

**FACTORS INFLUENCING DISASTER MANAGEMENT: A CASE OF
DROUGHT MANAGEMENT IN MANGO COMMUNITY, MWALA
CONSTITUENCY OF MACHAKOS DISTRICT, KENYA.**

BY:

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DECLARATION

This research project report is my original work and has not been presented for a degree in any other University.

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APPROVAL

This research project report has been submitted for examination with my approval as University supervisor.

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DEDICATION

This research project is dedicated to my family for being forever dependable and believing in me.

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ABBREVIATIONS AND ACRONYMS

ASAL- Arid and Semi Arid Lands

DSG- District Steering Group

EWS – Early Warning Systems

FEWSNET – Famine Early Warning Systems Network

GOK- Government of Kenya

HFA – Hyogo framework for Action

HOA – Horn of Africa

IFRC – International Federation of the Red Cross

IIRR – International Institute of Rural Reconstruction

ILRI- International Livestock Research Institute

KFSM – Kenya Food Security Meeting, an advisory group on drought and food security

KRC – Kenya Red Cross

KSSG- Kenya Food Security Steering Group

NGO- Non Governmental Organisation

OCHA – Office of the United Nations Humanitarian Coordinator in Kenya

UNDP – United Nations Development Programme

ABSTRACT

This study seeks to investigate the factors that influence drought management in Mango Community in Mwala District which is found in Eastern province. This area falls under Arid and Semi Arid Lands (ASAL) in Kenya. Kenya is a drought prone country mainly attributed to the climate changes, especially due to limited to lack of rainfall that largely affects pastoralists, agro pastoralists and farmers. Drought affects not only the country's economic performance but also its attempts to achieve the millennium development goals. Droughts directly impact on the household food security of over 10 million people living in drought-prone areas. This study sought to achieve three key objectives: to assess the influence of gender in drought management, to establish the influence of education level in drought management and last but not least to assess the effect of Early Warning Systems in drought management among the people of Mango Community. A section has been committed to the review of related literature. The literature reviewed was done under three subtitles: the influence of gender in drought management, influence of education level on drought management and influence of Early Warning Systems in drought management. This literature gave a review of empirical and theoretical literature related to the three areas of study. The study used a descriptive survey to investigate these factors. Data was collected through a questionnaire which was piloted before the actual study for validity and reliability. 99 respondents were targeted as the sample size in this study. From the 120 questionnaires distributed, 104 were collected back and were suitable for analysis. The data collected was analyzed using descriptive statistics to reveal patterns and inferential statistics to draw conclusions and make predictions. This data was analysed and summarized based on the influence of gender, education level and early warning systems in the management of drought. This was presented in the form of frequency tables', cross tabulation and correlation analysis. The study found and concluded that the education levels contribute positively to drought management. It also revealed that although women and men are both affected by drought, women are more affected by drought than their male counterparts. Early warning systems also play a direct role in management of drought. The study revealed that there is a need to promote literacy and education that has been seen to be crucial to managing drought. Reducing risks and enhancing people's resilient capacities to deal with disasters requires them to understand how they could best protect themselves. There is need for the government to continue increasing the capacity of farmers and pastoralists in the arid and semi arid lands to manage drought better through both formal and informal education. There is also need to empower communities with resources to be able to respond as most of the people in the area of study did not have adequate resources to respond to drought.

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

Preparing for disaster is a major element of disaster management. It prevents loss of life and reduces the economic and material impact of disasters. To be effective, disaster preparedness strategies need to actively involve the communities at risk. They also need to engage local and international organizations that may be willing to fund the strategies and the government to effectively ensure policies that will promote a constant state of preparedness.

The Hyogo Framework for Action (HFA) articulates a worldwide consensus that disaster risk reduction is an integral part of sustainable human development. The HFA identifies five priorities which guide all actions for disaster risk reduction. These include making disaster risk reduction a national and local priority with strong institutional basis; Identifying, assessing and monitoring risk and enhancing early warning; the Use of knowledge, innovation and education to build a culture of safety and resilience at all levels; Reducing the underlying risk factors As well as strengthening disaster preparedness for effective response at all levels. The fifth priority will be a key focus for this study.

In January 2005, the world conference on disaster reduction adopted the “Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters”. Countries that develop policy legislation and institutional frameworks for disaster risk reduction and that are able to develop and track progress through specific and measurable indicators have greater capacity to manage risks and to achieve widespread consensus for engagement in, and compliance with disaster risk reduction measures across all sectors of society (HFA 2005).

In the international decade for natural disaster reduction programme forum held in Geneva in 1999, Kofi Annan observed that much has been learnt from the creative disaster prevention efforts of poor communities in developing countries and that the prevention policy is too important to be left to governments and international agencies alone.

Kenya is a drought prone country. Drought affects not only its economic performance but also its attempts to achieve the millennium development goals. Droughts directly impact on the household food security of over 10 million people living in drought-prone areas. (ILRI, 2010) Droughts erode the assets of poor communities and undermine their livelihood strategies, culminating in a downward spiral of increasing poverty and food insecurity. Although drought affects the country as a whole, its effects are felt most dramatically in the Kenyan Arid and Semi-Arid Lands (ASAL).

In Kenya, recent droughts have caused significant damage to livelihoods and even loss of lives. In the arid lands, this includes loss of livestock which is the most important asset to pastoralists. When the people who are most vulnerable to disaster prepare, they are able to a large extent be 'ready' when disaster strikes.

In Kenya in 2011, after a failed short rains season, a drought resulted that has led to millions of people to be in need of food assistance. According to the October – December 2010 short rains assessment results done by humanitarian organizations with financial support from the government, 2.4 million people in Kenya are experiencing food insecurity, mostly in the arid and semi arid lands (Short rains Assessment, 2010).

Drought is one of the most serious problems facing the Greater Horn of Africa (HOA). It causes the deaths of many people, destroys the economy of large areas and sets back years of development efforts. Out of 14 disasters recorded in Kenya alone in the last 30 years, 11

were drought related. More than 40% of the Kenya's population lives in drought-prone arid and semi-arid (ASAL) areas. The frequency and seriousness of drought appear to be increasing (IIRR, Cordaid and Acacia Consultants, 2004).

Drought is the prime recurrent natural disaster in Kenya. It affects the 10 million mostly livestock dependent people in the ASAL districts. Consequently, the National Drought Management System, a dedicated disaster risk management system addressing drought, was established almost twenty years ago. There is a risk associated to risk management systems. Once established, they tend to become static while formalizing and focusing on agreed upon procedures. However our societies demand otherwise; risk management systems should be adaptive, which build in mechanisms to improve its performance and objectives based on lessons learned from experience and evaluation. At the end of the 2008 - 2009 drought, which badly affected livestock based communities in the Kenyan dry lands, the delegation of the European Union considered it opportune to review how effectively the above-described drought management structures mitigated and alleviated the negative impacts of the drought. (Zwaagstra et al., 2010)

Kenya faces a multitude of challenges due to drought. The long rains in 2009 and the short rains in 2010 were poor in most parts of the country which resulted in severe water shortages. An assessment carried out by Oxfam following the 2005 drought in northern Kenya, revealed that over 70% of the livestock had been lost (Wekesa et al., 2006)

As pointed out by Davies (2000) droughts causing production failures in agriculture do not automatically result in famines unless they coincide with other socio-economic factors. In

resilience terms—a drought leads to social disaster only if social resilience is eroded to the extent that the society is left with no capacity to absorb the environmental shock—in this case a drought. Droughts resulting in complete crop failure are common in Eastern and Southern Africa. A major challenge is to seek ways of mitigating and coping with droughts in small-holder farming systems, particularly in semi-arid regions which are most hardly hit by the effects of drought (Johan R, 2003)

The Government of Kenya (GoK), aware of the need for effective response, focuses resources to reduce the negative impacts of droughts. Since 1996 the Office of the President, supported by the World Bank (WB), has been implementing the Arid Lands Resource Management Project (ALRMP1) with the objective of enhancing food security and reducing livelihood vulnerability in drought-prone and marginalized communities. The ALRMP, further supported by the European Union (EU) funded Drought Management Initiative (DMI), consolidated a national drought management system, with drought management structures at the national, Kenya Food Security Meeting, an advisory group on drought and food security (KFSM), Kenya Food Security Steering Group, sub-committee and technical advisory body of the KFSM (KFSSG), district (District Steering Group's (DSG) and community levels. This drought management system includes policies and strategies, an early warning system, a funded contingency plan and an overall drought coordination and response structure.

Main stakeholders involved in drought management in Kenya include the GoK and its line ministries, various development partners and non-governmental organizations (NGO's) (Zwaagstra, et al., 2010)

An assessment done by the Kenya Food Security Steering Group (KFSSG) that includes institutions in the Government, the United Nations, NGOs and key development partners acknowledged that the south eastern area which covers Tharaka, Makueni, Mbeere, Machakos, Mwingi, Kitui and Meru North cyclic droughts. The findings stated that the short rains season is the main season for households and account for up to 70 percent of annual output. However, due to poor harvest, household food stocks are rapidly diminishing and are likely to last for the next two months instead of the normal four to five months. In addition to low household food stocks, rising cereal prices, and heightened demand for cash for the long rains crop production are likely to cause significant food consumption shortfalls, leading to high food insecurity, especially for the poor and very poor households, until August 2011 if long rains performance is good.

Administratively Mwala District comprise of four divisions which include Masii, Mwala, Yathui and Kibaoni Divisions. Mwala District is a new district that was curved out of the greater Machakos District. It boardsers Nairobi city and Thika district to the northwest, Kitui and Mwingi districts to the East, Machakos district to the west and south, and Thika district to the northeast. It stretches from latitudes $0^{\circ} 45'$ south to $1^{\circ} 31'$ south and longitudes $36^{\circ} 45'$ east to $37^{\circ} 45'$ east.

A huge proportion of the district is semi-arid and receives very little and erratic rain. There are two distinct rainy seasons. The long rains fall between March and May while the short ones fall between October and December. The annual rainfall varies from 500 – 1300mm with high altitude areas receiving more rains than low-lying areas. The rainfall is however very unreliable and varies from year to year making it very difficult for farmers to plan their

farming activities thus affecting both livestock and agricultural production. The temperatures also vary with altitude.

Mango Location is situated in Mwala District which is one of the districts that form Eastern province. Mwala is situated in an underdeveloped area in the Arid and Semi arid Land (ASAL). Mango is an area that is prone to disaster, which includes frequent famine and drought. Mwala Division has an estimated 70.9% of the poor making it the poorest division in Mwala District.

The community is largely agricultural with a dwindling negligible percentage of herders. The community practise farming though this is hampered by low rainfall. The major crops produced are mangoes, oranges, pawpaws, pigeon peas, cow peas and animal produce.

1.2 Statement of the Problem

Drought is a natural phenomenon that has been occurring over the years in Kenya. Depressed and poorly distributed rains leads to drought across the Arid and Semi Arid lands of Kenya interfering primarily with livestock and agricultural production. Drought in itself is beyond the control of communities, but the consequences can be lessened depending on how much communities are able to manage the drought. There are factors that influence how people react and handle drought. As it is, Mango community is one of the communities that is found a Semi Arid Land area and as a result has been affected time and time again by the drought. World Vision (2008) assessment on drought management reveals that Mango community has set out to increase measures in order to manage and avoid the impact of drought when it happens. However, the recurrence of drought and their devastating effects are still being faced not only in Mango community but in many communities in arid and semi arid lands in Kenya. As has been mentioned above, there are factors that influence how

effectively drought is managed and it would of interest to understand these factors and what their influence is. The government also plays a key role in establishing policies that support communities to deal with drought. It has been a priority for the government of Kenya to initiate and/or strengthen drought management structures and programmes. The effectiveness of these policies is also of key importance to the management of drought by creating a conducive environment that would enable Kenyans to respond better to drought. This has obviously not been the case. By definition, there is more time to plan and implement an appropriate response in a slow-onset disaster such as drought. Yet there has been apparent lack of learning and the repetition of mistakes, including the fact that intervention do not happen until it is too late. One reason for this is while it is known in advance there will be an impact – on water availability, crop and livestock production and prices – it is not always clear how well people will manage. This study therefore seeks to establish the factors that influence drought management.

1.3 Purpose of the Study

The purpose of this study is to determine the factors that influence the management of drought in Mango Community.

1.4 Objectives of the study

The objectives of this study are:

1. To assess the influence of gender role in drought management among Mango community
2. To establish the influence of education level to drought management among Mango Community

3. To assess the influence of early warning systems in drought management among Mango community

1.5 Research Questions

1. To what extent does gender role influence to drought management in Mango Community?
2. To what extent does education level influence drought management in Mango Community?
3. How do Early Warning Systems influence drought management in Mango Community?

1.6 Significance of the study

The study will assist in understanding the factors that influence disaster management, in this case drought, that have been continually facing Kenya, with a focus on Mango community in Mwala District. The study will also contribute to the growing body of knowledge in disaster management. Researchers interested in carrying out more studies in this area will also find this study a useful guide to further their studies in drought management.

1.7 Delimitation of the Study

The study focuses on Mango Community in Mwala, an area that is prone to drought and therefore has had the opportunities to prepare in order to manage the drought better. This will help establish whether there are factors that influence drought management and how effective they have been in dealing with drought. An assessment conducted in September 2008 by World Vision found out that revealed that the Mango community is an area faced with various challenges ranging from low access to portable water, low food production, among others. Mwala Division has an estimated 70.9% of the poor being the poorest

division in Mwala District. Mango community is a location of Mwala Division that has been identified and selected as a needy group from the rest of the communities living in Mwala District because of harsh environment and poor edaphic conditions (unreliable and inadequate rainfall and poor soils), Majority of the people living in the area live below the absolute poverty line where lack of access to portable water is very high and food insecurity is very high.

1.8 Limitations of the Study

The drought cycle is dynamic and constantly changing. The researcher may get varied responses depending on the time of the research in the drought cycle. To overcome this, the researcher will explain clearly what the research seeks to determine based on the drought cycle and hence get relevant information.

1.9 Assumptions of the Study

The major assumption is that the target group understands the drought cycle. Another assumption is that the selected sample will represent the entire population of interest and that the data collection instruments have been tested for both validity and reliability and are therefore valid and reliable enough for the study. The study also makes an assumption that the respondents shall truthfully and correctly answer the questions.

1.10 Definitions of Significant Terms

Disaster - A disaster is a natural or man-made event that negatively affects life or property.

In this study the disaster in reference is drought

Drought - A drought is an extended period where water availability falls below the requirements for a region. This is mostly as a result of lack of rainfall.

Drought preparedness – This means the effective precautionary actions to ensure the timely, appropriate and effective organisations and delivery of relief and assistance following a drought.

Drought management – This refers to the plans taken to minimize the effects of drought being implemented in a way that reduces the impact that the drought would otherwise have if no preparation was in place.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of theoretical and empirical literature on disaster management. The concepts of drought management and factors that influence drought management have been discussed with its possible implications on human activities. The concept will be used to assess the influence of drought management practices on the members of Mango Community in Mwala.

2.2 Theoretical Literature

The basic theoretical assumption of disaster management attests that the use of the term disaster management implies the ability to "manage" a very destructive and chaotic event, as if it was akin to managing a group of steel workers, or managing your money. In reality though, it is more of mitigation against the various threats that arise due to a disaster, in order to lower the amount of total damage it can do (D. Alfredo, 2011).

Disaster management encompasses all aspects of planning for and responding to disasters, including hazard analysis, vulnerability reduction (preparedness), prevention, mitigation, response, recovery and rehabilitation. It may refer to the management of both the risks and consequences of disasters. Contingency planning relates to events, which may or may not occur, in which objectives and scenarios are agreed, managerial and technical actions defined, and potential responses put in place to prevent, or respond to an emergency situation (S. Donohue et al, 2000)

While feminist theory and disaster research have evolved independently, a growing number of scholars are using feminist theoretical perspective to study and respond to disasters (E. Elaine and B. Phillips, 2008). Feminist scholarship demonstrates that gender serves as a

primary organizing principle of all societies and is therefore an essential lens through which to view the experience of a disaster such as a hurricane; disaster research suggests both vulnerability and capacity for women experiencing disaster (B.Cannon et al, 1999).

Till a few decades ago, disasters were viewed as one-off events and responded to by governments and relief agencies without taking into account the social and economic implications and causes of these events. With significant advancement in our understanding of the natural processes that underlie the hazardous events, a more technocratic paradigm came into existence that believed that the “only way to deal with disasters was by public policy application of geophysical and engineering knowledge”. These approaches looked at disasters as exceptional events, not related to the ongoing social and developmental processes. Gradually this attitude changed to an emphasis on preparedness measures, such as stockpiling of relief goods, preparedness plans, and a growing role for relief agencies such as the Red Cross. This “contingency planning” approach certainly improved the efficiency of relief agencies but left a lot to be desired in terms of appropriateness and effectiveness of relief. (S. Yodmani, 2001)

2.3 Empirical Literature

This section presents a review of empirical literature on factors influencing drought management. The concept of drought management is discussed with its possible implications human lives.

2.3.1 Influence of gender role in drought management

Traditional gender roles place women in the home as homemakers, the bearers of children, and primary caregivers. Men, traditionally, are assigned the role of family provider and protector, as the wage-earner and liaison between the home and the public sphere. Although considerable variations exist among actual families, it has been noted that even when

heterosexual couples do not follow traditional gender roles in their day-to-day activities, they tend to revert to them in a time of crisis (Dash, Nicole et al, 2007)

Gender determines what is expected, allowed and valued in a woman or a man in a given context. It determines opportunities, responsibilities and resources, as well as powers associated with being male and female. Gender also defines the relationships between women and men and girls and boys, as well as the relationships between women and those between men. These attributes, opportunities and relationships are socially constructed and are learned through socialization processes. They are context- and time-specific, and changeable. Gender does not mean “women.” However, given that women are often in a disadvantaged position in many developing, as well as developed countries, the promotion of gender equality implies an explicit attention to women's empowerment (UNDP, Gender and Disasters, 2010)

As cited by World health organisation in the world disasters report in 2000, the impact of disasters is felt differentially within societies, and those most socially excluded and economically insecure bear a disproportionate burden. The impact of disasters also varies between women and men. Women’s vulnerability to the impact of disasters is increased by socially determined differences in roles and responsibilities of women and men and inequalities between them in access to resources and decision-making power. Studies have also reported adverse reproductive outcomes following disasters, including early pregnancy loss, premature delivery, stillbirths, delivery-related complications and infertility.

A study from Israel reported an increase in delivery rates during the 48 hours following an earthquake and a significant increase in the premature delivery rate. Men, on the other hand, may suffer other disadvantages in different situations and for different reasons from women,

because of their gender-role socialization. Field notes from a Western Ethiopian refugee camp report an instance where young Sudanese men fleeing conscription continued to starve in refugee camps despite receiving prompt shipment of food aid. The food they were given needed to be cooked before it could be eaten, and as men, they had never learned to cook. Researchers reported that in the aftermath of Hurricane Andrew in the United States of America, men who had traditionally been the family providers and protectors struggled with their feelings of inadequacy and failure.

There is enough evidence that in any disaster disproportionately large numbers of women are affected more severely relative to men. Worldwide, it has generally been established that when gender issues are not addressed fully or sufficiently, in both development and disaster contexts, they perpetuate and in many instances augment existing gender-based inequities. Since the world conference on women in 1995, in Beijing, "gender mainstreaming" has been recognized as an overarching strategy to ensure that gender concerns are incorporated in all areas, sectors, and levels to promote gender equality. Mainstreaming gender in disaster preparedness and response involves viewing and analyzing situations through a gender perspective and render gender inequities explicit. To build gender-sensitive strategies and initiatives in disaster management process, it is necessary to address both the practical gender and strategic gender needs of women and men as well as transgender persons (Pincha, 2008).

Early warning systems may fail to reach women, Radios and TVs are not always found in the homes of some families. In some countries (Bangladesh, among others), women who are confined to the house or family plot have no access [through] radio, TV or otherwise to warning information.

Numerous disasters could have been avoided or mitigated if disaster reduction measures had been in place. The twenty-third special session of the General Assembly entitled "Women 2000: Gender Equality, Development and Peace for the Twenty-first Century" (Beijing+5), therefore called on Governments and other national and international actors to incorporate a gender perspective into disaster prevention, mitigation and recovery strategies.

In the arid and semi arid areas, drought management is something strictly related to a country development. A right open minded approach to gender related problems is equally tightly linked to the real development of a nation or a population. The latter could give an important contribution onto the solution of the former and quite positively influence the living and social condition of women towards whom gender policy is addressed. Trained, educated and self-confident women are able to manage their resources of domestic and rural water better than any other member of the rural communities (Quagliariello, 2002)

Beyond the increasing incidence of drought, dry land populations are increasingly vulnerable to drought resulting from socio-economic trends and local environmental pressures. There are circular relationships between drought and desertification (Dregne 2000), and while the relationships between drought and human vulnerability are complex, there is evidence that the impacts of drought are gendered.

Gender norms also affect the behaviour of men during disasters. Ideas about masculinity may encourage risky 'heroic' action in a disaster, and may also mean that men are less likely to seek counselling afterwards (Enarson 2000). More men died than women in Hurricane Mitch, for example, showing that relationships between natural hazards and gender do vary (Delaney and Shrader 2000).

Considering the social dimensions a problem like drought means considering the role that women play in the societies where such problems have been faced; the role women play and the one they could play giving more attention and value to their potentialities still estimated so far (Vitate, 2003).

Drought mitigation should include organization of women into associations which can give them a stronger impact on their environment and a bigger awareness of their power as a social group. Unity and problem sharing will surely contribute to achievement the success and regain the pride of being part of an organized group partaking the same difficulties and the same willingness to solve them (Quagliariello, Triorioliuzzi, Hamdy, 2002).

Considering gender equity in drought management programmes will indirectly give benefit not only to the environment, but also to economy, nutrition, health and social life (Budak Kantar, 2002)

Household food hierarchies exist (placing females below males), and disasters can reduce the overall amount of food available, exacerbating the unequal position of women. Women are likely to have poorer nutritional status and resistance to disease, and so are likely to be more at risk than men (Blaikie *et al.* 1994).

The effective management of water resources is strongly associated in development policy and projects with the greater involvement of women (Van Wijk-Sibesma 1998).

Women are envisaged as materially poor and excluded from decision making structures but nevertheless potentially rich in local knowledge, ability and the capacity to be 'empowered' by their involvement in development interventions (Narayan 1995).

2.3.2 Influence of education level towards drought management

The 1990s Decade for Natural Disaster Reduction emphasised the importance of governments 'educating and training their citizens to increase awareness'. Likewise, it is widely assumed that an educated public is more able to prepare for, and adapt and respond to, hazards, and that education for disaster reduction is complex yet essential to any properly implemented, centrally managed hazard strategy.

The theme of "Disaster Reduction, Education and Youth" was introduced during the UN World Disaster Reduction Campaign in 2000 (UN 2000). This priority has become integral to the 2005-2015 Hyogo Framework for Action as part of Priority 3, focusing on the "use [of] knowledge, innovation and education to build a culture of safety and resilience at all levels" (UNISDR 2005).

Basic education immediately and positively affects the productivity of subsistence and smallholder farmers. The provision of more and better basic educational services such as primary education, literacy and basic skills training in rural areas can substantially improve productivity and livelihoods (Diderik, 2005).

According to He Changchui, FAO's top envoy at the Fifth High Level Group Meeting on Education for All (EFA) in Beijing (28-30 November 2005), failure to educate children in rural areas perpetuates needless hunger. Attending primary education is one of the surest ways out of the cycle of poverty and hunger for children and their families.

Since the adoption by 186 UN member states of the Hyogo Framework for Action, promotion of DRR in education had been taken, specifically in the formal education sector. Policy guidelines, tools and methodologies had been developed to guide policy makers, implementers and practitioners in integrating DRR in education. This includes not only

integrating and mainstreaming disaster risk reduction in education but as well as developing guidelines in school building construction. The Philippines is one country where this initiative was pilot tested. Several materials related to this had been developed by the Asian Disaster Preparedness Center (ADPC) and other agencies and organizations.

Education is important for those functions which require adaption to change (Sloan, 1994; Chapman and Stemp, 1992; Bartel and Lichtenberg, 1987). There are sections of the agricultural industry which are sceptical: they say that farmers have always managed without much education. Historically, there has been an assumption that if you provide people with land they will know by instinct how to be effective farmers. Research has found that in the past, less academic sons have traditionally worked on and inherited the farm; they are less disposed towards formal courses which are viewed as too theoretical for 'practical' farming (Lees and Reeve, 1991). This quote describes farmers' perceptions of the relative importance of experiential learning and formal, institutionalised education: Most farmers continue to put local knowledge, the willingness to work hard (for extended hours) and the ability to work reliably without close supervision ahead of trade or university qualifications in farming when listing the important characteristics of a farm manager (Moore, 1990, 5)

Education and training are widely acknowledged as contributors to national economic wellbeing and growth. Countries with higher levels of income generally have higher levels of education; human capital, which includes both formal education and informal on-the-job training, is a major factor in explaining differences in productivity and income between countries (Hicks, 1987).

A number of studies suggest that the better educated are aware of a greater number of possible innovations through use of the mass media and contact with expert advisers (Rogers,

1995; Longo, 1990; Thomas, Ladewig and McIntosh, 1990; Riesenber and Obel Gor, 1989; Jones, 1963). Literacy and education is crucial to Disaster Risk Reduction. Reducing risks and enhancing people's resilient capacities to deal with disasters requires them to understand how they could best protect themselves. Literacy and education is a necessity in raising awareness on the nature and presence of natural hazards as well as the vulnerabilities and threats faced by the community. It plays a central role in building life skills that could make a difference in life threatening situations during disasters.

According to the millennium development goals and disaster reduction, to ensure that children everywhere — boys and girls alike — complete a full course of primary education Educational attainment is a fundamental determinant of human vulnerability and marginalisation. Basic literacy and numeric skills enable individuals to become more engaged in their society. Broadening participation in development decision-making is a central tenet of disaster risk reduction. The destruction of schools is one very direct way in which disasters can inhibit educational attainment, but perhaps more important is the drain on household resources that slow and sudden-onset disasters inflict. Households frequently have to make difficult decisions on expending resources on survival and coping with poverty, or on investments (such as education and health care) to alleviate human vulnerability and enhance longer-term development prospects. Unfortunately, for the poorest, there is no choice and human vulnerability deepens as resources are targeted towards survival.

2.3.3 Influence of Early Warning Systems in Drought management

An early warning system (EWS) can be defined as a system of data collection to monitor people's access to food, in order to provide timely notice when a food crisis threatens and thus to elicit an appropriate response (Davies et al. 1991).

It is of little use to look at an EWS in isolation. To be effective, it must be able to trigger a timely response, intervening *before* the point of destitution is reached, to protect livelihoods before lives are threatened (Buchanan-Smith and Davies 1995). In other words, the EW/response system must be geared to protect future capacity to subsist as well as able to ensure current consumption. Thus, the EWS must be sensitive to changes in food security status before famine threatens and able to detect localized pockets of acute food stress.

In early 2000, officials in some donor agencies appeared to be waiting for evidence of increasing and high malnutrition to convince them of the need to respond to the food crisis in parts of Ethiopia. In the politically fraught context of drought in Sudan in 1990-91, indicators had to be “catastrophic,” in the words of one agency representative, to be taken seriously and treated with urgency. Even the well-publicized and very early warning provided of the 1997 El Niño event encountered the attitude that they’ll wait until something actually happens (Thomson et al. 1998).

An early warning system allows for early detection of drought, improves response and triggers actions. An early warning system monitors and forecasts and analyses data that is used to trigger set actions within a drought plan. This can be in the form of media, education of different kinds etc. One of the main objectives of the drought management plans is establishing a reliable early warning system based on hydrological indicators, easy to obtain and representative of the spatial and temporal situation of drought that allows drought on-set identification, control and assess their severity. Some of the indicators that can be used to identify and manage droughts are combinations of: Stored surface reservoir volumes, Aquifer water levels, River flows, Reservoir outflows. To obtain an indicators system and determine representative indicators, it is necessary to select, aggregate and weight basic

indicators based on the associated resources and demands. Finally, the calibration of indicators through historical series, allows adjusting the weights given to each indicator, and obtaining an aggregated group of indicators, suitable for and representative of the basin. Summary global basin indicators can also serve to establish national indicator systems, since they are representative of the each basin situation (Drought management plan report, European Commission, 2008).

Human perception refers to a range of judgments, viewpoint and attitudes from which it can be seen that perception is neither universal nor static, but it is preferred to have a dynamic concept. What an individual has identified as a drought strongly depends on environment and its characteristics (Maltimore, 2001)

Based on past experiences, one can make a risk assessment, as a way to understand and deal with drought. Attitudes towards risk depend on individual behaviours. In semi arid Africa, an often normal farmers reaction regarding drought is that it is an act of God on which humans have no influence (Slegers, 2008)

Experience is an important factor influencing an individual's perception of drought. Previous drought experiences shaped an individual's memory and are an important influence on how someone defines drought. One remembers a drought depending on how an individual defines it. On the other hand, what an individual defines as drought depends on his remembrance about the drought. The behaviour of each individual can both be re-active and pro-active forms. (Meze-Hausken 2004)

Communities need to ask themselves questions like; when will drought happen? How to prepare? When to stay and when to go? Where to go? How to travel? How long will it last? Who can advise and help? What help will be given and when? What to do during the event?

When to return? What to do afterwards? These are paramount questions that a community needs to ask themselves when preparing for disaster and thinking ahead about reconstruction and recovery efforts to get them back on track. A problem identified by disaster managers was the lack of communication reaching both down to, and up from, the village level. Managers need to know what the community understands about the risks of disaster impact and how they believe those risks might be treated. Ultimately, a need exists to harmonize disaster management programmes at all levels, have the right allocation of resources, implement the use of early warning systems, map disaster-prone areas, strengthen disaster management institutions countrywide and enforce laws and bylaws. This entails a shift from the short-term relief responses to development. (E.B. Joyce, 2002)

2.4 Conceptual Framework

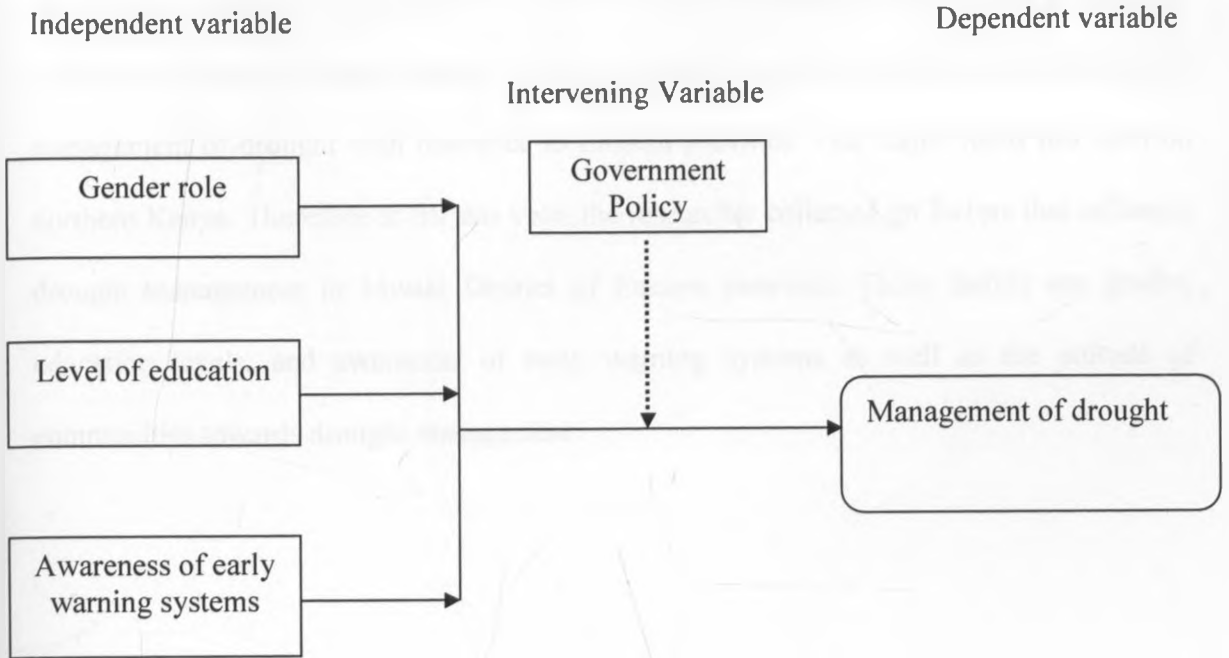


Figure 1: Conceptual Framework

2.5 Summary

The researcher has looked at the various factors that influence drought management. The literature cited the need for gender considerations when dealing with drought preparation and management. It also highlighted the impact of education in and preparation beforehand by use of early warning systems so that communities can become more resilient and are able to respond to and manage drought more effectively. The importance of government

involvement has also been highlighted. It is paramount to have government policy that provides an avenue for implementation of the strategies that need a thrust by the government. However the review above mostly focuses on Arid lands and has not established the management of drought with reference to Eastern province. The major focus has been on northern Kenya. Therefore to fill this void, the researcher collected on factors that influence drought management in Mwala District of Eastern province. These factors are gender, education levels, and awareness of early warning systems as well as the attitude of communities towards drought management.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlined the methodology, procedures and modalities in data collection. It also covered research design, determination and identification of the population sample size, sampling design, sampling procedure, the instruments of data collection, validity and reliability of data collected, sources of data, methods of collecting data and methods of analysing the data.

3.2 Research Design

The study used a descriptive survey to investigate factors that affect drought management in Mango community. This survey described data and characteristics about Mango community to gather opinions regarding the factors that affect drought management. A descriptive survey has the aim of description and the researcher followed-up with examinations of why the observations exist and what the implications of the findings are. A cross sectional survey was used to study a sample of the population. This was used to compare the opinions of a sample of people in Mango Community.

3.3 Target Population

The target population was the people from Mango Community in Mwala District. The study was carried out in Mango Community in Mwala District. Mango location covers an area of 40km² with an approximate population of 15726 persons (men 4582, Women 5105, Children 6065). 60% of the population lives in flat areas especially along the rivers and 40% live within the foot of mango hills. 65% of the population is considered to be poor, 35% of

the population is living under absolute poverty and 5% of the population is child headed household.

3.4 Sample size and Sampling Procedure

A sample is a subset of a population that is representative of a larger group.

A representative sample size with known confidence and risk levels was selected based on

the work of Yamane (1967) using the formula
$$n = \frac{N}{1 + N(e^2)}$$

Where n = The desired sample size

e = Level of precision (sampling error), the range in which the true value of the population is estimated. In this study this range is + 10% i.e. 0.10

N = Population size

$$n = \frac{15726}{1 + 15726 (0.10)^2}$$
$$= 99.3$$

99 respondents will be targeted as the sample size in this study.

3.5 Research Instruments

The primary data was collected through field surveys conducted in the study area. This included structured questionnaires administered to capture qualitative and quantitative data.

The questionnaires combined both closed ended and open ended questionnaires. Key informant interviews with local community leaders, community based organisations and donor institutions.

The field data quality was checked through intensive supervision, meetings and discussions to ensure the completeness and consistency of the collected data

A letter from the University of Nairobi stating that the researcher is a student from the university and is taking the said study for the purposes of her master's degree was attached to the questionnaires and presented together with an introductory letter from the researcher. These were used to formally introduce the researcher and to authenticate the entire research process. The ethics will also be observed by the research assistants during the study.

3.6 Validity and Reliability of research instruments

Validity and reliability of the research instruments was ensured by the researcher. These terms are further elaborated below;

3.6.1 Reliability

The trustworthiness of the study was established through provision of reliability. The reliability of the research defined by Yin (1989:41) as "demonstrating that the operations of a study-such as the data collection procedures can be repeated, with the same results," was met by thorough documentation of all interviews and developing a survey database. At the same time during personal interviews both the respondent and the interviewer influenced the process of conducting the interview. During the process of the study the interviewer asked guiding and additional questions and sometimes explaining the meaning of the questions in order to eliminate misunderstandings and to achieve more comprehensive information. The questions chosen for the present study adequately represents the domain of interest, and thus the content-related reliability will be observed. Triangulation was used to ensure consistency of information. Respondents were allowed to answer the questions independently thus eliminating bias.

3.6.2 Validity

The data collection was carried out with the help of qualitative methods. These gave a better understanding of the phenomenon being investigated. Validity ensures that the results are sound. Pre-testing of the instruments was undertaken before the actual study to give a view of the areas that needed attention and modification.

3.7 Methods of Data Analysis

Generated data was entered into Statistical Package for Social Sciences (SPSS) which was followed by analysis of both the quantitative and qualitative household data for the various identified indicators.

Data collected was weighted during analysis to account for the inadequacies of simple random sampling. Further statistical calculations were used such as means, variances, frequency tables and a Correlation technique for strength of association between variables.

3.8 Ethical considerations

The participants were assured of confidentiality and anonymity in handling of information and procedures involved in this study. Written informed consent was sought from literate participants while oral informed consent was obtained from illiterate participants. Respondents were informed that this information will not be availed to persons outside the study teams. They were further assured that no personal identifiers would be used in case of publication.

3.9 Operational definition of Variables

Table 3.1: Operational Definition of Variables

Objective	Variable	Indicator (s)	Measurement	Scale	Data collection method	Data analysis	Tools of Analysis
To assess the contribution of gender roles to drought management among Mango community	Independent Variable: Gender	Male Female	Number of female or male who engage in drought management activities	Nominal	Questionnaire	Descriptive statistics	Descriptive statistics : Tabular -Frequency tables & Percentages
To assess the influence of education level on drought management among Mango Community	Education level	Academic qualification	- Have not gone to school -Primary school level - Secondary school level - Certificate - Diploma - Degree - Higher than degree	Ordinal	Questionnaire	Descriptive statistics	Descriptive statistics : Tabular -Frequency tables & Percentages

To assess the level of awareness of Early warning systems in drought management among Mango community	Awareness of early warning systems	Identification of signs of drought Identification of indigenous early warning systems	Number of people who can tell signs of drought Number of people who can identify indigenous early warning systems	Nominal	Questionnaire	Descriptive Statistics	Descriptive statistics : Tabular -Frequency tables & Percentages
	Dependant Variable: Drought management	Community engaging in drought management	Planting drought resistant crops Destocking Controlled grazing Saving	Nominal	Questionnaire	Descriptive statistics	Descriptive statistics : Tabular -Frequency tables & Percentages - Pearson's Correlation for strength of relationship between variables

CHAPTER FOUR: DATA PRESENTATION, INTERPRETATION AND DISCUSSION

4.1 Introduction

This section covers data presentation, interpretation and discussion of findings. Data has been analyzed and summarized based on the influence of gender, education level and Early Warning Systems in the management of drought. This has been presented in the form of frequency tables, percentages and narratives. The data was collected in Mango community in Mwala District, Eastern Province through questionnaires and interviews.

4.2 Response Return Rate

From the 120 questionnaires distributed, 104 questionnaires were collected back and were suitable for analysis purposes. This indicates that the response rate was 86%. The questionnaires and interviews were administered during a drought period (November 2011) and hence the respondents could relate to the enquiries made. This could have promoted the high response rate.

4.3 Demographic information

The demographic information has been analysed and presented according to the findings.

4.3.1 Gender Demographic information

This was analysed into male and female respondents.

Table: 4.1. Distribution of respondents by gender

Gender	Frequency	Percent	Cumulative Percent
Male	52	50.0	50.0
Female	52	50.0	100.0
Total	104	100%	

Out of the 104 respondents captured by the study 52 were women while 52 were men. This is ideal and largely welcome as one of the variables in this study mainly focuses on gender.

4.3.2 Age of the respondents

The age of the respondents in the area of study was analyzed and the results summarized as follows;

Table 4.2 Distribution of respondents by age

Age	Frequency	Percent	Cumulative Percent
15-20 years	3	2.9	2.9
21-30 years	34	33.0	35.9
31-40 years	26	25.2	61.2
41-50 years	20	19.4	80.6
51-60 years	12	11.7	92.2
Above 60 years	8	7.8	100.0
Total	104	100	

The study revealed that only 2.9% of the respondents were in the age group of 15-20 years, 32.7% in the age group of 21-30 years, 25% in the age group of 31-40 years, and 19.2% in the age group of 51-60 years while 7.7% were above 60 years. The majority of the respondents were between 30 and 40 years old. 38.5% of the male respondents were between 21 and 30 years, 15.4% between 41 and 50 years while 13.4% were above 50 years. Out of the female respondents, 27.5% were between 21 and 30 years, 23.5% between 41 and 50 years while 25.5% were above 50 years.

4.3.3 Level of education of the respondents

The level of education of the respondents has been analysed in table 4.3. This has been distributed by the categories of the respondents that had not gone to school, had a primary level certificate, secondary level certificate, and tertiary and degree levels.

Table 4.3 Distribution of respondents by education level

Education level	Frequency	Percent	Cumulative Percent
Have not gone to school	9	8.7	8.7
Primary school level	26	25.0	33.7
Secondary level	23	22.1	55.8
Tertiary level	36	34.7	90.4
Degree	10	9.6	100.0
Total	104	100	

The study revealed that 8.7% of the respondents had not gone to school. 25% had attained primary level education, 22.1% had secondary school level, and 34.7% had attained a tertiary level education while only 9.6% had graduated with a degree. The majority of the respondents were between Primary school and tertiary level.

4.3.4 Marital Status of the respondents

The marital status of the respondents is presented in the table below. This has been analysed under the categories of married, single, widowed and any other status to the discretion of the respondents. The three categories are highlighted below based on the respondent's response.

Table 4.4 *Distribution of respondents according to Marital Status*

Marital status	Frequency	Percent	Cumulative Percent
Married	55	52.9	52.9
Single	34	32.7	85.6
Widowed	15	14.4	100.0
Total	104	100.0	

The distribution of respondents according to marital status revealed that the majority of the respondents were married. This was followed by single and widowed respondents respectively. 46.7% of the widowed respondents were above 60 years old.

4.3.5 Number of children

The number of children that the respondents have has been analysed and presented below.

This was rated between no children to five and above.

Table 4.5: *Distribution of respondents according to the number of children*

Number of children	Frequency	Percent	Cumulative Percent
None	25	2.9	24.3
One	4	33.0	28.2
Two	13	25.2	40.8
Three	21	19.4	61.2
Four	15	11.7	75.7
Five and above	25	7.8	100.0
Total	104	100	

For those who had children, 3.8% had one child while 24% had above 5 children. 24% of the respondents had no children. 69.6% of the single respondents had no children while 96.4% of the married respondents had children.

4.4 Drought management by gender

The researcher sought to determine whether gender influences the management of drought.

Drought management would encompass preparedness to respond to drought.

Table 4.6 Drought management by gender

Gender	Manage Drought		Do not manage drought	
	Frequency	%	Frequency	%
Male	35	68.1	17	31.9
Female	31	60.4	21	39.6

From the study findings, 68.1% of the males in the among Mango community engage in managing drought while 60.4% of the females from the same community manage drought.

From this analysis, it is apparent that gender influences drought management among Mango community with more males than females involved in the drought management.

Table 4.7 Method of managing drought by gender

Activity	Male		Female	
	Frequency	%	Frequency	%
Planting drought resistant crops	45	86.5	39	75
Storing water	35	67.3	25	48.1
Controlled grazing	33	63.5	31	59.6
Destocking of animals	29	55.8	28	53.8
Saving	35	67.3	34	65.4

This reveals that both men and women cited planting drought resistant crops as the best method they use for managing drought. This was followed by saving money for both male

and female respondents. Saving is considered an important method of managing drought but limitations in accessing money exist that hinder this from happening. Savings made run out when drought extends to unpredictable lengths leaving them vulnerable. This was more common for the men who cited looking for casual jobs as a way of managing drought when their land ceases to produce. Other effective ways of managing drought were cited as digging of boreholes and terraces to hold water and forming of small investment groups that would assist in communal saving schemes.

4.4.1 Awareness of drought based on gender

Drought management is a process that starts with the awareness of drought as a problem. People need to acknowledge that before they venture into any drought management procedures. Before you manage drought, you must be aware that it exists hence the researcher wanted to know how many respondents were aware that drought exists as a basis for drought management. The table below shows the respondents' awareness of drought based on gender.

Table 4.8 Respondents awareness of drought based on gender

Gender	Know what drought is		Do not know what drought is		Not sure		Total	
	Frequency	%	Frequency	%	Frequency	%		
Female	52	100	0	0	0	0	52	100
Male	50	92.6	0	0	3.8	2	52	100

All the female respondents answered in the affirmative to knowing what drought was. On the other hand 92.6% of the men knew what drought was while 3.8% were not sure. Understanding of drought was also analyzed by definition given by respondents. All the

respondents who knew what drought was defined drought as the absence of rains and consequently food and water.

4.4.2 Challenges associated with drought by gender

The researcher sought to determine whether drought was a problem and the related problems affecting respondents by gender.

Table 4.9 Problems associated with drought by gender

Gender	Drought is a problem		Drought is not a problem	
	Frequency	%	Frequency	%
Female	52	100	0	0
Male	52	100	0	0

All the respondents, both male and female, agreed that drought was a problem to them. This was not surprising as the area is faced sporadically by drought. During the time the data was being collected, the area had experienced more than two failed rain seasons that had exposed them to drought and this was stated as a being a problem.

The table below shows further analysis on the whether the different genders who accepted that drought was a problem manage drought or not.

Table 4.10 Respondents managing drought based on acceptance of drought as a problem

Gender	Manage drought		Do not manage drought	
	Frequency	%	Frequency	%
Female that admit drought is a problem	35	68.1	17	31.9
Male that admit drought is a problem	31	60.4	21	39.6

Acceptance of drought as a problem is one thing, but it is important to take it a step further and engage in activities that would build community resilience and ensure that people are prepared for drought. The table above reveals that more women who admitted that drought was a problem engaged in activities to manage it than men.

4.4.4 Respondents that have been trained on managing drought by gender

25.5% of females and 28.8% of males had been trained on drought management. Out of the female respondents 84.6% have been trained by NGOs and 15.4% by the government. 100% of the female respondents also reported that the training was helpful to empowering them to manage drought. The table below shows the respondents that had been trained vis-à-vis management of drought.

Table 4.11 Respondents that have been trained by gender and manage drought

Training by gender	Manage drought		Do not manage drought	
	Frequency	%	Frequency	%
Female that have been trained	9	69.2	4	30.8
Male that have been trained	8	53.3	7	46.7

69.2% of females that had been trained manage drought, while 30.8% of the same do not. On the other hand, 53.3% of the males that had been trained manage drought while 46.7% do not. The trained respondents manage drought more. As much as the knowledge was acquired and the will existed to manage drought was there, some limitations existed which included, lack of resources and money.

4.4.6 Difficulty in managing drought by gender

The researcher sought to determine the degree of difficulty associated with managing drought. This is shown in the table below;

Table 4.12 Level of Difficulty in managing drought by gender

Level of difficulty	Male		Female	
	Frequency	%	Frequency	%
Easy	5	9.6	6	11.5
Difficult	29	55.8	22	42.3
Very hard	17	32.7	24	46.2
Impossible	1	1.9	0	0

From the analysis above, most men and women stated that they found it between difficult and very hard to manage drought. All the respondents agreed that the challenges faced were joblessness, low yields, children dropping out of school, malnutrition among children, lack of development due to diversion of funds to managing the drought and lack of knowledge regarding preparing effectively for the drought.

The research also sought to determine what both genders thought about each others vulnerability and role in managing drought.

Table 4.13 Attitude towards the gender that is most affected by drought

Gender	Women are affected more by drought		Men are affected more by drought	
	Frequency	%	Frequency	%
Female	48	92.3	14	7.7
Male	38	72.5	14	27.5

Based on the analysis, 92.3% of the female respondents agreed that women are more affected than men by drought while 72.5% of the male respondents agreed on the same thing. This is attributed to the perceived woman's role as the caretaker of the home.

4.5 Drought management by education level

Education level was the second variable in the study that the research sought to determine its influence in the management of drought.

4.5.5 Influence of education level in management of drought

The management of drought by different levels of education as was analyzed by the researcher. This is described in terms of the different education levels and their engagement in the management of drought.

4.14 Management of drought based on different education levels

Education level	Manage Drought		Do not manage drought	
	Frequency	%	Frequency	%
Have not gone to school	3	33.3	6	66.7
Primary school level	12	46.2	14	53.8
Secondary school level	13	56.5	10	43.5
Tertiary	21	58.3	15	41.7
Degree	7	70.0	2	30.0

On the influence of education level on drought management, the study established that 70% of those who have degrees manage drought, followed by 58.3% of those with a tertiary education and 56.5% of those with a secondary school level of education. However, majority (66.7%) of those who have not gone to school and 53.8% of those with a primary school level of education do not manage drought. This implies that education level influence

drought management among Mango Community with those that are more educated participating more.

Table 4.15 Attitude of respondents in importance of education level in management of drought

Education level	Believe that people with education manage drought better		Do not believe that people with education manage drought better	
	Frequency	%	Frequency	%
Have not gone to school	7	77.8	2	22.2
Primary school level	22	84.6	4	15.4
Secondary school level	21	95.5	1	4.5
Tertiary	23	63.1	12	36.9
Degree	8	80	2	20

When asked which a specific question on attitude of the respondents towards the relationship between education and drought, Most of the respondents as revealed above on all education levels believed that people who have a higher level of education are able to manage drought better. This is because the respondents who answered positively believe that they have jobs and consequently income to help them during times of drought when everyone else without a job and hence no income have limited options.

4.5.1 Awareness of drought based on education level

The researcher sought to establish how different education levels affected awareness of drought.

Table 4.16 Awareness of drought based on education level

Level of education	Know what drought is		Not sure what drought is	
	Frequency	%	Frequency	%
Have not gone to school	9	100	0	0
Primary school	26	100	0	0
Secondary school	23	100	0	0
Tertiary	35	96.4	1	7.1
Degree	9	90	1	10

The analysis revealed that all the respondents who had not had any formal training, had primary school level, secondary school level and certificate level were aware of what drought was. 7.1% of the respondents with a diploma and 10% of the respondents with a degree cited not being sure of what drought was. Most of the people knew what drought regardless of their education level.

4.5.6 Level of difficulty in managing drought based on education level

The researcher sought to establish what the level of difficulty based on education level with regard to managing drought. This is presented in the table below;

Table 4.17 Level of difficulty in managing drought

Education level	Very hard		Difficult		Easy	
	Frequency	%	Frequency	%	Frequency	%
I have not gone to school	6	66.7	3	33.3	0	0
Primary school	12	46.2	14	53.8	0	0
Secondary school	18	34.7	10	43.5	5	21.7
Tertiary	14	37	20	55.8	2	14.3
Degree	2	20	4	40	4	40

The responses given reveal that the respondents with a lower level of education found it very hard to manage drought. 66.7% of the respondents who did not go to school indicated that it was very hard to manage drought. 46.2% and 53.8% of the respondents with a primary school certificate said it was very hard and difficult to manage drought. 20% of the respondents with a degree found it very hard while 40% of the respondents with the same level indicated that it was easy to manage drought.

4.5.8 Challenges faced when managing drought based on education level

The researcher wanted to establish what challenges the respondents faced in dealing with drought. All respondents across the education levels confirmed that they faced challenges when dealing with drought. The challenges encountered were listed by the respondents as lack of income, lack of food for mostly for children, dropping out of school for children and low yields from farms that were not sufficient to store for the dry seasons. These also did not differ across the respondents with different education levels.

4.6 Early warning systems in drought management

The researcher sought to determine the role of early warning systems in management of drought. This was mainly on whether or not the respondents were aware of the existing early warning systems, their role, the different kinds and their effectiveness.

Table 4.18 Management of drought based on early warning systems

Early warning systems	Manage Drought		Do not manage drought	
	Frequency	%	Frequency	%
Aware of early warning systems	66	63.5	38	36.5
Not Aware of early warning systems	36	34.6	68	65.4

The study further inquired on the influence of early warning systems in drought management. According to the study findings, 65.4% of the respondents of those who are not aware of early warning systems do not manage drought while 63.5% of those aware of early warning systems manage drought. This shows that awareness of early warning systems influences drought management among Mango community.

4.6.1 Influence of education level on the awareness of early warning systems

Table 4.19 Influence of education levels on EWS

Education levels	Aware of EWS		Not aware of EWS	
	Frequency	%	Frequency	%
Have not gone to school	0	0.0	9	100.0
Primary school level	9	34.6	17	65.4
Secondary school level	18	78.3	5	21.7
Tertiary	32	88.9	4	11.1
Degree	9	90.0	1	10.0

On the influence of education level on the awareness of early warning systems, the study found that 100% of those that have not gone to school are not aware of early warning systems while 90% of those with a degree are aware of early warning systems. This implies that the education level influences the awareness of early warning systems.

4.6.2 Prediction of drought

The researcher sought to determine whether the respondents could predict drought

Table 4.19 Respondents that can predict drought

Prediction of drought	Frequency	Percentage
Can predict drought before it happens	83	79.8
Are not able to predict drought before it happens	21	20.2
Total	104	100

79.8% of the respondents affirmed that they can predict drought before it happens while 20.2% believed that drought is unpredictable

4.6.3 Awareness of traditional early warning systems

The researcher sought to find out whether the respondents were aware of traditional early warning systems. The table below shows the analysis of this.

Table 4.20 Awareness of traditional early warning systems

Traditional Early systems	Frequency	Percentage
Aware of traditional early warning systems	40	38.5
Not aware of early warning systems	64	61.5
Total	104	100

The traditional early warning systems identified by the respondents were observation of the clouds, trees bearing flowers, leaves turning yellow, temperature change, movement of birds in groups, increase in temperature and drying up of rivers.

4.6.4 Awareness of modern Early Warning Systems

The researcher also sought to determine the respondents were aware of modern early warning systems in managing drought. The table below reveals the responses obtained

Table 4.21 Awareness of modern early warning systems

Modern early warning systems	Frequency	Percentage
Awareness of modern early warning systems	91	88.3
Are not aware of modern early warning systems	12	11.7
Total	104	100

It was revealed that 88.3% of the respondents are aware of modern early warning systems while 11.7% are not aware of modern early warning systems. Most respondents believed that these were more reliable than the traditional ones although not as readily available.

4.6.7 Effectiveness of early warning systems

Table 4.22 Effectiveness of early warning systems

Effectiveness of early warning systems	Frequency	Percentage
Early warning systems are effective	69	67.6
Early warning systems are not effective	33	32.4
Total	104	100

The researcher sought to determine whether indeed early warning systems were effective in helping people to be in a position to predict drought and as a result manage drought. 67.6% of the respondents agreed that the early warning systems were effective while 32.4% did not agree.

4.6.8 Correlation Analysis

Pearson's product moment correlation analysis was used to assess strength of the relationship between the variables.

Table 4.23 Correlation Matrix on drought management

	Drought Management
Gender role (r)	0.496
(p) (2 tailed)	0.039
Level of education (r)	0.751
(p) Sig. (2 tailed)	0.026
Awareness of early warning systems (r)	0.639
(p) Sig. (2 tailed)	0.031

Source: Survey Data (2011)

The data presented above on gender role, level of education, awareness of early warning systems and drought management were computed into single variables per factor by obtaining the averages of each factor. Pearson's correlations analysis was then conducted at 95% confidence interval and 5% confidence level 2-tailed. The table above indicates the correlation matrix between the factors (gender role, level of education and awareness of early warning systems) and drought management. According to the table, there is a positive relationship between the factors and drought management indicating that the level of education is more strongly related with a magnitude of 0.751. This is followed by awareness of early warning systems with a magnitude of 0.639 and least positive relationship represented by gender role with a magnitude of 0.496. The positive relationship indicates that there is a correlation between the factors and the drought management with level of education having the highest value and gender role having the lowest correlation value.

This notwithstanding, all the factors had a significant p-value ($p < 0.05$) at 95% confidence level. The significance values for relationship between drought management and gender role, level of education and awareness of early warning systems were 0.039, 0.026 and 0.031 respectively. This implies that level of education was the most significant factor, followed by awareness of early warning systems while gender role was the least significant.

4.7 Discussion

This section discusses the findings obtained with regards to influence of gender, education level and early warning systems in managing drought. The discussion is based on the answers given by the respondents in association with the literature review.

4.7.1 Influence of gender role in drought management

There is enough evidence that in any disaster disproportionately large numbers of women are affected more severely relative to men. (Pincha, 2008). Based on the findings, it is clear that both men and women play a key role in drought management. However the study reveals that women are more affected when drought hits. In terms of drought management, from the findings, it is apparent that that gender influences drought management among Mango community with more males than females involved in the drought management. The male gender engages more in activities towards management of drought than their female counterparts. On the other hand, both men and women understand what drought is and are both affected in different ways. While men might be keen about loose of animals and income, women are more concerned about food and water for their children. This was affirmed by majority of both men and women. The impact of disasters is felt differently within societies. Women's vulnerability to the impact of disasters is increased by socially determined differences in roles of women and men (WHO 2000) .The study revealed that

women are more in charge of the household and that they are more concerned about the children than their male counterparts. The female respondents also revealed that most of the men in times of drought 'go off to the urban cities to look for jobs and leave their wives and children behind with no one to take care of them'. Another common response from women is that men 'start drinking alcohol when disaster strikes'. More women are also affected because, the key household chores lay on the women who had to trek many kilometers looking for water.

4.7.2 Influence of education level on drought management

Historically, there has been an assumption that if you provide people with land, they will instinctively know how to be effective farmers. Research has found out that in the past, less academic sons have traditionally work on and inherited the farm' they are less disposed towards formal courses which are viewed as too theoretical for 'practical' farming. (Lees and Reeve, 1991). Most farmers continue to put local knowledge, the willingness to work hard (for extended hours) and the ability to work reliably without close supervision ahead of trade or university qualifications in farming when listing the important characteristics of a farm manager (Moore, 1990). The study has revealed that people across all education levels manage drought the same way however as much as the difference were somewhat negligible for some education levels, people with higher education engage more in activities to manage drought. The researcher also sought to find out whether the respondents believed that people with a higher education manage drought better. It was revealed that the majority of respondents believe that people with a higher level of education manage drought better based on the fact that they have income that enable them to acquire resources that they need to do this. This was an interesting attitude to capture. Literacy and education has been seen

to be crucial to DRR. Reducing risks and enhancing people's resilient capacities to deal with disasters requires them to understand how they could best protect themselves. (Rogers et al, 1995)

4.7.3 Influence of Early Warning Systems on drought management

The study sought to find out about the influence of early warning systems in managing drought among the respondents. These early warning systems ideally should predict drought in advance and would give communities information that would help them prepare for drought. In semi arid Africa, an often normal farmers reaction regarding drought is that it is an act of God on which humans have no influence (Slegers, 2008). The responses revealed that the community under study believed in early warning systems being a good source of information to enable them prepare for drought. 79.8% of the respondents affirmed this. Most of the respondents (88.5%) believed more in modern early warning systems than traditional ones. The modern systems were cited to be more reliable and scientifically based hence believed to give accurate information. On the other hand, traditional early warning systems were less famous. Only 38.5% believed in them. The respondents that affirmed the use of traditional early warning systems said that they use them because they are traditional and can be observed and have for worked them in the past. Some respondents did not believe in early warning systems at all, either traditional or modern, citing that drought is unpredictable and that only God knew when it would start and end.

The researcher also sought to find out how reliable the early warning systems have been in preparing for and managing drought. 67.7% of respondents confirmed that early warning systems were effective in enabling them prepare for drought and enable them to manage the drought when it really happens. It was confirmed that as much the early warning systems

were effective, the lack of resources and means to prepare was a big hindrance to effectively managing drought. It was possible for example to store food but sometimes the food would run out before the drought was over.

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of findings on the influence of gender role, education level and early warning systems in the management of drought based on the responses of the respondents. The summary of findings, conclusions and recommendations are based on the objectives of the study.

5.2 Summary of main findings

The influence of gender role in drought management among Mango community

From the study findings, 68.1% of the males in the among Mango community engage in managing drought while 60.4% of the females from the same community engage in the same. This reveals that more men than women engage in drought management among Mango community. All the respondents, both male and female confirmed that drought was a problem to them. However, the study revealed that men and women look at drought differently. Granted that it affects all, however more women cited taking care of children as the biggest problem that affected them while the men cited loss of animals and income as their biggest problem. When looking at the attitude towards drought, it was agreed by both genders that women are more affected by drought. This is because they assume the home making roles. In terms of attitude, more female than male respondents believed that being educated played a key role in managing drought while both male and female respondents agreed that it was either difficult or very hard to manage drought.

The influence of education level to drought management among Mango Community

On the influence of education level to drought management, the study established that 70% of those who have degrees engage in managing drought, followed by 58.3% of those with a tertiary education and 56.5% of those with a secondary school level of education. However, majority (66.7) of those who have not gone to school and 53.8% of those with a primary school level of education do not manage drought. This implies that education level influences drought management among Mango Community with those that are more educated participating more. In terms of understanding what drought was and challenges faced the differences among the education levels was negligible. In terms of attitude towards educated people, most respondents perceived that people who have a higher level of education, can manage drought better mainly because 'they have jobs and hence an income that help them through dry seasons'.

The influence of early warning systems in drought management among Mango community

The study further inquired on the influence of early warning systems in drought management. According to the study findings, 65.4% of the respondents of those who are not aware of early warning systems do not manage drought while 63.5% of those aware of early warning systems manage drought. This shows that awareness of early warning systems influence drought management among Mango community. On the influence of education level on the awareness of early warning systems, the study found that 100% of those that have not gone to school are not aware of early warning systems while 90% of those with a degree are aware of early warning systems. This implies that the education level influences the awareness of early warning systems. On the influence of education level on the

awareness of early warning systems, the study found that 100% of those that have not gone to school are not aware of early warning systems while 90% of those with a degree are aware of early warning systems. This implies that the education level influences the awareness of early warning systems.

5.3 Conclusion

From the findings of the study, the researcher concluded that based on gender, women bear the brunt of drought more than their men counterparts. As much as men engage more in activities to manage drought, they (women) are disadvantage in light of the fact that they are more concerned about and manage the entire household. This was also affirmed by both male and female respondents in the study.

The researcher also concluded that education level directly influences the management of drought. Respondents who had higher levels of education both prepare and manage drought more than the ones without education. Most of the respondents believe though that people with higher levels of education are more financially empowered to react better to drought. On the contrary some of the respondents believe that the educated were more ignorant because they only cared about their careers and not people back in the village.

From the study, the researcher also concluded that Early Warning Systems contribute positively to the management of drought. The respondents are aware of both traditional and modern early warning systems. The highly favored early warning systems were the modern ones which the majority of respondents believed because they are scientifically sound and

reliable. The few that still believe in early warning systems look out for traditional signs and assert that they still work for them. As much as these early warnings have helped, inadequate resources and skills have been a limitation in effective preparedness and management of drought.

The respondents responded in the affirmative that the government has played a key role in helping communities manage drought through training, distribution of relief food and distribution of seeds to farmers to help them manage drought.

5.4 Recommendations

Literacy and education has been seen to be crucial to managing drought. This enhances people's resilient capacities to deal with disasters by enabling them to understand how they could best protect themselves.

a) There is need for the government to continue increasing the capacity of farmers and pastoralists in the arid and semi arid lands to manage drought better through both formal and informal education. Unavailability of resources and modern technology has been a big hindrance to building resilience and hence the government can provide these in time to enable effective preparedness to promote drought management. Most of the respondents felt the government was not doing enough.

b) Gender should be a factor to be considered when assistance of any kind is provided to communities as it is clear that women bear the burden more when drought strikes. There is need to equip women with life skills to empower them to be able to take care of their families and build resilience in times of disaster like drought.

c) The early warning systems that have been consistently provided by the government are effectively working in giving warnings about impending drought. Alongside this, resources should be provided, for example drought resistant crops, pesticides, storage facilities, water facilities that will enable the communities to be in a better position to prepare and manage drought.

5.5 Areas for further research

The researcher recommended the following areas for further research;

- 1. The influence of early warning systems on timely response**
- 2. The influence of informal training on management of drought**

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APPENDIX 1: Letter of Transmittal

Eunice N. Maina,
University of Nairobi,
Department of Extramural Studies,
P. O Box 30197,
Nairobi.

Dear Sir/Madam,

Re: Letter of Transmittal

My name is Eunice Maina from the University of Nairobi and I am conducting a study on the influence of gender, education and early warning systems on drought management in Mango community in Mwala District. This study is for academic purposes and might be useful to other researchers engaging in the same area of study.

The results of this research will be confidential and no name is required in the questionnaires and other discussions. I kindly request for your honest responses and opinions regarding the different questions asked, some of which might be personal and based on experience. This will be very helpful in achieving the desired objectives of my study through the findings obtained.

Yours faithfully,
Eunice N. Maina

APPENDIX 2: QUESTIONNAIRE

Part I

1. What is your gender?

Male ()

Female ()

2. What is your age?

15-20 years ()

21-30 years ()

31-40 years ()

41-50 years ()

51-60 years ()

Above 60 years ()

2. What is your Marital Status?

Married ()

Single ()

Widowed ()

Other _____

3. How many children you do you have?

None ()

One ()

Two ()

Three ()

Four ()

Five and above ()

4. What is your education level?

Have not gone to school ()

Primary school level ()

Secondary school level ()

Certificate ()

Diploma ()

Degree ()

Higher than degree ()

2. Part II

5. (a) Do you know what drought is?

Yes ()

No ()

(b) If Yes, What is drought?

(c) Is it a problem to you?

Yes ()

No ()

(d) If Yes, How is it a problem?

5. When was the last drought that affected your area?

6. How often does it happen?

7. What were the effects of this drought?

Income reduction ()

Loss of crops ()

Loss of livestock ()

Inability to educate children ()

8. How do you manage drought?

9. Have you been trained on managing drought?

Yes ()

No ()

If Yes, by whom?

Community leaders ()

NGOs ()

Government ()

Other _____

10. Did the training help?

Yes ()

No ()

If Yes, How?

11. Do you think people who have a higher level of education manage drought better?

Yes ()

No ()

Please explain your answer

3. Part III

11(a) Do you know when a drought is about to happen?

Yes ()

No ()

(b) How do you know that a drought is about to happen?

12. Are you aware of traditional early warning systems?

Yes ()

No ()

If Yes, which ones?

13. Are you aware of modern/government early warning systems?

Yes ()

No ()

14. Which one do you trust more?

Traditional ()

Modern/government ()

Why?

15. Do they help (government or traditional)?

Yes ()

No ()

If Yes, How do they help?

Part IV

16. (a) Do you prepare for drought?

Yes ()

No ()

(b) If yes, how do you prepare for drought?

Planting drought resistant crops ()

Storing water ()

Controlling grazing ()

Destocking ()

Saving ()

Others

(c) Was it effective in managing the drought?

If No, Why not?

If Yes, How?

17. Have you invested either cash or other resources in preparing for drought?

Yes ()

No ()

18. Who helps you in preparing for the drought?

Community leaders ()

NGOs ()

Government ()

Other _____

19. Does drought affect men or women most?

Men ()

Women ()

Please explain your answer

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20. Are men involved in preparing for drought?

Yes ()

No ()

If Yes, How?

21. Are women involved in preparing for drought?

If yes, How?

22. Do you face any challenges when preparing for drought?

Yes ()

No ()

If Yes, What are the challenges/constraints that you face when preparing for drought?

23. Do you deal with these challenges?

Yes ()

No ()

If Yes, How do you deal with the challenges?

Thank you for your time.