affected by the 2016 to 2017 drought. The study was also focused on the available scientific early warning systems currently applied in the County.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter presents a review of literature relevant to the subject under study and also highlights various concepts which are significant to this study. The chapter includes the conceptual framework to explain the basis of this study.

2.1 The Concepts of Drought

Drought is context specific and thus there is no a singular agreed upon definition of drought. This makes it challenging to ascertain when to declare it a disaster. Drought is also sometimes referred to as a creeping phenomenon (Tannehill, 1947) since it a challenge to determine when it will begin and end. Because of this reason, droughts are mainly characterized based on their intensity, duration and spatial coverage. In the works of Wilhite and Glantz (1985), the authors conducted an analysis of over 150 definitions and more seems to exist and therefore no consensus on the definition of drought. However, drought can be defined as deficiency of precipitation resulting to inadequate soil moisture which leads to diminished plant growth prolonged over longer periods of time (Crafts, 1968). According to IPCC (2012), drought is defined as “a period of abnormally dry weather long enough to cause a serious hydrological imbalance”.

Compared to other natural hazard, drought is the least understood, most complex and with impacts that are significant (Hagman, 1984). There is also inadequate clarity between the scientific and policy community on its characteristics and this situation can be related to some extent as to why the progress towards drought preparedness in a lot of regions across the globe is staggering.

Drought has generally been classified into four types as shown in figure 1 below. Meteorological drought is caused when precipitation is below a threshold on a specified period of time. Hydrological drought has a relationship with water supply systems like drainage basins, rivers, and aquifers. Agricultural drought is the other type and is caused by insufficient moisture available for crops, forests rangelands, and livestock. Lastly there is the socio- economic drought, which refers to the effect of drought on the societal and economic aspects of lives of people in a community.

A drought is an ordinary occurring climatic feature (Wilhite, 1992). It takes place in both high and low-lying areas. Drought occurs as a result of inadequate precipitation in an area over relatively long period of time, but it is not a permanent condition as in the case of aridity. Impacts of drought can be felt as high temperatures, strong winds and high humidity (Wilhite, 1992). Drought is measured on its intensity and duration of its impacts.

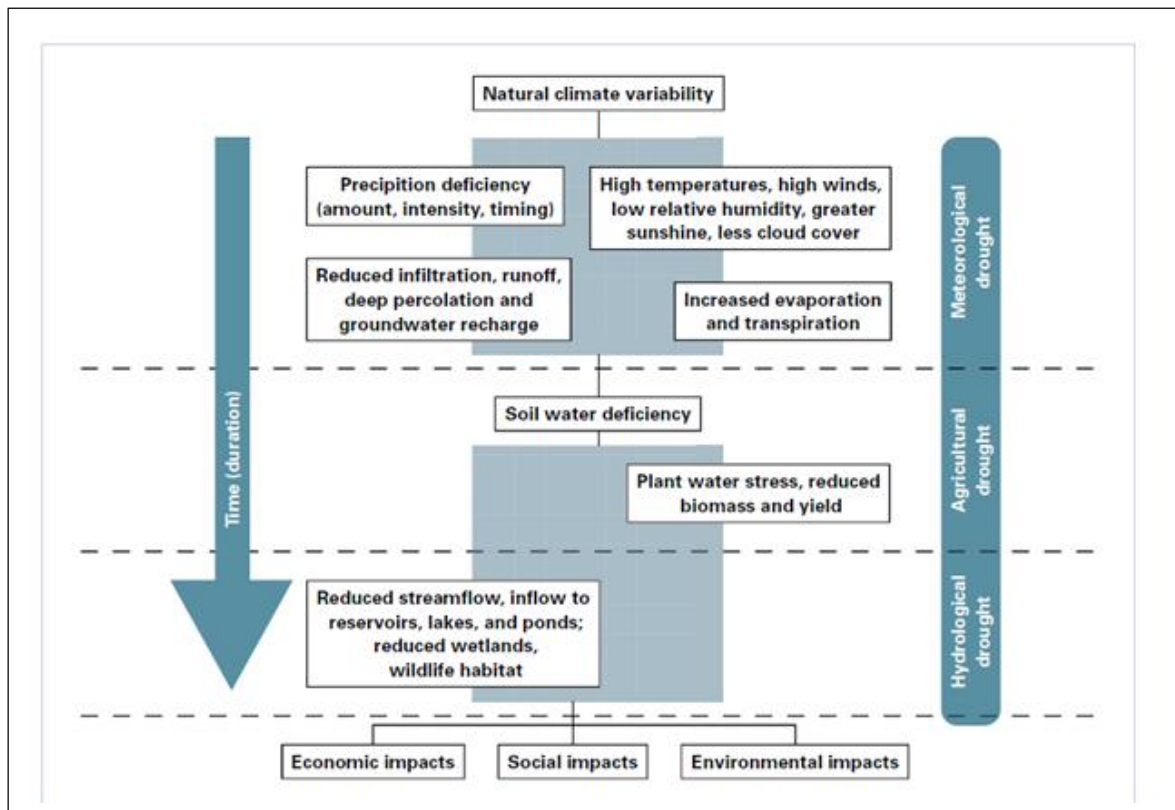


Figure 1: Figure showing the different types of droughts

Source: WMO

According to the Inter-Governmental Panel on Climate Change (2014), drought is regarded as one of the major challenges for agricultural production in Sub-Saharan Africa region. Droughts in this region extend over a long period of time where the climate is characterized by less than annual rainfall average thus resulting to severe water scarcity. In fragile ecosystems like the arid and semi-arid areas, the communities residing in these lands are vulnerable and directly affected by the impacts of droughts due to the sensitivity of their livelihoods to the changes in weather patterns (IPCC, 2014; Masinde, 2015).

Major droughts were experienced in Africa between 1960s through the 1980s in the Sahel region of the Sub-Saharan Africa. However, in the East African region, droughts were experienced from 1980s to 2000s, the most recent one being 2017 drought.

The impacts of droughts are also not easily quantifiable, since it affects, lives, livelihoods and ecosystems over a long period of time and is connected to other impacts. Drought being a natural hazard is also very much linked with the population's vulnerability. The vulnerability of a population is determined by the social, economic, political, environment and technological factors. In most cases declaration of drought is based on personal bias or reactive actions by politicians without linking it to specific key impacts due to inaccurate or absence of assessments to define the real problems. Therefore, as these factors change and so is the vulnerability level of the same community.

Unlike other natural disasters, drought impacts are non-structural making it difficult for government and humanitarian actors to develop accurate, reliable and timely estimates of severity and impacts. Drought also affects people differently even in the same area. This is mainly determined by their exposure levels and capacity to respond. Therefore, it is important to understand, who is at risk and why, in order to be able to come up with an appropriate strategy for drought mitigation.

2.1.1 Drought as a Hazard

Hazard is attributed as a dangerous phenomenon to human activity or a situation that may lead to death, personal injury or other harmful effect to health, social economic damages, loss of lives and livelihood or damage to the environment (UNISDR 2009). Drought has negative impacts on environment and society at large. It leads to reduction of water supply causing inadequate supply of water for human beings and environment. It is also connected to causing other long-run adverse effects on people's lives and livelihoods for example degradation of ecosystems which may take several decades to regenerate.

2.1.2 Drought Risks

Drought risk is defined as “potential disaster losses in lives, health status, livelihoods, assets and services which could occur to a particular community or society over some specified future time period” (UNISDR, 2009)

In assessing risks that may lead to drought, it is important to look at the aspect of drought as a hazard and its consequences or impacts. Owing to the complexity of drought, it is important to understand the uncertainty related to its impacts which can be quantitative or qualitative. Drought risks keep changing and the assessments of these risks should be continuous, systematic and updated regularly to reflect the contexts. From the assessment of drought risks, scenarios are developed, and several interventions established to reduce the risks. This process is normally a long term process and all relevant stakeholders should be involved.

Historically, Isiolo County has been facing droughts which has been increasing in terms of its severity and frequency. Figure 2 shows changes in temperatures and precipitation over the years in Isiolo County. The figure is important in understanding the future projections of intensity drought in the County.

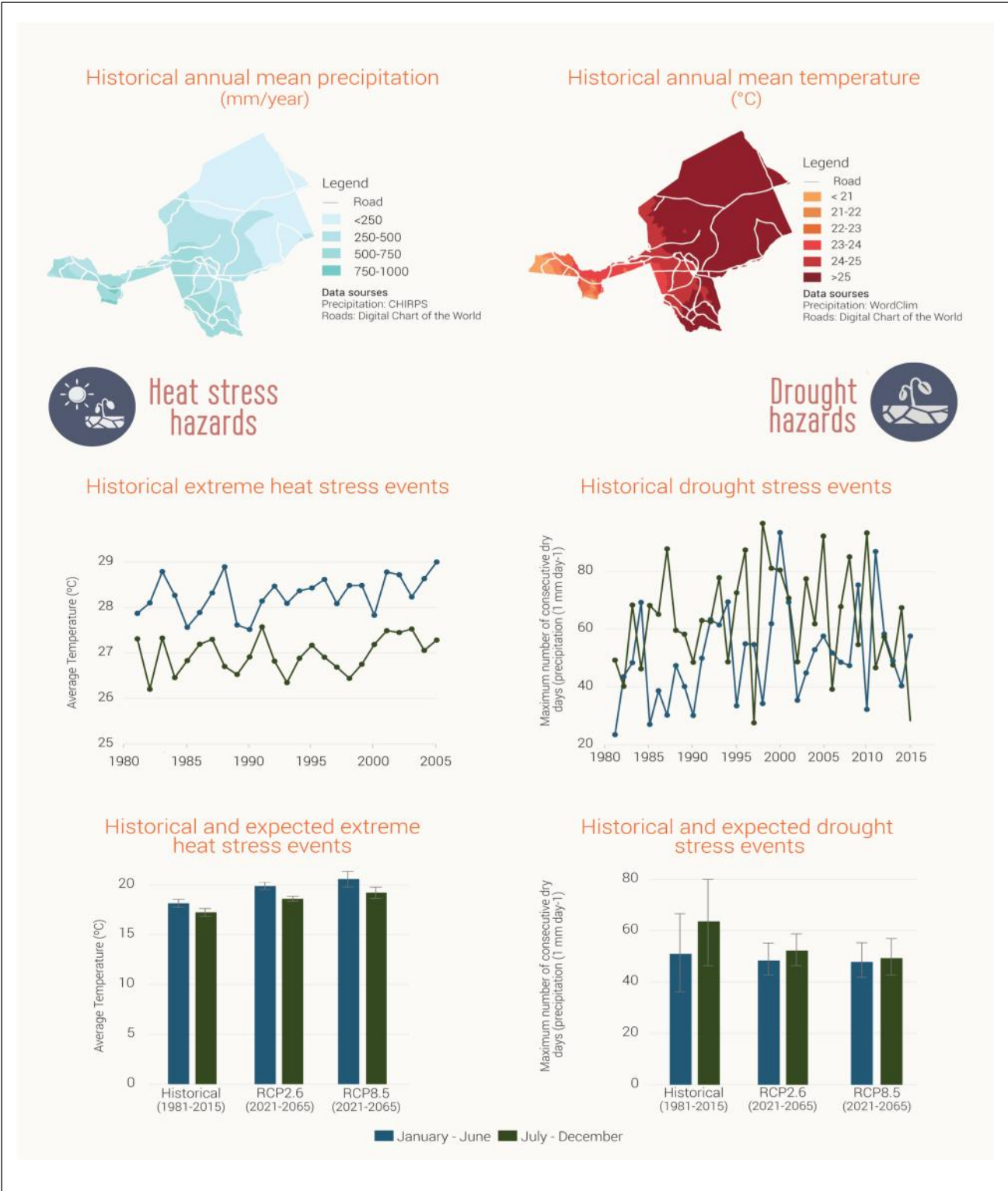


Figure 2: Past and future impacts of climate hazards in Isiolo

(Source: MoALF, 2017)

For droughts to be managed effectively, early warning information should be available at all the stages of drought management cycle as shown by figure 3 below. Each stage is guided by series of actions which should be undertaken to mitigate the impacts of drought and reduce further risks.



Figure 3: Figure showing disaster cycle management model (DCM)

(Source: Cordaid, 2004)

2.2 Impacts of Drought

Drought impacts are felt over extended periods of time even when drought situation is under control. For example, regeneration of ecosystems after severe drought may take years to regain their former status. Drought causes a disruption to cropping programs, limits breeding stock, erodes capital and resources and cause significant environmental damage through vegetation degradation as well as soil erosion (Sivakumar and Wilhite, 2002).

Drought impacts are felt across the world, for example United States has in various instances experienced significant adverse effects of drought. This was evidence through the drought years of 1930, which was regarded as the Country's top extreme weather event throughout the 20th century (Hensen *et al.* 1999).

This drought caused the population of the southern Great Plains to migrate to California. In Africa, the drought of 1968-1973 adversely affected 6 Million people and 25 Million cattle (Glantz, 1977; Grainger, 1990). Severe and wide –spread drought condition were experienced in Latin America, the Caribbean, and Asia in 2000 with devastating impacts on water availability (Sivakumar and Wilhite, 2002). In Europe severe droughts has resulted to significant economic losses which is estimated at 100 Billion Euros (Maxwell *et.al* 2011, Tsakiris *et.al* 2013).

Droughts are continuously being experienced in many parts of the world. Many have either suffered in the past and others continue to struggle with its frequency is increasing each year. Drought experienced in the 21st century is characterized by duration and spatial coverage. Its severity is increasing leading to scarcity in water supply (Allen *et al.* 2015).

2.3 Drought preparedness and Early Warning Systems

According to Davis *et al.* (1991), an early warning system refers to a system of data collection, analyzing and monitoring people’s access to food, to come up with timely notice when there is a threat of food shortage to ensure appropriate response.

Wilhite *et al.* (2005) assert that drought preparedness is the process of monitoring and forecasting the vulnerability and assessing the impacts, mitigation as well response planning measures. Preparedness is a crucial aspect of drought management. It comprises of measures of drought planning, implementing, mitigating, and creating awareness on the impending situation. Drought preparedness is increasingly recognized and adopted by government and donors in many affected countries. For instance, internationally FAO coordinated GIEWS is an example of information network that gives early warning for information on food situation.

Drought preparedness efforts are long term and requires enough resources and thus facilitated by the national and state drought policies and planning mechanisms (Sivakumar, 2011 and Wilhite, 2011). The approaches used lay emphasis on the need to move from the ad hoc drought relief and response actions to proactive risk management. Drought monitoring plays important role in shaping a country’s security. It provides a basis for basic problems such as food insecurity, malnutrition, resource-based conflicts, ecological degradation, and environmental refugee menace.

Some of these problems if neglected can be fatal both to the living things and the ecosystems at large. Therefore, it is essential for the Government to develop a national system for monitoring, prevention and response before and during a crisis.

Research and science play a vital role in early warning and crisis management. A warning is regarded as a process of data collection and dissemination of information between command and operatives for impending adverse in order events to trigger preparedness and immediate actions. (NATO, 2006). However, the essence of early warning system is that it entails collection and analysis information to reduce the risks of threats becoming disasters, control the current situation and reduce the future impacts.

New technologies for early warning systems and scientific research finding took too long before it was accepted as a means of providing significance information and actions for disaster risk reduction. The importance of early warning system as a tool for disaster response is to provide information for the anticipated disasters to a specific target group and population (Nedevski, 2010). Early warning systems is important in reducing economic, social and environmental losses and disaster risks by providing information that ensures the protection of communities, households, assets and critical infrastructures.

Early warning systems for drought are inherently important in drought mitigation especially for the semi-arid areas which experience low rainfall amounts of between 250mm to 500mm and with high potential for variability (Egeru *et al.*, 2014). Information derived from drought early warning systems is used in developing databases which are used for planning and development programs targeted at drought mitigation by the communities (UNISDR, 2013). Early warning systems are meant to trigger actions for decision makers in response to certain impending situation.

However, how and when the decision makers respond to drought early warning information is largely dependent on other factors beyond the early warning system. An Early warning system aims to respond in good time to impending disasters in order to protect livelihoods and lives that are threatened.

A suitable early warning system should not be static but sensitive to environmental, socio-economic, political changes. An effective early warning system should be reliable, timely, consistent and should also be able to elicit an early response.

2.4 Channels Used for Disseminating Early Warning Information

For a very long time, the role of media in triggering early action in case of disasters has been very crucial. According to Dreze and Sen (1989) independent press in a democratic government is considered as one of the best sources of information protection against famine to support as evidenced by a significant positive impact it has made in limiting famine in India. Media coverage is normally used to inform the public and decision makers on the situation on the ground which in most cases increase response rates. However, media sometimes would broadcast sensational information where disasters have happened but report little on preparedness and mitigation. Where all is lost, early warning practitioners turn to media to elicit reaction from Government or international community. However, in most cases where a response is triggered it comes as a last response with no regard of the EWI which was initially disseminated with a view to prevent such situation from happening.

According to Lwoga *et. a.*, (2010), channels for disseminating early warning information is affected by low literacy levels, and the use of electronic media leads to low coverage due to lack of adequate electrification of some regions. Additionally, the content, format as well as the channels of dissemination employed are in some cases not user friendly to the targeted communities, which as a result limit utilization of information (Masinde, 2015), The major drawbacks of most EWS in Sub-Saharan Africa is the inaccessibility of key messages as well as the challenges in understanding the information. (UNEP, 2012).

2.5 Challenges of Utilizing Early Warning Information

Major challenge which faces the drought early warning systems is the emphasis placed on the risk knowledge analysis as well as messages development rather than attention to content of these messages and dissemination for the right persons to act, (Basher, 2006; Choo, 2009). According to Coffey *et al.* (2015), since drought early warning systems (DEWS) are based on forecasts, uncertainty of the early warning information in most cases leads to unreliable information.

The early warning information shared in some instances Information that is shared is not easily implementable because of the difficulty in interpreting it. Therefore, to enhance utilization, the drought early warning messages should not only be generated but also disseminated in a manner that is easier to understand among the target population in order to trigger appropriate response to the impacts of droughts (Makala, 2012; UNISDR, 2013).

For DEWS to be effective, it requires that the information disseminated is of good quality and its dissemination happens through the right channels. Mittal *et. al.* (2012) and Attaluri *et. al.* (2012) assert that measurement of quality information is based on its accessibility, availability, relevance as well as timeliness. Furthermore, the World Bank (2011) notes that the right channels are imperative for effective information exchange among DEWS actors. Various channels like electronic and print media, community gatherings, telephones, and extension services can be applied for the purposes of sharing information.

One of the outstanding challenges in EWS is lack of clear and consistent early warning messages. In some cases, centralized EWI disseminated by Government are among information sources and that are shared at smaller scale e.g. villages and are often different. Therefore, as much as there is better coordination among stakeholders, in some cases, the EWS can also create contradictory information and confusion among the stakeholders. For instance, in Ethiopia in 1997, there were reports of impending droughts and famine that led to appeal for food aid. Due to inconsistency in messages from various EWS, response from donor was regarded as “unusually poor and late,” resulting in delivery of less than 15% of the estimated relief requirements by 1st December 1997, long after the major drought season (Thomson *et al.*, 1998)

In a study done by Buchanan-smith and Davies (1995) “Famine Early Warning and Response – the Missing Link” the author discussed the lack of coordination between early warning information and the early action. This study explained the role of non-Governmental organizations and donors who in most cases are passive in utilization of the early warning information and are not proactive in taking decision in a timely manner. However, this might not be the case in regard to the role played today by the international organizations and donors/development partners who are aware of the risks and working closely with communities and Government in disseminating early warning information and enhancing Government early response to droughts through lobby and advocacy initiatives.

A similar study by Imeje (2014) investigated the factors that affect the humanitarian agencies in responding to drought even though the early warning information was available and timely. The focus of this study was mainly the humanitarian organizations that are working in Kenya and have programs on drought cycle management in these Counties. Whereas the two studies provide important literature on the early warning systems and response mechanisms both by national Government and humanitarian agencies, the role of County Government in response is not adequately assessed in these two studies.

2.7 Crisis Management versus Risk Reduction-Relief Food in Emergencies

The provision of relief food does not assist in reducing the drought risks but enforcing the status quo of the resource management (Sivakumar *et. al*, 2002). Until the nineties, drought response during disasters was heavily focused on relief. Addressing root causes of vulnerability and underlying risks were viewed as interventions that could not be undertaken after the disaster is over. Many Governments have now recognized the importance of risk management as compared to emergency response and its effectiveness in reducing the vulnerabilities of affected communities.

Globally vulnerability to risks is increasing rapidly and activities to reduce these risks have been emphasized in planning and operations. Previously, many actors were quick to conduct impact assessment, response, recovery, as well as reconstruction practices during a disaster event.

This situation gave little attention to preparedness, mitigation and early warning actions which could reduce future impacts and assist in building the capacities of the communities to absorb the shocks from these disaster events.

From the work of practitioners (e.g., Berke *et. al*, 1993; Buchanan-Smith *et. al*, 1995; Cuny, 1983; Hay, 1986; Lewis, 1999) and researchers (e.g., Cutter, 1996; Hewitt, 1997; Quarantelli, 1989; Tobin, 1999; Wisner, 1993), the link between disaster and development is slowly gaining popularity. There is also strong consensus between scientific and policy communities that disasters are not as a result of hazard event alone but the interconnectedness among the hazard event, the physical environment and the societal vulnerability.

Even though this interconnectedness is evident, this fact has not translated into the mainstream practice. Indeed “the journey has only just begun” (Wisner, 2011). Vulnerability analysis and risk reduction initiatives are still underfunded by donor projects. It is reported that only 4% of the estimated \$10 billion in annual humanitarian assistance is devoted to disaster risk reduction (ECBP, 2008).

Some researchers have explained why most of the donors do not readily support preparedness projects. For instance, Christoplos *et. al*, (2001) noted that disaster mitigation and preparedness do not have “the allure of directly saving lives”.

Another researcher (Luna 2001) indicates that relief funding is more accessible because the impacts of saving lives is visible. However, Kyle (2004), working on Angola and Mozambique, noted humanitarian actors are “ill-suited to transition from emergency aid to development work, the skills that are needed for one are not the same as for the other. Getting food and medicine to the needy as fast as possible is quite distinct from the longer-term goals of agricultural development in which demonstration and transfer of technological advancement is the main goal”.

It is imperative, noting that in some instances the humanitarian actors need to have the necessary know-how on shifting from provision of free goods and services to the transfer of skills and knowledge with the use of new technologies and approaches.

However, some development NGOs are involved in disaster response (Luna 2001). Some of these NGOs have also incorporated vulnerability assessment in their relief work (Anderson *et. al*, 1991; Benson *et. al*, 2001; Christoplos *et al.*, 2001; Remington *et. al*, 2002).

2.8 Conceptual Framework

In Kenya, drought early warning systems were developed to limit vulnerability to a drought hazard through provision early interventions for effective mitigation strategies which is meant to be put in place by Governments, stakeholders and communities. The communities most affected are those that rely on climate sensitive livelihoods like agriculture and pastoralism. Drought preparedness therefore plays a central role in protecting economic and societal losses due to the impacts of droughts. Provision of drought early warning information is important, and could be undertaken through setting up institutions which will provide reliable and timely information and in a language understood across the board. Many agencies, both Government and non-governmental, have come up with tools for early warning information on various hazards in the Country.

For early warning information to illicit early action, it should be reliable and able to provide appropriate solutions to the affected communities to enable them to take an early action. This information is relayed through media (both print and audio/visual), newspapers, newsletters and through word of mouth at community level. The communities benefit from this information by understanding their contexts and the risks they face and this can enable them take the appropriate actions and decisions to be able to reduce the risks and mitigate the impacts of the droughts on their livelihoods and as a result build capacity to withstand the shocks of disasters in future. The figure 4 below shows the different concepts as explained above, and how they interrelate.

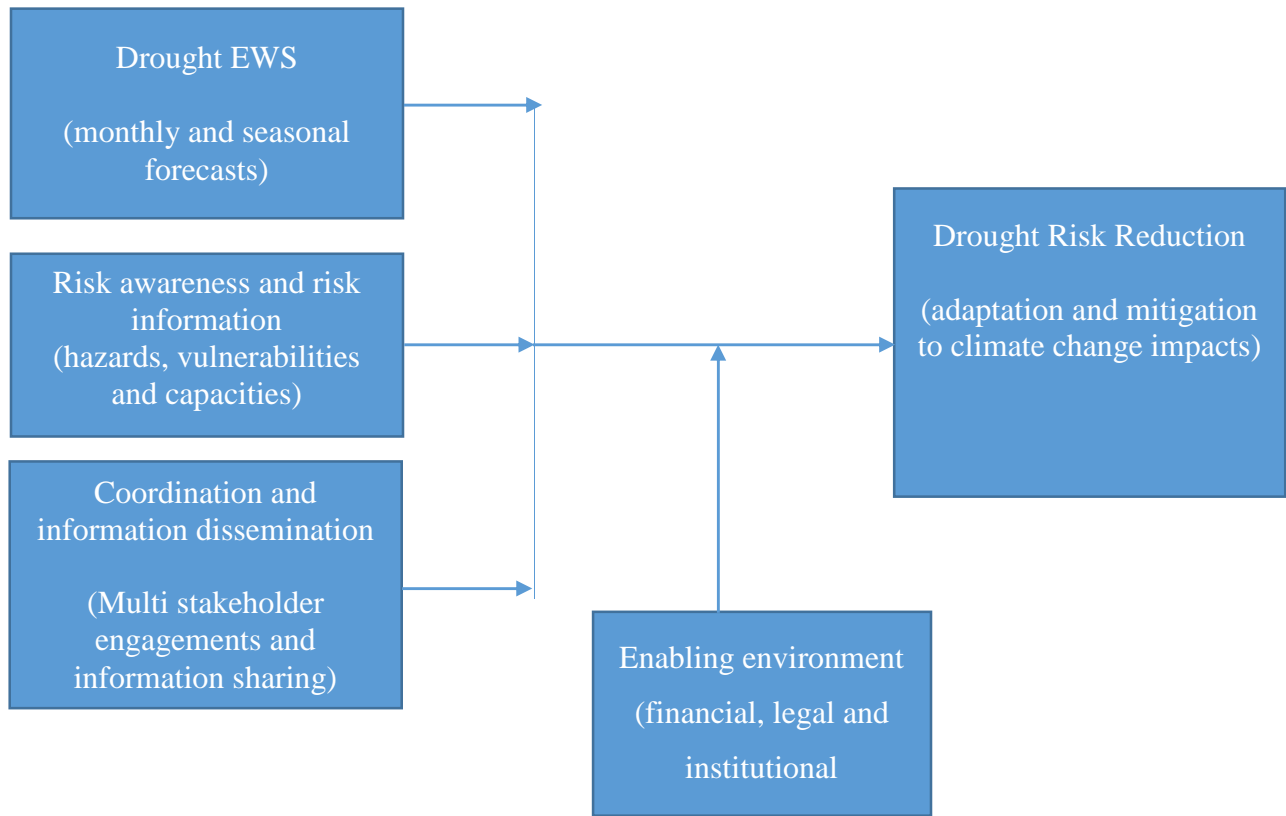


Figure 4: Conceptual framework

(Source: Author)

CHAPTER THREE: DATA AND RESEARCH METHODOLOGY

3.0 Introduction

This chapter presents an overview of the study area, data and methodology used in the study.

3.1 Study Area

This research study was conducted in Isiolo County, Central Ward where all Government offices are located and humanitarian organizations have their offices. Isiolo County is located in the northern Kenya in the former eastern province and located between Longitudes 38°35'16.31"E and Latitude 1°2'51.11"N. The County covers 25, 336.1 square kilometers. KNBS (2009) report shows that population in this county is 143, 294 whereby 51% of this population are men and 49% are female. The map of the study site is shown in Figure 5 below.

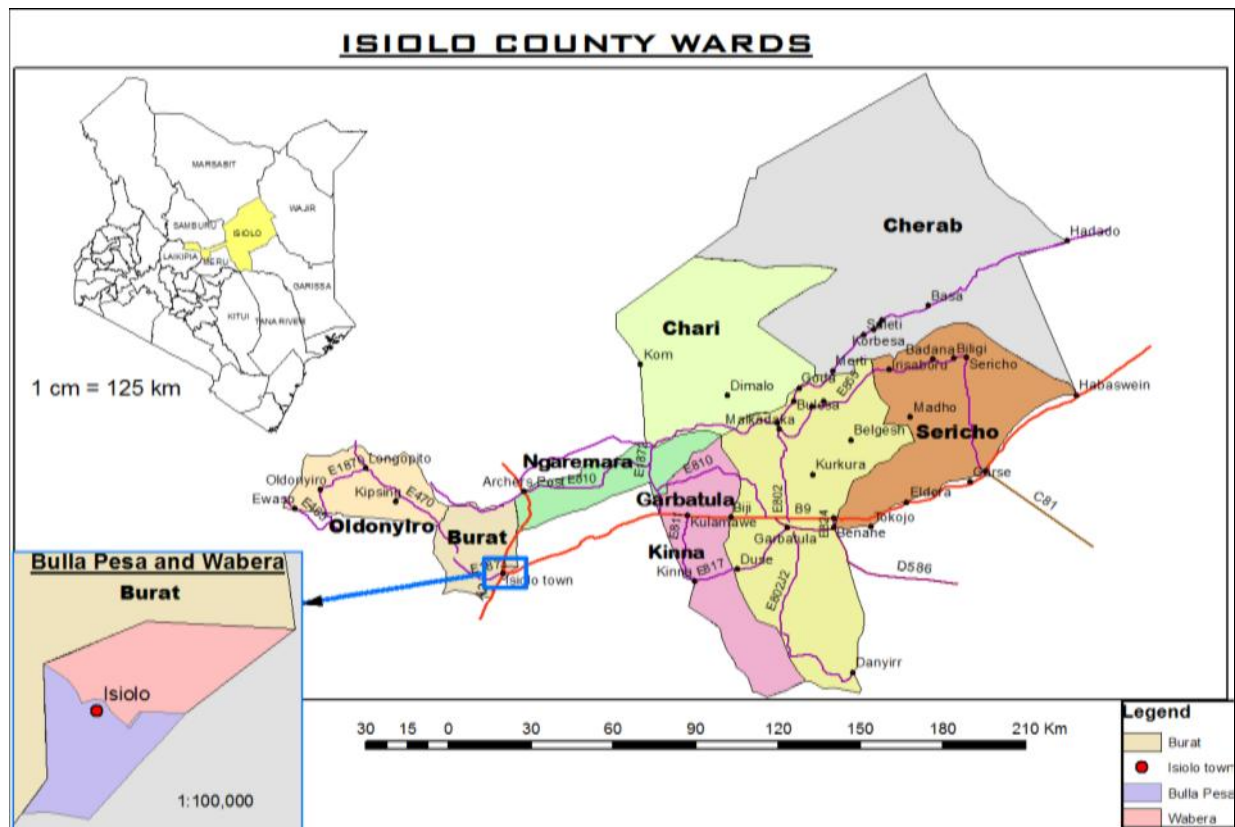


Figure 5: Map of the area of study

Source: GIS Maps, 2017

3.2 Target Respondents

The target respondents for this research were staff drawn from the County Government executive committees (CEC), the County assembly, staff from departments in the ministries of water, health, education, peace and security, agriculture, and livestock. The study also involved staff from five humanitarian organizations based in Isiolo County who are either from the international organizations or donor communities and local Non-Governmental organizations. The study also targeted NDMA and KMD as the key institutions playing crucial roles in provision of drought early warning information.

3.3 Sample Size

The study selected 35 respondents to participate in this study. The respondents were randomly selected from different clusters such as the County Executive committee, the County assembly, the international NGOs, the local NGOs, relevant department in the ministries and the national Government representatives in the County.

All the respondents selected were senior officers who were mandated by legislation to provide early warning information or in capacities at their various institutions to influence decision making based application on the early warning information received.

Based on the kind of information required for this study, the researcher applied non-random or purposive sampling in selecting the 35 respondents. The following criteria was used to identify the 35 respondents;

- i. Senior management staff of County Government of Isiolo in the relevant ministries
- ii. He / She was accessing the drought early warning systems and is utilizing the early warning information in response activities in their own institutions
- iii. He/she had experiences in 2016 and 2017 drought response activities in their organizations

Table 1: Table showing the target respondents

Organization	Respondents	No. of respondents	Reason for selection
County Government of Isiolo	County Governor, 2 CECs (tourism and finance) MCA, County Clerk.	5	The county assembly and the executive are the two arms of Government. They play an important role in setting up institutional frameworks and resources allocation to risk management imitative in the County
Humanitarian organizations in the County	KRCS, ACF, Mercy Corps, CARITAS, World Vision, Action Aid, WFP	7	They are mainly the donors who are implementing risk reduction programs in the county aiming towards resilience strengthening of the communities
Line ministries and departments	Water, health, education, agriculture, livestock, peace and security, special programs, tourism	8	Line ministries and departments act as the implementing agencies of the Government programs on drought risk reduction in the County as mandated by the relevant legislations and policies.
National Government (In Isiolo)	4 NDMA, KMD	5	NDMA and KMD are mandated to provide drought monthly bulletin and seasonal forecasts respectively. They coordinate and advice the County steering group on the relevant actions to undertake at various phases of drought.
Local NGOs	MID-P, ISID, KLMC	3	Local NGOs in the County receive grants from development partners to implement adaptation and mitigation programs in the County. They also act as a link between local level initiatives and international agendas on risk management.
International NGOs	Cordaid, CARE, LVIA, UNDP, UNISDR	5	These international NGOs based in the country are implementing resilience programs in the broader context of disaster risk reduction. They also have elements of droughts response in their programs, which may not be the core agenda of their initiatives in the Country.
Total		35	

3.4 Methods and tools of Data Collection

In this study, combination of primary and secondary sources of data were used. Mugenda and Mugenda (2003) attribute primary data as the data that is observed or collected directly through first-hand experience. This is data which is in its original state and has not been manipulated either or analyzed to give information. Secondary data, on the other hand, refers to data (or materials) which has already been collected and documented by previous researchers and is usually found in libraries, archives, books, records, internet, census, organizational reports as well as data which is obtained through qualitative methodologies (Bishop, 2007). The study used both qualitative and quantitative data collection methods as explained below. The data was collected using key informant questionnaires which was administered to the respondents. (Appendices 11)

3.5 Collection of Quantitative Data

The researcher collected qualitative data for this study. However, to enhance the reliability of the data collected it was important to use both qualitative and quantitative methods. The data collected for this study also included quantitative data which was coded, analyzed and presented using quantitative methods. This data was mainly used to compare and reveal the relevance of information collected from respondents in different sections as indicated in the questionnaire. From the analyzed data, scoring was conducted to show how different respondents agreed or disagree to different statements which then was presented using descriptive statistics.

3.6 Collection of Qualitative Data

The data collected was mainly qualitative in nature. The data collected examined the understanding of various concepts and the perceptions among the different actors on early warning information. The information collected also sought to establish how the information received on early warning are translated into actions and what were the challenges faced during this process. Qualitative data was collection using questionnaires which was administered through key informant interviews, email correspondence and telephone interviews as discussed below.

3.6.1 Key Informant Interviews

Key informant interviews were used to gather information from the sampled 35 respondents who are regarded as knowledgeable about the drought early warning information. When diverse information is required and the key informants are easily accessible, this approach becomes the most appropriate to use (Jimenez 1985). The study used a structured interview to facilitate face to face discussions and seek new information, ask questions and seek clarity on different topics and issues pertaining the drought early warning information. In case information received has not been sufficient, follow up meetings were arranged prior to the conclusion of the data collection process.

3.6.2 Email Questionnaires

Due to the diverse nature of respondents' work schedules, the researcher employed innovative approaches for obtaining data from the respondents outside the traditional the face to face interviews. Structured questionnaires were sent via email to those who could be accessed virtually.

3.6.3 Telephone Interviews

The study also used a guided structured interview for those respondents who were available through telephone. Telephone interview is important because the researcher can be able to provide more clarification and explanation on certain questions where the respondents are not sure of.

3.6.4 Secondary Data

The study relied on secondary data that was collected from libraries, archives, books, records, internet, census and organizational reports among others. The information was both qualitative and quantitative, and was applied in conceptualizing, assessing and utilizing the available information relevant to the study. In this case, therefore, the researcher used Government early warning reports as well as publications, NGOs drought early warning and reports and records, internet sites on online early warning systems, and archives on drought early warning information and responses by various actors in Isiolo County.

3.7 Validity and Reliability

This study measured the quality of research design using methodology of validity and reliability.

3.7.1 Validity

Validity is referred to as the degree to which the instrument effectively measures the subject under study to ensure that the study outcomes are valid and justifiable (Polit *et. al*, 2010). In ensuring that the research instruments are valid, the questionnaires were tested to ascertain the validity of the instruments. The researcher used face and content validity to ascertain the suitability of the tool used in data collection. Pre-testing of the questionnaires was done before administering it to the target population and this enabled the researcher to adjust the questions where necessary to avoid confusion and enhance chances of receiving the intended feedback (Tayie, 2005). The researcher used a content validity test and face validity test methods in testing questionnaires to ensure the relevance of the questions being asked and also to measure the concept being tested.

3.7.2 Reliability

According to Polit *et. al*, (1999), reliability refers to the level of consistency with which instruments can certain attributes that is designed to measure. The researcher used pre-test interviews to study participants who were not part of the main study sample but with similar features as the research subjects to ascertain reliability of data collected as well as consistency in response.

3.8 Ethical Considerations in the study

The researcher ensured that all the ethical standards and regulations were adhered to in this study. The researcher sought authority to conduct research from County Commissioner to ensure smooth collection of data in the field. The respondents were informed of consent prior to the visit. The aims and objectives of research were explained to the respondents and the researcher also committed to share the findings from the study with them upon finalization of the study. Information gathered through interviews conducted with the respondents were also handled in strict confidence and anonymity ensure respondents identified are not disclosed.

3.9 Data Analysis and Presentation

According to Kombo and Tromp (2010) data analysis involves testing data that have been gathered through an experiment or survey in order to make deductions and inferences. The researcher utilized quantitative and qualitative analysis approaches.

Analysis of quantitative data was conducted through descriptive statistics which include cross tabulations, frequency distribution, percentages, and charts.

The data collected data, was edited (clean), coded and input into statistical software, SPSS for analysis. SPSS was used in opening data files inputted in excel, edit the data by computing sums, means in rows and columns, and create statistical summaries using tables and charts. The researcher also used SPSS to inferential statistics such as T-test. The researcher qualitatively analyzed the information from open ended questions and structured interviews so as to identify the relationship between concepts, meaning and responses. The data analysis techniques used by the study include descriptive statistics such as frequencies, percentages, mean and standard deviation for first, third and fourth objectives while paired test was used together with descriptive statistics to achieve for the second objective of the study.

CHAPTER FOUR: RESULTS AND DISCUSSIONS

4.0 Introduction

This chapter presents the results obtained from data the analysis. The findings of this study presented using charts and tables.

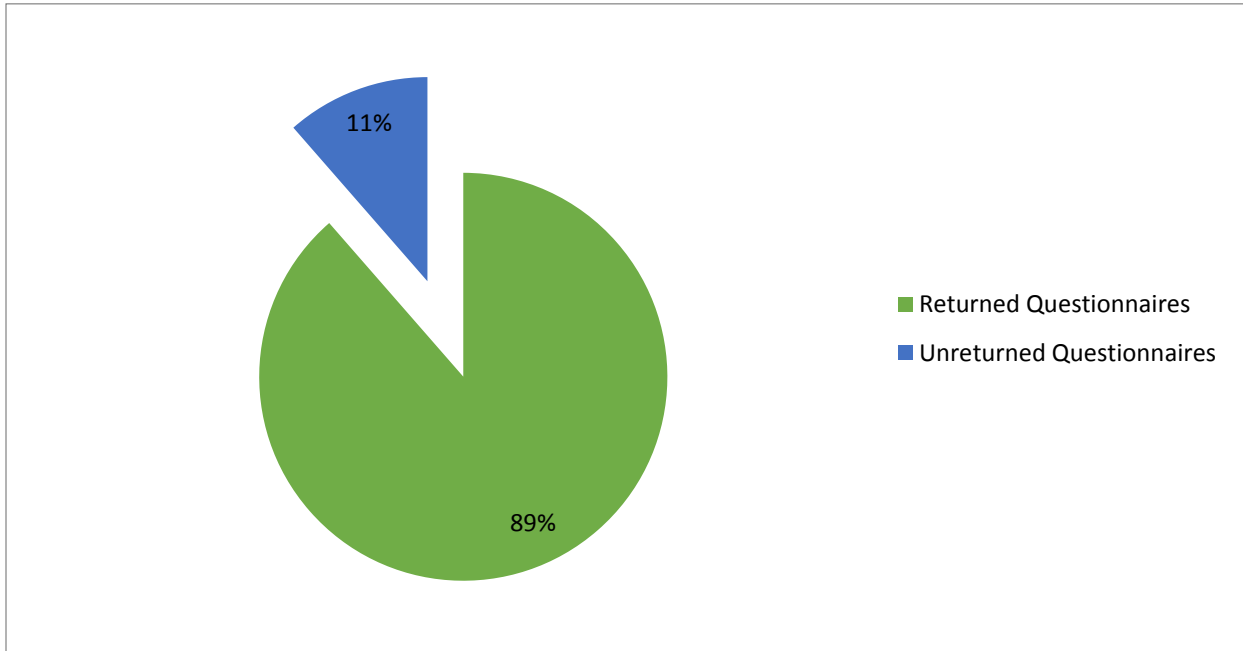


Figure 6: Response rate achieved by the survey

4.1.1 Respondent's Institution

Figure 7 shows the distribution of respondents by institutions. 32.3% were obtained from institution under National Government, 25.8% came from various departments under County Government, 19.4% were from international organizations and another 19.4% were from local NGOs while 3.2% came from NDMA. Majority of the respondents were also senior staff of these organizations, or were in charge of implementing response plans in their respective offices.

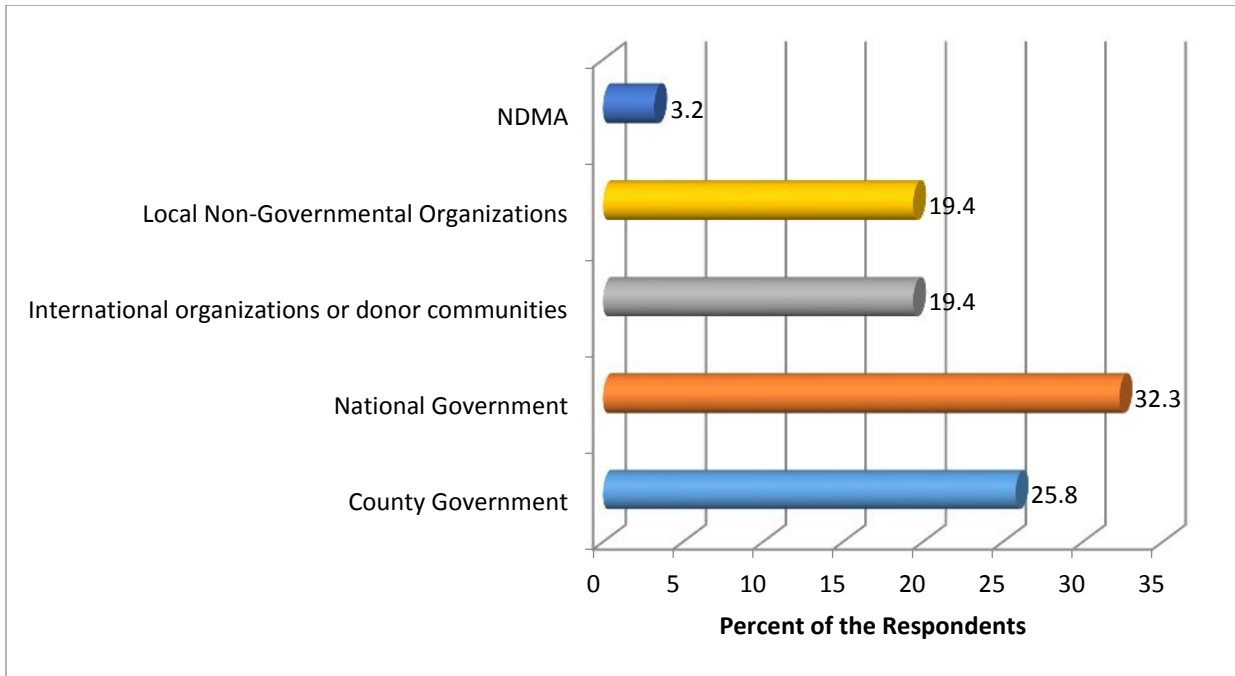


Figure 7: Respondents’ Institutions

4.1.2 Respondent’s understanding of Early Warning System

The study sought the respondents’ organization understanding of early warning systems and the role that early warning information play in their daily tasks. The study established that majority of the respondents understood what early warning systems were and provided a clear definition. A precise definition provide by majority of the respondents was;

“Generation and dissemination of timely and reliable information on the imminent extreme weather events to instigate mitigation measures”

Majority of the respondents indicated that they used early warning information for planning and decision making to mitigate the impacts of drought as a result of extreme weather events. In some departments like agriculture and livestock, EWI was mentioned as key in their day to day operations in their work. One of the key informants mentioned that;

“In our organization early warning information is used to plan ahead of the disaster, provide the information to the community, partners and policy makers to prepare for actions to mitigate the impacts”

From the findings, it was evident that the respondents were aware about early warnings systems and their role in their respective organizations. Therefore, the group of respondent selected for the study was reliable in providing the necessary information.

4.13 Adequacy of Drought Early Warning Information

Table 2: Adequacy of Early Warning Information

	Availability of DEWS in Isiolo County	Response of County Government of Isiolo to DEWS
Very Inadequate	6.5%	9.7%
Inadequate	22.6%	45.2%
Moderately Adequate	41.9%	35.5%
Adequate	22.6%	9.7%
Very Adequate	6.5%	0.0%
Mean	3.00	2.45
Std Dev	1.00	0.81

Table 2 indicates that 41.9% of the respondents indicated that early warning information was moderately adequate, 22.6% indicated inadequate, 22.6% indicated adequate while 6.5% indicated very inadequate. The results further show that 45.2% of the respondents indicated that response by County Government of Isiolo to drought early warning was inadequate while 35.5% indicated that the response was moderately adequate. These findings implied that majority of the respondents were not satisfied with the level of response by the County Government of Isiolo to drought amidst availability of the drought early warning information. A respondent from local NGO indicated that the response of County to drought early warning was moderately adequate by giving an explanation below.

“There has not been adequate coordination and collaboration between National and County Governments’ agencies. In my view, the early warning systems have not been scaled down to the smallest units” This view was also supported by another respondent from Ministry of Health “During the 2017 drought in Isiolo, as the health sector, we had jointly with other parties mobilized resources that would counter the situation. For example, blankets, supplementary feeding, cash transfer. Additionally, the SRA/LRA (Short-term/Long-term risk analysis) projections and recommendations are usually acted upon”

A respondent who indicated inadequate indicated that *“Early response is a challenge, the Government response systems are bureaucratic in nature and therefore decision making takes long time thus undermining early responses.”* This view was also supported by another respondent who indicated that *“Little measures are put in place by the County Government to respond to early warning information from NDMA”*. Another key informant mentioned that *“government only responds when there is an emergency and the situation is already out of control.”*

A report by USAID (2018) also noted that while humanitarian aid can save lives, it has historically arrived late, well into the peak of a crisis. During the 2006 drought, despite warnings that came as early as July 2005, substantial interventions did not start until February 2006. In addition, the study reveal that late response may not always mean that the County Government was not aware of the risks and hence, but mainly due to the inadequate structures to enable efficient response.

4.2 Availability of Drought Early Warning Information and how it is utilised in Isiolo County

This section presents the results on the perspective of the respondents on availability of the drought early warning information and utilization of the same information by the Isiolo County Government.

4.2.1 Availability of Drought Early Warning Information in Isiolo County

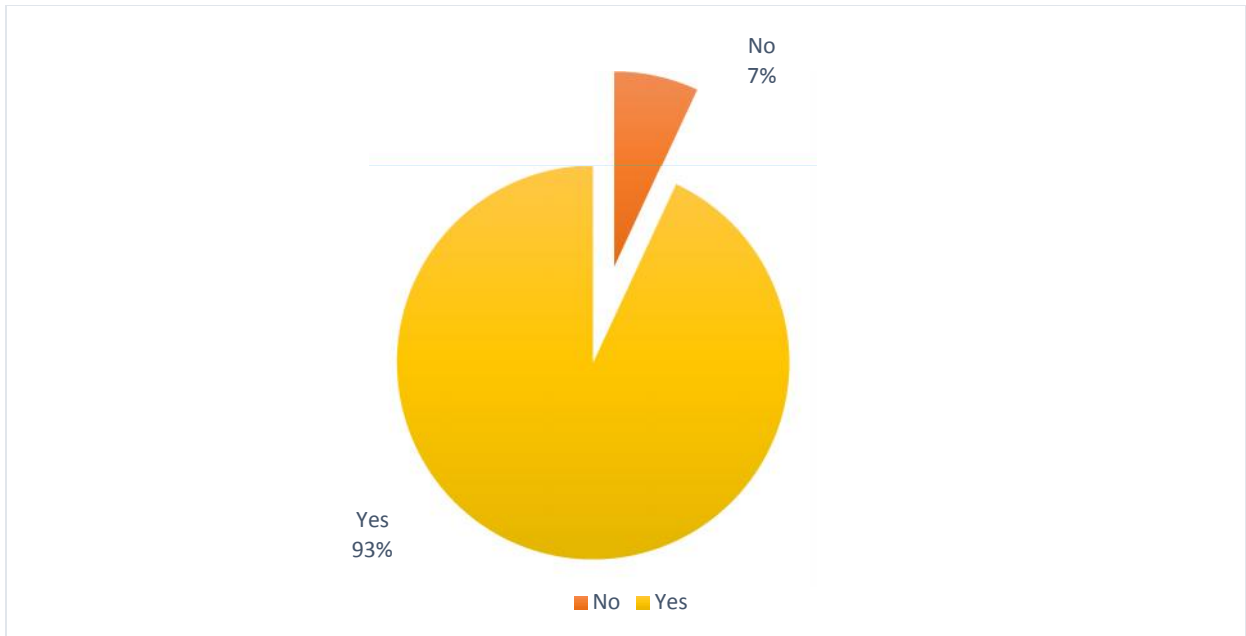


Figure 8: Availability of Early Warning Information

Figure 8 shows the availability of drought early warning information in Isiolo County. 93% of the respondents agreed that Isiolo County received drought early warning information on the drought that was experienced in 2016 and 2017. The respondents indicated monthly bulletins from KMD with various parameters for example precipitation, temperature, soil moisture, vegetation cover among others. EWI reports, seasonal weather forecast from KMD, FEWSNET among the types of the early warning information received by the Isiolo County government. Majority of the respondents further agreed that they relied on drought early warning information provided by Government and that information received was useful to some respondents in triggering early responses while to other it was not successful in triggering early responses.

A study conducted by Wilhite and Svoboda, (2000) on drought early warning systems in the context of drought preparedness and mitigation established that existence of early warning information before a disaster however the response is normally not quick and therefore resulting to adverse impacts.

From the findings however, it was established that drought early warning information was available. The early warning information was generated by NDMA and KMD which was shared on monthly basis. It was also evident that some of the departments had their own systems that were used in their response. This raised the issue of harmonization of early warning systems in order to respond to the needs of all Government departments in the County.

4.2.2 Frequency of provision of Early Warning Information

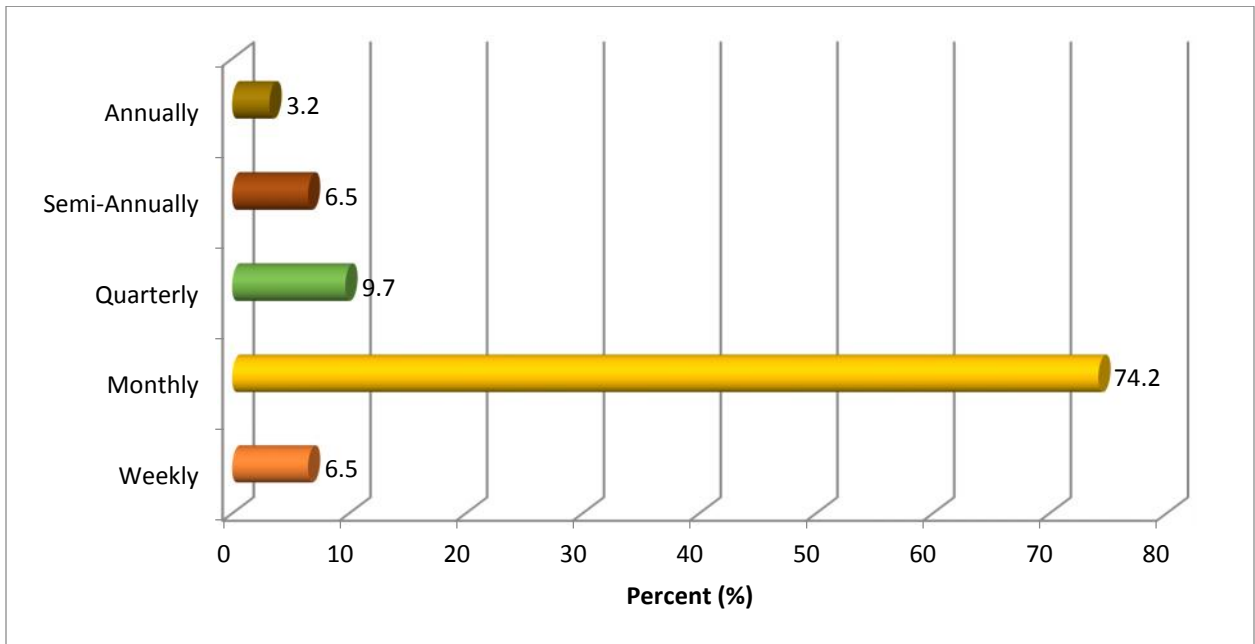


Figure 9: Frequency of provision of Early Warning Information

The frequency of provision of early warning information is given in figure 9. It is shown that the majority of the respondents (74%) indicated that early warning information was provided to Isiolo County on monthly basis. Majority of the respondents received the monthly drought bulletin from NDMA and also attended the County steering group meetings where such information was also disseminated and roles and responsibilities in regard to response discussed and agreed upon. The findings confirmed that Isiolo County Government received drought early warning information which further implied that EWS information was always available to the County ahead of drought events.

The respondent further indicated that the Isiolo County had agencies mandated to collect, analyse and timely disseminate early warning information on imminent drought situations. Effective drought early warning systems can therefore support appropriate mitigation and preparedness strategies and hence minimize the effect of the drought. (Masinde, 2014).

Isiolo County also receives seasonal climate forecasts for example inform of a seasonal forecast to inform the County on the future seasonal outlook. An example of a seasonal forecasts disseminated by Meteorological Department for Isiolo County showing the depressed rainfall between October and December 2016 before drought was declared a national disaster in the Country is given in figure 10.

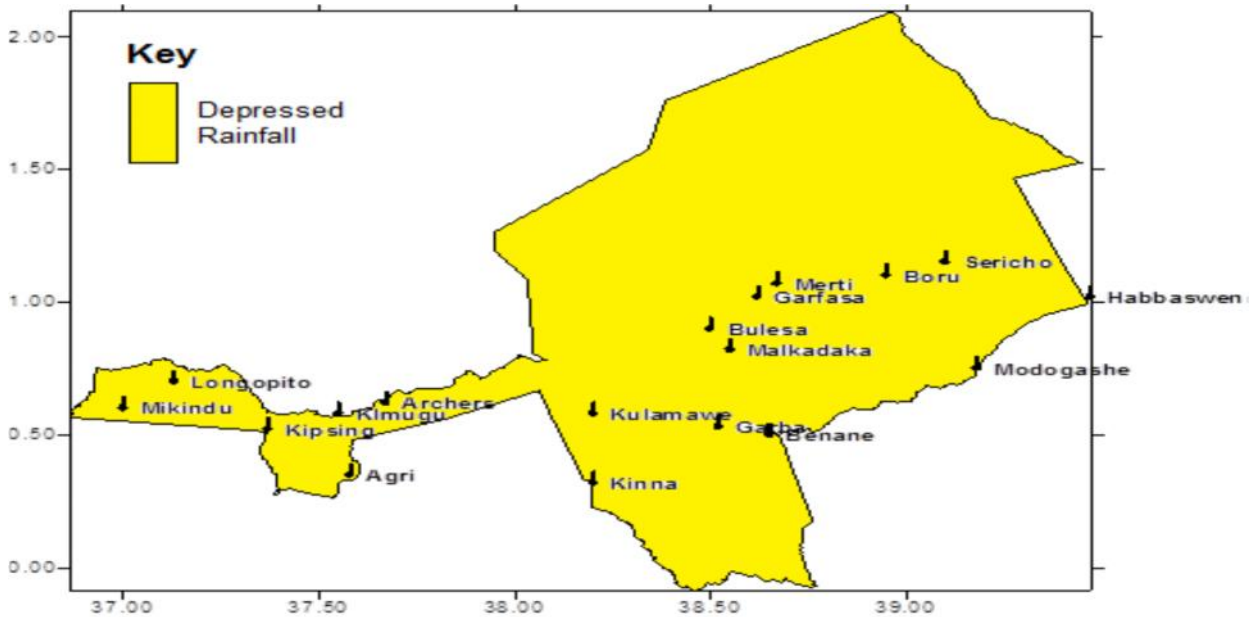


Figure 10: October to December (OND) 2016 Seasonal Rainfall Forecast by KMD

4.2.3 Types of Early Warning information received in Isiolo County

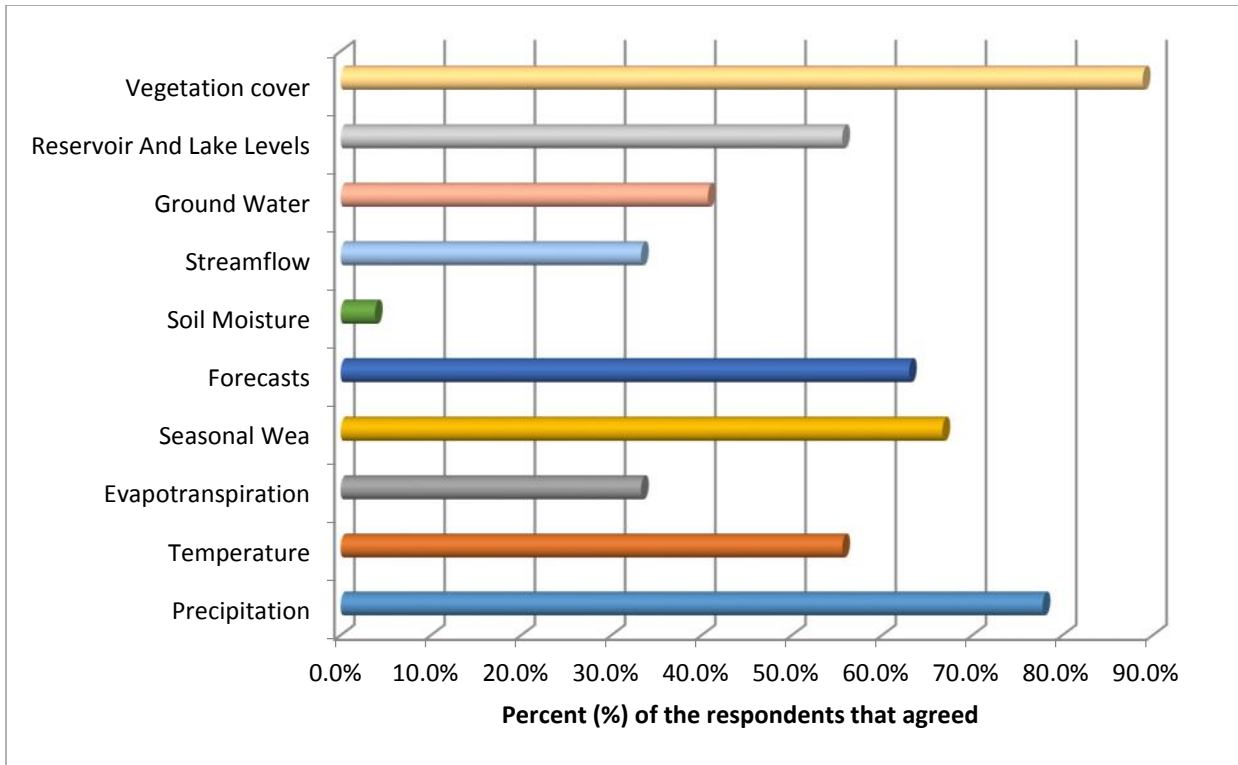


Figure 11: Types of Information in Early Warning system received in Isiolo County

Figure 11 shows the type of early warning information received in Isiolo County. EWI types include vegetation cover, precipitation level, forecasts on seasonal weather, temperature, reservoirs and lake levels. Other early warning information include ground water, evapotranspiration and streamflow.

Table 3 shows the respondents' perception of available EWI in Isiolo County. 86.7% of the respondents indicated that early warning information provided to Isiolo County is collected and analyzed on multiple drought indices. The findings further show that 83.3% of the respondents agreed that early warning information calibration is done based on various intensities of drought. On the other hand, 56.7%, disagreed that drought early warning information provided to County government of Isiolo triggered early/timely responses while 43.3% agreed. Those who disagreed indicated that the laxity of the County Government to put in place response mechanism

On the other hand, those who agreed indicated that the county government was swift in responding to early warning to mitigate drought through mobilizing the responsible agencies to initiate early responses based on the information provided. From the responses, it was also revealed that even though the Government in most cases responds late to the early warning information, this situation does not help the County in the dealing with the root causes of vulnerability and future risks of droughts.

Similarly, 66.7% disagreed that there has been effective utilization of early warning information in Isiolo County as an adaptation strategy to averse the effects of climate change among the ASALs in Kenya. Further the study indicates that lack of early response to drought was caused by poor utilization of the available early warning information by the relevant County Government departments.

Table 3: Descriptive Results on Availability of Early Warning Information

	No	Yes
Early warning information provided to Isiolo County is collected and analyzed on multiple drought indices/indicators	13.3%	86.7%
Early warning information calibration is done based on various intensities of drought	16.7%	83.3%
Drought early warning information provided to County government of Isiolo trigger early/timely responses	56.7%	43.3%
Do you think there has been effective utilization of early warning systems in Isiolo County as an adaptation strategy to climate change among the ASALs in Kenya	66.7%	33.3%
Is there specific committee in the County government of Isiolo responsible for monitoring, evaluating and responding to drought early warning information	32.1%	67.9%

The findings on this study are in agreement with the findings of Imeje (2014) who found that even though early warning information was available and timely, drought responses by humanitarian organizations in Kenya was slow and ineffective. Many agencies, both Governmental and non-Governmental have come up with tools for early warning information on various hazards. However, the utilization of these information to enhance drought early responses has been very low. Development Initiative (2017) report also noted that Kenya's capacity to prepare for disasters is not a data or information challenge.

There are several sources of data, which could have analyzed to yield information that improve decision-making and service delivery. The findings of this study also is in agreement with those of Development Initiative (2017) which indicated that investment in preparedness activities was a major challenge especially across the different natural disasters. However, from these findings, Governance structures at County level also played a very critical role in determining the kind of activities are prioritized when it comes to disaster risk management.

4.3 Opportunities brought about by devolution in responding to drought crisis

The second objective of the study was to determine the opportunities brought about by the devolution in responding to drought crisis. The study sought to find out whether devolution has helped in ensuring early response to EWI since they are closer to the people affected than the National government.

4.3.1 Mean score evaluation based on the respondents' feedback

Table 4: Opportunities brought by the devolution in responding to Early Warnings

	Mean Score (Before Devolution)	Mean Score (After Devolution)
Effectiveness of Response to drought warnings in Isiolo County	2.89	3.33
Number of people affected by drought situations in Isiolo county is low	2.46	2.89
Effectiveness of dissemination of Drought early warning information dissemination	2.82	3.44
Effective utilization of early warning systems in Isiolo County as an adaptation strategy to climate change	3.00	3.50
Drought early warning information provided to County government of Isiolo trigger early/timely responses	2.65	3.27
Coordination among the stakeholders in Isiolo in drought response has improved	3.08	3.88
Average	2.82	3.39

Table 4 represents the opportunities brought about by devolution. A mean of 3.33 indicated that the majority of respondents indicate that early response was effective after devolution than before (2.89). Majority of the respondents further agreed that the number of people affected by drought situations in Isiolo county is lower after devolution than before. The mean score of 3.44 further indicated that majority of the respondents indicated that dissemination of drought early warning information was also effective after devolution than before devolution. Majority of the respondents (3.50) indicated that utilization of early warning in Isiolo County as an adaptation strategy to climate change impacts improved after devolution. Similarly, that drought early warning information provided to County government of Isiolo triggered early/timely responses (3.27) and coordination among the stakeholders in Isiolo in drought response improved after devolution (3.88).

These finding indicated that overall availability and utilization of early warning information improved after devolution. The study therefore established that devolved government systems provided an opportunity for improvement the in dissemination and utilization of the early warning information to mitigate the impacts of drought. Some of the opportunities highlighted by respondents that have been provided by devolved government include: availability of the government services closer to the people hence faster and efficient response management. The respondents further mentioned that closeness of County Government to the people implies that relevant policies can be formulated that will direct adaptation to drought conditions through allocation of necessary resources. The respondents further mentioned that devolution has brought resources closer to the local institutions that are responsible for dealing with drought situations.

4.3.2 Paired T-Test analysis of the mean before and after devolution

The study used paired t-test to test whether there is a significant difference between the responses before and after devolution among the respondents. The Results in Table 5 shows that mean for before devolution was 2.7840 while after devolution was 3.333 which implied that majority of the respondents agreed on improvement of utilization of early warning information after devolution.

Table 5: Paired samples descriptive statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Before Devolution	2.7840	27	.70075	.13486
	After Devolution	3.3333	27	.90935	.17501

The finding in Table 5 shows that there was significance positive difference in availability and utilization of early warning after and before devolution. The findings established that there was significant improvement in available and utilization early warning information after devolution. The study revealed that devolution provided an opportunity for effective use of early warning information to triggers early responses to drought.

Table 6: Paired T-statistics significance results

		Pair 1
		Before Devolution – After Devolution
Mean		0.54938
Std. Deviation		1.07598
Std. Error Mean		0.20707
95% Confidence Interval of the Difference	Lower	0.97502
	Upper	-0.12374
t-statistics		2.653
Df		26
Sig. (2-tailed)		0.013

The finding presented in Figure 12 further revealed that 68% of the respondents interviewed agreed that County Governments are well placed to respond to drought early warning information. The finding further confirmed that is a significant difference in the utilization of drought early warning information before and after devolution.

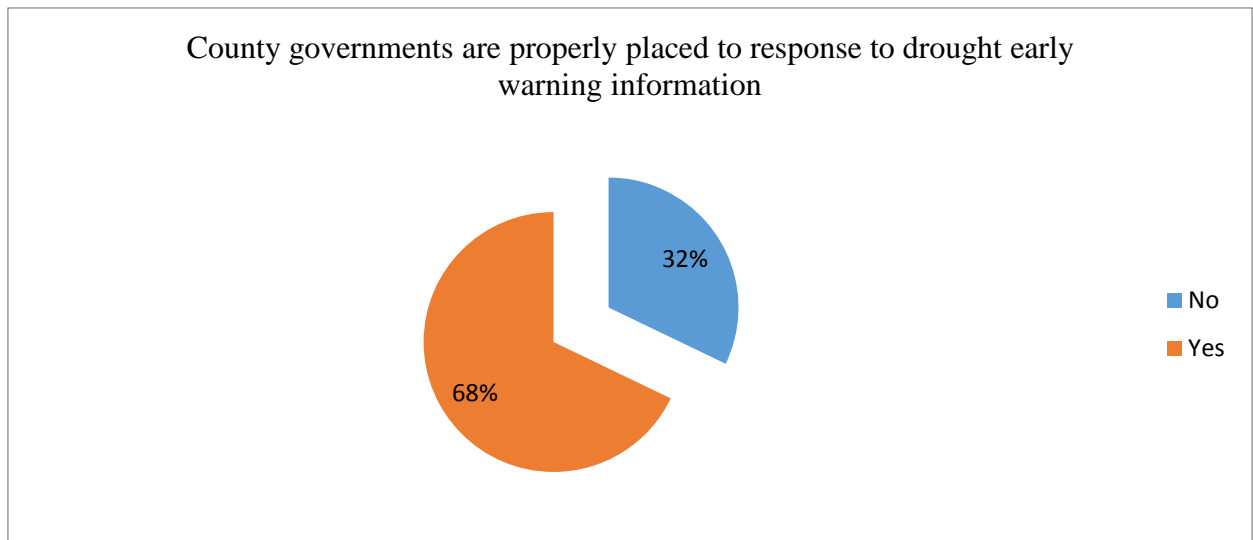


Figure 12: Whether County Governments are well placed for early warning Responses

The result of this study are in agreement with those of Nabutola (2015) who found that county governments are well placed to initiative early responses to curb the effect of disasters. For instance, his study argued that within the Counties, we can have smaller cells, at village level, of youth trained in emergency response, and who keep busy with income generating activities. In this study, the majority of respondents also mentioned that unlike in centralized Government where decisions were made by individuals who are not aware of what was going on in the districts then, County Government systems have enabled communities to be in charge of prioritizing their needs and also hold the authorities accountable in case they go against their plans during implementation.

4.4 Challenges faced by County Government that impede the Drought Early Warning responses

The third objective of the study was to establish the challenges faced by County Government in relation to socio-cultural, political and institutional factors which impede the drought early warning responses. The results on this objective are presented in the following subsections.

4.4.1 Socio-Cultural Challenges

Table 7: Socio-Cultural challenges that impede the Drought Early Warning responses

Socio-cultural challenges	Disagree	Neutral	Agree	Mean	Standard Deviation
Response to drought warning in Isiolo County has been ineffective since majority of people don't believe in it	56.6%	10.0%	33.3%	2.67	1.15
People attributes drought to supernatural powers hence ignore drought early warning information	33.3%	13.3%	53.3%	3.20	1.21
County Government of Isiolo and development partners are unable to respond to early warning information because of the language used (scientific jargons)	80.0%	6.7%	13.4%	2.17	1.09
Utilization of drought early warning information is hindered by social and cultural/religious beliefs	33.3%	13.3%	53.4%	3.23	1.07
The means of sharing the early warning information is limited and only target the elites	30.0%	3.3%	66.7%	3.57	1.38

Table 7 presents socio-cultural challenges impede drought early warning responses in Isiolo County. 56.6% disagreed while 33.3% agreed that responses to drought warning in Isiolo County has been effective since majority of people believe in it. 53.3% of the respondents agreed that attributing drought to supernatural power hindered drought early response based on early warning information. The results show that 80.0% disagreed that County Government of Isiolo and development partners are unable to respond to early warning information because of the language used (scientific jargons).

On the other hand, 53.4% of the respondents agreed that utilization of drought early warning information is hindered by social and cultural/religious beliefs while 66.7% agreed that the means of sharing the early warning information is limited and only targets the elites. The mean score for all the indicators of socio-cultural obstacles revealed that socio-cultural had minimal influence on lack of drought early warning responses. Therefore, from these findings, the socio-cultural factors were not major obstacles impeding the utilization of drought early warning information in triggering early responses in Isiolo County.

In addition to factors presented in Table 7, respondents also mentioned religious belief, language barriers, lack of community ownership of the early responses initiated, movement of pastoralist further complicate the early response initiatives, and finally high level of illiteracy among pastoralist communities among social-cultural obstacles to utilization of drought early warnings for drought early responses.

4.4.2 Political challenges that impede the Drought Early Warning responses

Table 8 shows the political challenges that impede drought early warning responses in Isiolo County.

Table 8: Political challenges that impede the Drought Early Warning responses

Political challenges	Disagree	Agree	Neutral	Mean	Standard Deviation
Political goodwill is essential in utilization of drought early warnings information	3.3%	93.4%	3.3%	4.53	0.86
Politicians benefits from drought emergency and hence don't collaborate/frustrate early responses	23.4%	66.6%	10.0%	3.70	1.29
Information disseminated by politician on drought occurrence is usually inaccurate and contradicts early warning from experts	26.7%	53.3%	20.0%	3.40	1.30
Early warning initiatives implementation is affected by politics and thus ineffective	33.4%	60.0%	6.6%	3.33	1.21
Declaration of drought is often late leading to loss of livelihoods which might have been saved in case of an early response	30.0%	63.4%	6.6%	3.63	1.38
Early response does not allure to Government. Resources are only available/released when there is an emergency crisis	26.6%	70.0%	3.4%	3.80	1.30
Government do not trust in drought early warning and see it as waste of resources to engage in preparedness activities	40.0%	46.7%	13.3%	3.10	1.42

93.4% of the respondent agreed that political goodwill was essential in the utilization of drought early warning information, 66.6% agreed that politicians' benefits from drought emergency and hence don't collaborate and frustrate early warning responses. The study further shows that 53.3% of the respondents agreed with the fact that information disseminated by politicians on drought occurrence is usually inaccurate and contradicts the early warning information from experts. Though in most cases politicians have access to factual data, they manipulate these results for their own political interests. Similarly, the majority of the respondents (60%) agreed that implementation of early warning initiatives was affected by politics and thus ineffective.

For example, one of the member of County assembly responded that during relief food distribution in the County, the criteria used to distribute these resources are politically determined. He reported that in most cases those wards which are not affected by droughts will end up receiving relief food as well and thus those vulnerable communities may not benefit as intended. Therefore, for early warning responses to be effective it should not be influenced by political interests which might not in most cases take into consideration the real situation on the ground.

70% of the respondents also agreed that early response does not allude to Government and that resources are only available only during emergency situations. Finally, the minority of the respondents (46.7%) agreed that the government does not trust drought early warning information provided by the mandated authorities and thus resources are often not available to support preparedness activities. This situation is mainly caused by lack of collaboration between the national Government and County Government in response initiatives.

The findings in this section highlight the important role played by politics, in utilization of early warnings information, whereby political interference was major obstacles in utilization of drought early warning information in Isiolo County. These results have an agreement with those of Ndegwa, and Kinyua, (2018) study which showed lack of political goodwill or government support as a challenge to the persisting illegal tree logging in the Country.

Other notable political factors highlighted by respondents as challenges to the utilization of drought early warning information were tribalism and nepotism, lack of good will from politicians, misplaced priorities where funded projects were in the interest of the politicians, and diverse viewpoints among local politicians. Thomson *et. al*, (1998) also noted that the role of political good will in responding to EW information is very crucial in triggering early responses.

4.4.3 Institutional challenges that impede the Drought Early Warning responses

Table 9 presents institutional challenges that impede the drought early warning responses.

Table 9: Institutional challenges that impede the Drought Early Warning responses

Institutional challenges	Disagree	Agree	Neural	Mean	Standard Deviation
The institutions responsible for drought early warning responses lack adequate budget allocations for early response	13.4%	83.3%	3.3%	4.03	1.16
Actions towards drought early warning response are usually bureaucratic and take long to be approved or implemented	6.7%	80.0%	13.3%	4.07	1.08
Institutions responsible for Drought management responses has inadequate understanding on drought risk management and thus leading to ineffective response	56.7%	36.6%	6.7%	2.63	1.47
There is a harmonized and agreed upon drought thresholds among the Government institutions and development partners to trigger early actions	24.1%	68.9%	6.9%	3.59	1.30
County Government and development partners have preparedness plans in their programs to trigger early drought response	40.0%	46.6%	13.3%	3.07	1.31

83.3% of the respondents agreed that lack of adequate budget allocation to institutions was a major impediment to drought early warning responses. 80.0% of the respondents agreed that actions towards drought early warning response are usually bureaucratic and take long to be approved or implemented. This suggests that institutional bureaucracies are major challenges to drought early warning responses. 56.7% of the respondent disagreed that institutions responsible for drought management responses have inadequate understanding of drought risk management and thus leading to ineffective response. The findings show that the institutions responsible for drought management responses have adequate understanding of drought risk management and thus not responsible factor for the drought early response in Isiolo County. On the other hand, 68.9% of the respondents agreed that there were a harmonized and agreed upon drought thresholds among the Isiolo County Government institutions and development partners to trigger early actions.

With regard to partnerships and collaboration between County Government and partners, there seems to be a consensus that there is a lot of improvement in coordination among the stakeholders in responding to drought. 46.6% of the respondents agreed that Isiolo County Government and development partners have preparedness plans in their programs to trigger early drought response. These results, therefore implies that lack of adequate budget, bureaucracy were the major institutional obstacles that impeded the drought early warning responses in Isiolo County.

Inadequate implementation structures, uncoordinated engagement between National and County Governments affect effectiveness, lack of capacity and adequate resources, lack of disaster management education in schools within the vulnerable regions, lack of strong accountability measures and rampant corruption in the institutions were also mentioned as some of the challenges the County is faced with in utilizing drought early warning information.

Figure 13, presents a summary of challenges faced by County Government of Isiolo in drought early warning responses. Political challenges are shown as the major challenge the County is facing in the utilization of drought early warning information.

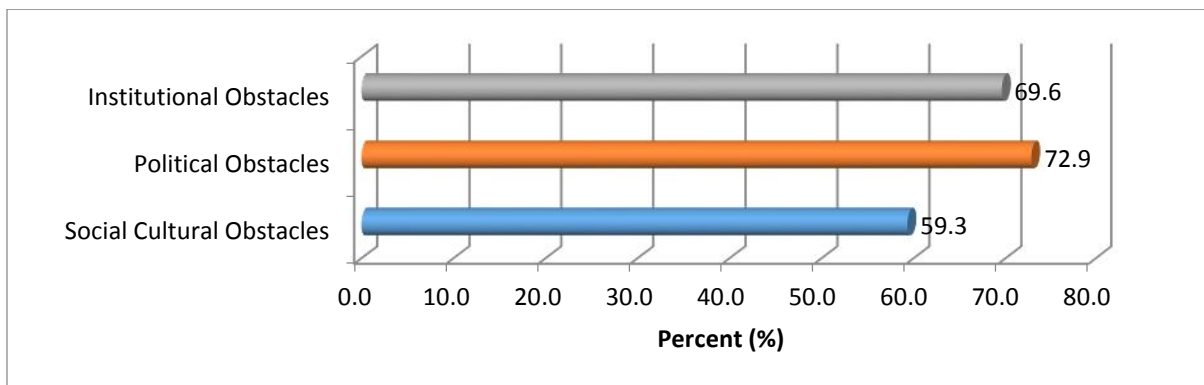


Figure 13: Summary of challenges that Impede the Drought Early Warning Responses

The findings in Figure 14 show that respondents from all organisations except County Government mentioned politics as the major obstacles to utilization of early warning information to trigger drought early responses. Respondents from Isiolo County Government mentioned institutional factors as the major obstacles to utilization of drought early warning information for drought early responses.

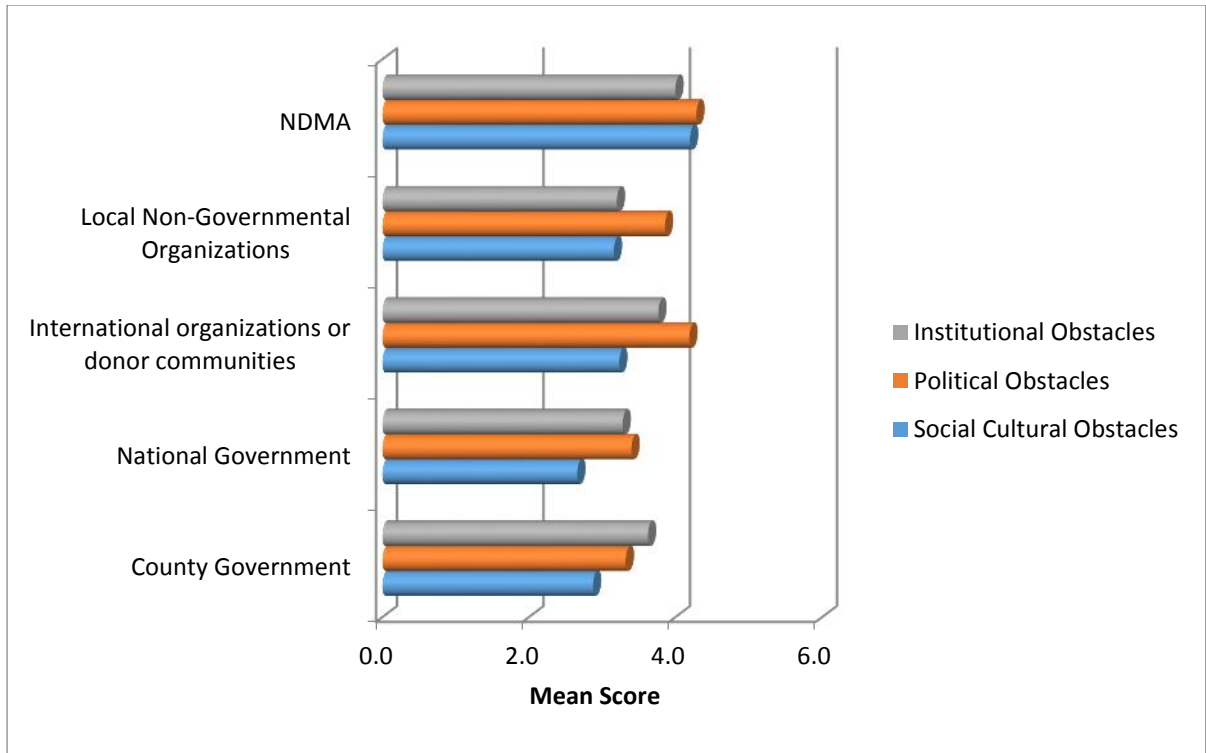


Figure 14: Challenges that impede the Drought Early Warning responses according to various institutions

4.5 Sustainable solutions for utilization of the Drought Early Warning Information

Table 10: Sustainable solutions for utilization of the Drought Early Warning Information

Sustainable solutions for utilization of Drought EWI	Disagree	Agree	Neutral	Mean	STD-DEV
Increasing budget allocation by County Government of Isiolo would leads to effective and timely response to drought crisis	13.4%	86.7%	0.0%	4.2	1.2
The County Government of Isiolo must have a committee responsible for monitoring, evaluating and initiating responses to drought early warning information	3.3%	93.3%	3.3%	4.5	0.9
County Government of Isiolo should formulate policies necessary to support timely response to drought early warning information	3.3%	96.7%	0.0%	4.8	0.8
Information from NDMA and KMD (and any other institution) should be provided in a language which is simple language and with clear messages/advice in what actions should be taken	3.3%	96.6%	0.0%	4.7	0.8
County Government of Isiolo should put in place policy and legal frameworks for drought early warning responses (policies and legislations related to drought management)	3.3%	96.7%	0.0%	4.8	0.8
Legal action should be taken for County Governments that fail to respond to drought early warning information, leading to crisis	6.6%	90.0%	3.3%	4.6	1.0
County Government staff from relevant ministries and departments should be trained on drought early warning information to avoid misinterpretation	3.3%	96.6%	0.0%	4.7	0.8
The Government must play a key role in coordinating drought early warning information and response	3.3%	93.4%	3.3%	4.6	0.9
Declaration of droughts should be localized and not politically determined	3.3%	96.6%	0.0%	4.7	0.8

Table 10 shows that 86.7% of the respondents agreed that increasing budget allocation by County Government of Isiolo would lead to effective and timely response to drought crisis, while indicating that 93.3% of the respondents County Government of Isiolo must have a committee responsible for monitoring, evaluating and initiating responses to drought early warning information. 96.7% of the respondent agreed that County Government of Isiolo should formulate policies necessary to support timely response to drought early warning information. There are no policies in place on disaster preparedness and response in the majority of the ASAL Counties and this situation has greatly contributed to the increased risks due to slow responses in these Counties.

96.6% of the respondents indicated that information from NDMA and KMD (and any other institution) should be provided in a language which is simple language and with clear messages/advice in what actions should be taken was also mentioned by majority of the respondents as one of the solution for utilization of drought early warning information. On the other hand, 96.7% of the respondents noted formulation of necessary legal frameworks, proper coordination and minimizing political interference as other strategies to improve utilization of drought early warning information to enhance drought early responses.

Figure 15 contain the summary of the solution suggested that would lead to utilization of drought early warning information to enhance drought early responses by the county government of Isiolo. Necessary policies were ranked the top most since resources allocation must be preceded by backing legal frameworks. Minimizing political interference, use of simple language and training of the relevant department officers were other solutions recommended by the respondents that can be adopted to improve utilization of the drought early warning information. Other solutions mentioned by the respondents include adoption of modern technologies in information dissemination of drought early warning, decentralized of the institutions responsible for EWI such KMD to region affected with extreme weathers, investing in long term programs for climate change adaptation, mapping out vulnerable areas for quick response and dissemination of EWI through “Barazas” and other local meetings. The respondents further mentioned that institutions should leverage on the media in dissemination of EWI. Integration of traditional early warning and modern early warning should be adopted as one of the solution to drought early responses.

Finally, the respondents mentioned continuously improvement of the quality of the EWI to be more accurate and precise to easy utilization.

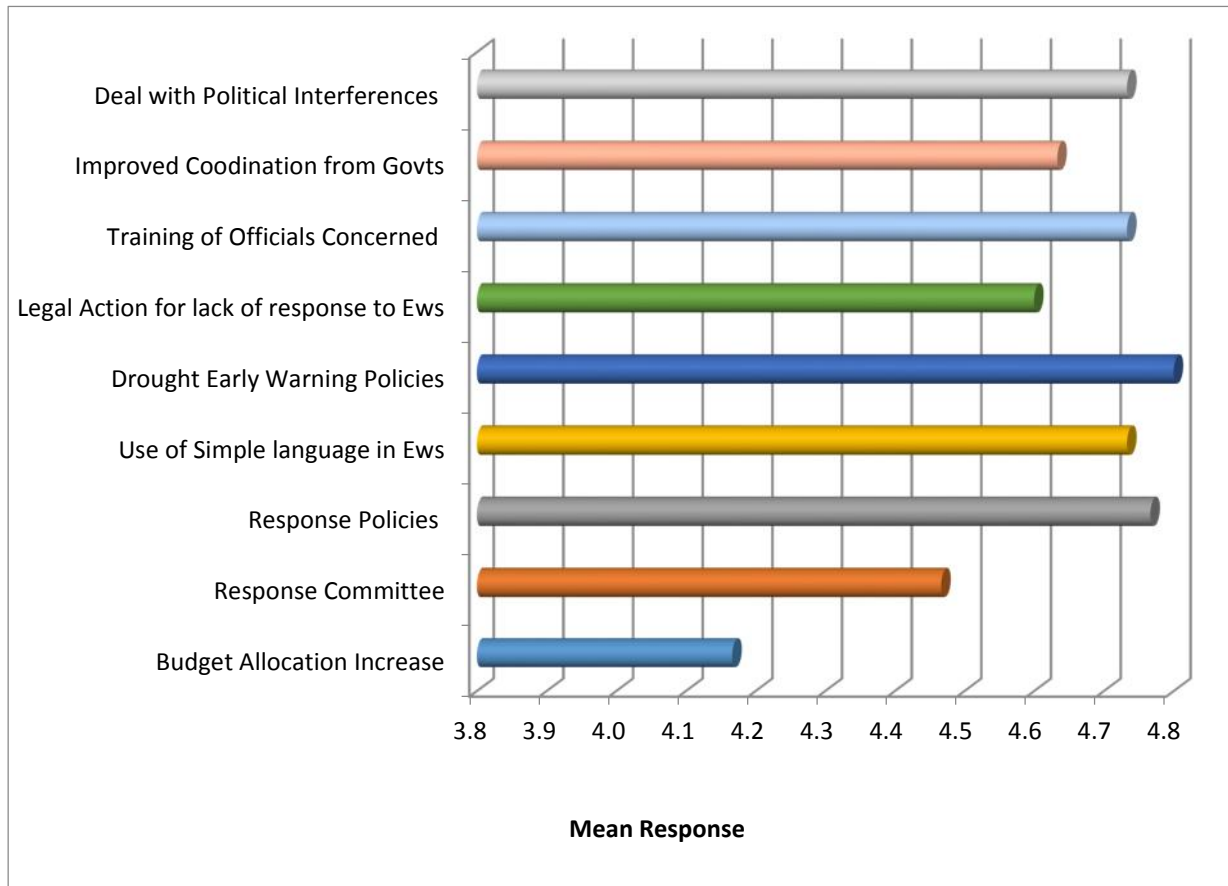


Figure 15: Sustainable solutions for utilization of the Drought Early Warning Information

The above findings are in agreement with the report by Development Initiatives (2017) that notes that, there are no policies in place on disaster preparedness in the majority of the Counties. Challenges such as inadequate political goodwill, weak coordination and engagement of stakeholders, competing priorities at the National Assembly and lack of a champion in the executive, have contributed immensely to the slow response to drought early warning information. Lack of policy directions and coordination of stakeholders on of preparedness initiatives on the relevant disasters is weak and therefore act as obstacles during response activities in most instances.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter presents the conclusion made by this study based on the results of the specific objectives and recommendations for improvement and policy formulation. The chapter further presents suggestions for areas for further studies and limitations faced during the process of research.

5.1 Conclusion

This study has revealed that 93% of the respondents have access to drought early warning information, however, utilization of this information is normally very low leading to late drought responses. NDMA and KMD frequently updated the County on drought situation through their monthly bulletin and seasonal forecasts. It can therefore be concluded that it is important for the County Government to come up with strategies on how to effectively utilize the available early warning information in Isiolo to trigger early responses. This can be implemented for instance through recognition and integration of these institutions in the County institutional frameworks.

The research has also brought forth the important role played by County Government in early warnings information dissemination and utilization. It was noted from the findings that the devolved Government structures provides an opportunity for improvement in dissemination and utilization of the early warning information to mitigate the impacts on drought. Therefore, it is important to enhance the capacity of County Government in responding to droughts through increased budgetary allocation, capacity building and given mandate to declare disasters based on their local contexts. One of the major challenges (72.9%) faced by the County Government in utilization of drought early warning information is political interferences which is instigated by lack of institutional frameworks for drought early warning information interferences. Therefore, to bridge the gap between policy and practice, the study concludes that formulation of relevant laws and policies on drought early warning information and drought response is crucial to ensure that County Governments are accountable during disaster events.

5.2 Recommendations

The study made the following recommendations based on the study findings;

- i. The study has revealed that decision making for drought early response is affected greatly by lack of coordination within the County Government structures. Therefore, the study recommends that Isiolo County Government should establish specific committee which is mandated to analyze the EWIs received from different agencies and provide guidance to different departments in initiating drought early responses. The main mandate of the committee shall be to improve utilization of EWI in triggering early drought responses.
- ii. From the study findings it was also established that the relevant laws and policies for drought risk management is not in place and this was seen as an impediment to utilize the drought early warning information. Therefore, there is need for Isiolo County Government should formulate disaster risk management policies and legislations to guide the utilization of the early warning response. Currently the County is in the process of adopting their DRM policy, however legislations to allocate resources towards implementation of drought responses are lacking. The policies formulated should direct the budget allocation and disbursement, allocation responsibility to relevant departments in drought preparedness and planning. This will increase accountability in cases where EWI is not properly utilized to trigger early planning and early actions towards drought responses.
- iii. The inadequate utilization of early warning information was caused by inadequate collaborations between National and County Level Governments on drought responses. The study therefore recommended harmonization of strategies between the two Government levels in planning and responding to drought situations to ensure efficient coordination.
- iv. Partnerships and collaboration is very essential in drought responses. To be able to reduce chances of mistrust and disagreements between stakeholders and County Government in utilization of drought early warning information, there is need to establish and strengthen partnerships through matching funds and joint implementation between non-Government actors and County Government to reduce mistrust and discourage political propaganda which may affect the response activities in the County.

5.3 Areas for Further Research

This study focused mainly on drought early warning systems and not on other extreme weather events such as floods which is also common in Isiolo County. Therefore, further study on the availability of EWI on floods in the County and its utilization by the County Government and other relevant stakeholders will be important.

From the research findings, it was evident that County Government system has brought about opportunities for the ASAL counties in drought response, however due to limitation of scope of this study, the focus was mainly on the decision makers. Therefore, a further study need to be conducted to determine whether the opportunities brought about by devolution on utilization of drought early warning information has any impacts on the communities who are affected by the drought in Isiolo County.

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APPENDICES

Appendix I: Introduction Letter

Tullu Roba Zeituna

Reg No: 154/8193/2017.

University of Nairobi

To Whom It May Concern

RE: REQUEST TO COLLECT DATA FOR MY RESEARCH STUDY

I am a postgraduate student at the Department of Meteorology, University of Nairobi. As part of the requirement of this course I am obliged to collect data for my research project namely *“Assessing opportunities and challenges in the utilization of drought early warning information as an adaptation strategy to climate change by County Governments of Kenya; A case study of Isiolo County”*. I write this letter to request for your assistance in data collection for this study. The information that you will provide will not be used for any other purpose other than the intended research and will be treated with utmost confidentiality.

Yours Sincerely,

Zeituna Roba Tullu.

Appendix II: Key Informant Interview Questionnaire

This questionnaire seeks to collect data that will be necessary to achieve the research objectives kindly respond to the information sought with utmost sincerity and honest. Do not include your name anywhere to maintain confidentiality. The questionnaire contains five sections kindly respond to all the questions.

SECTION A: BACKGROUND INFORMATION

Your Name: _____ (Optional)

Organization: _____

Current Designation: _____

Kindly indicate the type institution you work for

- a) County Government { }
- b) National Government { }
- c) International organizations or donor communities { }
- d) Local Non-Governmental Organizations { }
- e) NDMA { }
- f) KMD { }
- g) Local NGOs { }

1. What is your organization's understanding of early warning system?
2. What roles does early warning system or information play in your work and organization as a whole?
3. How do you rate the availability of drought early warnings in Isiolo County?
 - a) Very Inadequate { }
 - b) Inadequate { }
 - c) Moderately Adequate { }
 - d) Adequate
 - e) Very Adequate { }

4. How do you rate the response of County Government of Isiolo to drought early warnings?
 - a) Very Inadequate { }
 - b) Inadequate { }
 - c) Moderately Adequate { }
 - d) Adequate { }
 - e) Very Adequate { }

5. Explain your answer above with examples.

SECTION B ASSESSMENT OF THE AVAILABLE DROUGHT EARLY WARNING INFORMATION AND HOW IT IS UTILISED IN ISIOLO COUNTY

This section assesses the availability of drought early warning information and how it is utilized by the county government of Isiolo.

1. Which type of early warning systems are available in the Isiolo County?
2. Do you rely on early warning information provided by Government in your drought responses or use other means of information (own early warning systems? Or others?)
3. Is the early warning information your organization is receiving successful or not successful in triggering early response? Explain your answer.
4. Drought early warning information has been available in Isiolo County Government for all the droughts (including 2016/2017) experienced in this region
 - a) Yes { }
 - b) No { }
5. How often do you receive drought early warning information on drought?
 - a) Weekly { }
 - b) Monthly { }
 - c) Quarterly { }
 - d) Semi-Annually { }
 - e) Annually { }

6. Does your County have agencies responsible for collecting, analyzing, timely disseminating data and information on drought situation?
- a) Yes { }
 - b) No { }
7. If Yes in 6 above, what kind of information do they collect, analyse and timely disseminate (Multiple choices are allowed)
- a) Precipitation { }
 - b) Temperature { }
 - c) Evapotranspiration { }
 - d) Seasonal Weather { }
 - e) Forecasts { }
 - f) Soil Moisture { }
 - g) Streamflow { }
 - h) Ground Water { }
 - i) Reservoir And Lake Levels { }
 - j) Vegetation cover { }
 - k) Others Specify _____
8. Early warning information provided to Isiolo County is collected and analyzed on multiple drought indices/indicators?
- a) Yes { }
 - b) No { }
9. Early warning information calibration is done based on various intensities of drought
- a) Yes { }
 - b) No { }
10. Drought early warning information provided to County government of Isiolo trigger early/timely responses?
- a) Yes { }
 - b) No { }

11. Explain your answer provided in 10 Above

12. Do you think there has been effective utilization of early warning systems in Isiolo County as an adaptation strategy to climate change among the ASALs in Kenya

a) Yes { }

b) No { }

13. Briefly explain your response in 12 above

14. Is there specific committee in the County government of Isiolo responsible for monitoring, evaluating and responding to drought early warning information

a) Yes { }

b) No { }

15. Explain How Isiolo County utilize drought early warning they receive

SECTION C: ASSESSMENT OF OPPORTUNITIES BROUGHT ABOUT BY THE DEVOLUTION IN RESPONDING TO DROUGHT CRISIS

This section analyses the available opportunity brought about by devolution in responding to drought crisis using a case of Isiolo County government. Use the scale provide to responded to the following statements

No.		Before Devolution					After Devolution				
		1	2	3	4	5	1	2	3	4	5
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	Response to drought warnings in Isiolo County has been effective										
2.	Number of people affected by drought situations in Isiolo county is low										
3.	Drought early warning information dissemination has been effective										
4.	There is effective utilization of early warning systems in Isiolo County as an adaptation strategy to climate change										
5.	Drought early warning information provided to County government of Isiolo trigger early/timely responses										
6.	Coordination among the stakeholders in Isiolo in drought response has improved										

5. County governments are properly placed to response to drought early warning information
- a) Yes { }
- b) No { }

6. Highlight some of the opportunities devolution has created in response to drought situation in Isiolo County?

SECTION D: OBSTACLES FACED BY COUNTY GOVERNMENT IN RELATION TO SOCIO-CULTURAL, POLITICAL AND INSTITUTIONAL FACTORS WHICH IMPEDE THE DROUGHT EARLY WARNING RESPONSES

This section analyses the obstacles faced by county government in relation to socio-cultural, political and institutional factors which impede the drought early warning responses. Use the scale provided to respond to the following statements.

No		1	2	3	4	5
	Socio-Cultural Obstacles	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	Response to drought warning in Isiolo County has been ineffective since majority of people don't believe in it					
2.	People attributes drought to supernatural powers hence ignore drought early warning information					
3.	County Government of Isiolo and development partners are unable to respond to early warning information because of the language used (scientific jargons)					
4.	Utilization of drought early warning information is hindered by social and cultural/religious beliefs					

5.	The means of sharing the early warning information is limited and only target the elites					
	Political Obstacles					
1	Political goodwill is essential in utilization of drought early warnings information					
2	Politicians benefits from drought emergency and hence don't collaborate/frustrate early responses					
3	Information disseminated by politician on drought occurrence is usually inaccurate and contradicts early warning from experts					
4	Early warning initiatives implementation is affected by politics and thus ineffective					
6.	Declaration of drought is often late leading to loss of livelihoods which might have been saved in case of an early response					
7.	Early response does not allure to Government. Resources are only available/released when there is an emergency crisis					
8.	Government do not trust in drought early warning and see it as waste of resources to engage in preparedness activities.					
	Institutional Obstacles					
1	The institutions responsible for drought early warning responses lack adequate budget allocations for early response					

2	Actions towards drought early warning response are usually bureaucratic and take long to be approved or implemented					
3	Institutions responsible for Drought management responses has inadequate understanding on drought risk management and thus leading to ineffective response.					
4.	There is a harmonized and agreed upon drought thresholds among the Government institutions and development partners to trigger early actions					
9.	County Government and development partners have preparedness plans in their programs to trigger early drought response					

List other social-cultural, political and institutional factors obstacles faced by county government which impede the drought early warning responses

Social-Cultural Factors
Political Factors

Institutional Factors

SECTION E: SOLUTIONS FOR UTILIZATION OF THE DROUGHT EARLY WARNING INFORMATION BY COUNTY GOVERNMENT OF ISIOLO FOR TIMELY RESPONSE TO DROUGHT CRISIS IN THE COUNTY

This section analyses the solutions for utilization of the drought early warning information by county government of Isiolo for timely response to drought crisis in the county. Use the scale provided to respond to the following statements.

No		1	2	3	4	5
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	Increasing budget allocation by County Government of Isiolo would leads to effective and timely response to drought crisis					
2.	The County Government of Isiolo must have a committee responsible for monitoring, evaluating and initiating responses to drought early warning information					

3.	County Government of Isiolo should formulate policies necessary to support timely response to drought early warning information					
4.	Information from NDMA and KMD (and any other institution) should be provided in a language which is simple language and with clear messages/advice in what actions should be taken					
5.	County Government of Isiolo should put in place policy and legal frameworks for drought early warning responses (policies and legislations related to drought management)					
6.	County Governments that fail to respond to drought early warning information, leading to crisis should be held accountable.					
7.	County Government staff from relevant ministries and departments should be trained on drought early warning information to avoid misinterpretation					
8.	The Government must play a key role in coordinating drought early warning information and response					
9.	Declaration of droughts should be localized and not politically determined					

List some of the solutions that you think are important in utilizing the drought early warning information by County Government and development partners for timely response to drought crisis

- a) _____
- b) _____
- c) _____
- d) _____
- e) _____

Thanks for your Participation