

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

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**International Academic Journal of Information Sciences and Project Management  
(IAJISPM) | ISSN 2519-7711**

**Received:** 24<sup>th</sup> November 2018

**Accepted:** 30<sup>th</sup> November 2018

Full Length Research

**Available Online at:**

[http://www.iajournals.org/articles/iajispm\\_v3\\_i2\\_538\\_559.pdf](http://www.iajournals.org/articles/iajispm_v3_i2_538_559.pdf)

**Citation:** Golicha, T. & Wanyonyi, L. (2018). Influence of pastoralists' drought management practices on their livelihoods: A case of Isiolo North Sub-county. *International Academic Journal of Information Sciences and Project Management*, 3(2), 538-559

## **ABSTRACT**

The pastoralists communities mostly inhabiting the ASALs regions have been affected by drought since their economic activity is livestock keeping which is affected by drought due to lack of rainfall that reduces water and forage availability. The current ability of pastoralists to respond to drought is limited increasing frequency of drought, increasing population, a dwindling resource base, conflict, changes in access to land and water, as well as the impact of other shocks such as flooding and disease outbreaks. Despite the numerous studies documented on the disaster risk project management, the political, economic and social marginalization of most pastoralists, decades of adverse national policies which have restricted their access to key natural resources, increased frequency and intensity of climate shocks such as drought, and endemic conflict have all contributed to significantly undermine their resilience. The purpose of this study was to investigate the influence of pastoralist drought management practices on their livelihoods in Isiolo North Sub-County, Kenya. This study sought to investigate the effects of drought contingency planning, drought relief strategy, rehabilitation mechanism and policies for drought resilience on pastoralists' livelihoods in Isiolo North Sub-County. The research was designed as a cross sectional descriptive study. The target respondents included household heads and key informants who include local leaders (usually local chiefs, elders, community/clan leaders), livestock officers, NDMA, politicians and County Government officials), pastoralists from Isiolo North

Sub- County and civil society personnel. According to Krejcie and Morgan (1970), a sample corresponding to the target population of 14,325 is 375 households. In addition, five government technical staff and five stakeholders' key informants were included making a total sample of 384 respondents. The researcher relied on questionnaires for household heads while the key informants were interviewed. Qualitative data was analyzed using frequencies percentages, means and standard deviations. Multivariate regression was undertaken to test the relationship between the variables and enable the researcher generalize results from the sample to the population. Tables and figures were used to present the data. The study found that most of the areas in Isiolo North Sub County are frequently struck by drought and water scarcity putting the pastoralists at a great drought disaster. The study deduces that the pastoralists are familiar with drought contingency planning. Drought relief strategy affects drought disaster risk reduction in Isiolo North. The pastoralists are knowledgeable about rehabilitation mechanism as a mitigation strategy. The study ascertained that rehabilitation mechanism as a mitigation strategy is not carried at the right time of the drought cycle. The study recommends the community, planners, professionals and the implementers of drought disaster risk management need to realize and rise to the awakening that drought affected people have the learning and the strength to develop coping and survivability capacities. There is a need to enhance community communication and feedback mechanism in

the county. The study also recommends that the government of Kenya and development agencies working in the area need to invest in the provision of credit facilities to the pastoralists to assist them in coping with droughts. The study recommends funds

should be allocated for effective supplementary feeding programmes.

**Key Words:** *pastoralists' drought management practices, livelihoods, Isiolo North Sub-county*

## **INTRODUCTION**

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

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

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

Eighty four percent of Kenya's territory is arid and semi-arid lands, commonly known as the Arid and Semi-Arid Lands. In these territories, more than 10 million people live, that is slightly more than 25 percent of Kenya's population (YazanElhadi, 2012). The economic activity

practiced in this region is pastoralism (Mugo, 2009). At the same time, these areas comprise the most marginalized parts of the country. For very many years, drought and famine has become a common and recurring phenomenon in many parts of Kenya especially in the ASALs areas. The pastoralists communities mostly inhabiting the ASALs regions have been affected by drought since their economic activity is livestock keeping which is affected by drought brought by the lack of rainfall that reduces water and forage availability

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

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

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

Development and disaster management practitioners use risk analysis or assessment methods when drawing up project plans and making operational decisions. The recurrence of severe drought is a cause of human suffering and a major blockage to pro-poor livestock development in sub-Saharan Africa, particularly in pastoral and agro pastoral systems (HPG, 2006). Disasters induced by drought account for about ninety percent of all disasters in the Region. Drought sets off a vicious cycle of socioeconomic impacts beginning with crop-yield failure, unemployment,

erosion of assets, decrease in income, worsening of living conditions, poor nutrition, and, subsequently, decreased coping capacity, and thus increasing vulnerability of the poor to another drought and other shocks as well as the risk of political instability and, in some cases, conflict (Walter, 2004).

Sophisticated and dynamic strategies such as tracking pasture and water in time and space and maintaining high levels of mobility across large tracts of land, allow pastoralists to effectively cope with the threats and risks that characterize their environment and to maintain a viable production and livelihoods system (Huho & Kosonei, 2014). There have been previous cases of unreliable seasonal forecast and no specific information on projected impacts with the data itself, not appropriately shared among the stakeholders. This has left both the government and communities ill-prepared to tackle subsequent droughts despite having previous experiences in droughts. The combination of all of these factors turns shocks such as droughts and other type of hazards into catastrophic losses for the most vulnerable groups. In Kenya, the frequency and severity of drought has been on the increase due to climate change. The Arid and semi-Arid Lands (ASALs), especially Northern Kenya (Isiolo, Marsabit, Mandera and Samburu) are the most vulnerable (Cordaid & IIRR, 2011). The current ability of pastoralists to respond to drought is limited not only due to the increasing frequency of drought, but also due to increasing population, a dwindling resource base, conflict, changes in access to land and water, as well as the impact of other shocks such as flooding and disease outbreaks.

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

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

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

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

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

Scarcity of arable land and pasture is a daily challenge for the people of Isiolo, phenomena that is witnessed from the constant community conflicts that plague the county. The Borana are nomadic pastoralists, moving from one area to another - within the county and in neighboring counties in search of pasture and water for their goats, camels and cows. According to Vision 2030's plans Isiolo will host a major Resort City, an international airport and a railway line linking Lamu to Lokichogio and Ethiopia. However, while significant developments are planned for Isiolo, a wave of violent conflict has swept the city in recent years. The conflicts and violence in Isiolo appear to be the usual traditional pastoral communities' competition for pasture and grazing land.

## **STATEMENT OF THE PROBLEM**

Pastoralists' livelihoods strategies have evolved over centuries to adapt to hot and dry climate with low and erratic rainfall, typical of the arid and semi-arid lands. According to Action Aid (2012) pastoralist communities are predisposed to disasters by a combination of factors such as poverty, aridity, settlement in areas prone to drought. Due to increasing global interdependence, there is need for all actors to at least share information and where appropriate act in tandem with government strategies where they exist or facilitate improvement of such strategies. Wamugi and Muchemi (2011) in their study on strengthening community managed drought risk reduction in



northern Kenya and Southern Ethiopia (SCMDRR) noted that the migration of pastoralists in Northern Kenya and Southern Ethiopia is a systematic process that is largely dependent on traditionally accepted clan grazing ranges. Muhuba (2013) in an assessment of community based drought cycle management as a strategy for disaster risk reduction in Wajir County found that of the various coping strategies used, the community opted to move their animals and families to other places in search of pasture during drought. Musimba (2014) investigated the role of community participation in drought risk management in Kilifi County, Kenya and found that there was a significant role of community participation in drought risk management as the process was implemented by the community themselves although in most of the cases the criteria was predetermined and dominated by experts who assertively considered the contribution of community. Despite the numerous studies documented on the disaster risk project management, the political, economic and social marginalization of most pastoralists, decades of adverse national policies which have restricted their access to key natural resources, increased frequency and intensity of climate shocks such as drought, and endemic conflict have all contributed to significantly undermine their resilience. It was in this light that the study sought to carry out an investigation into the influence of pastoralist drought management practices on their' livelihoods in Isiolo North Sub-County, Kenya.

## **PURPOSE OF THE STUDY**

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

## **OBJECTIVES OF THE STUDY**

1. To investigate the influence of drought contingency planning on pastoralists' livelihoods in Isiolo North Sub-County
2. To explore the influence of drought relief strategy on pastoralists' livelihoods in Isiolo North Sub-County
3. To ascertain the influence of rehabilitation mechanism on pastoralists' livelihoods in Isiolo North Sub-County
4. To establish the influence of policies for drought resilience on pastoralists' livelihoods in Isiolo North Sub-County

## **THEORETICAL REVIEW**

### **Bordieu Theory of Cultural, Social, and Symbolic Capital**

Bordieu's theory emerged from French sociologist, anthropologist, and philosopher Pierre Bourdieu (1930 – 2002). Bordieu's theory offers a way to examine the cultural, social, and symbolic capital within a community. Social capital means resources that one can acquire

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

### **Community Empowerment Model**

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

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

At the community level, an empowered community makes it possible for individuals and organizations to apply their skills and resources in collective efforts to meet their respective needs. As such an empowill bed community has the ability to influence decisions and changes in the larger social system. Braithwaite and Lythcott (1989) support this argument and describe that empowerment at the community level is connected with empowerment at the individual and organizational levels. In practical sense, and as McMurray (2007) states, empowerment brings



back power to the people by improving people's participation, increasing individual and community control over various programs that impact their development and also improves a sense of local ownership and collaboration.

## **EMPRICAL REVIEW**

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

Across the continents the way pastoralism is practiced varies greatly, from the highly technologically advanced pastoral systems of Australia or the USA to partially subsistence systems in parts of Africa. The degree of social and political support for pastoralism is equally diverse, with some African governments strongly opposed to it, whilst many European countries increasingly promote mobile pastoralism in order to manage and conserve biological diversity. The current system thus has two problems: a lack of response to early-warning information, in which stakeholders prefer to see hard evidence of an actual crisis (as opposed to an emerging crisis) before responding; and a late and inadequate response to the prevailing situation as provided by the bi-annual assessment reports.

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

The reductions in food production would have severe consequences most directly for smallholder farmers and agro-pastoralists, who rely on farming for income, and for all those who purchase such crops. Kenya (2009) describes Kenya's disaster profile as being dominated by drought disasters that disrupt people's livelihoods, destroy infrastructure, divert planned use of resources, interrupt economic activities and retard development. Kenya (2009) records that 1999-2001 drought disaster response costs were more than would otherwise be the case if sufficient efforts

had been put in place for effective disaster management. Drought disaster risk management involves systematic analysis and manage of the effects of droughts through reduced exposure, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events (ISDR, 2005). Community participation refers to members of the public taking part in the analysis and management of threats posed by drought and developing survivability capacities.

Goyet (2009) challenges the myth that drought affected population would be too shocked and helpless to take responsibility for their own survival as superseded by the reality that many find new strength during emergencies. Communities affected by drought disasters have a role to play in disaster risk management and should be given the maximum opportunity to participate in risk reduction and response programmes. People are involved to solve their own problems and cannot be forced to participate in projects which affect their lives but should be given the opportunity for involvement as it is a basic human right and a fundamental principle of democracy (Mainlay & Tan, 2012). Citizens are involved in community needs assessment where the community expresses opinions about desirable improvements, prioritizing goals and negotiating with agencies for synergy building where they are engaged to plan and design interventions through formulation of appropriate objectives, setting goals, criticizing plans based on traditional knowledge of disaster risk management.

## **RESEARCH METHODOLOGY**

### **Research design**

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

### **Target Population**

Target population is the specific population about which information is desired. Target population is the specific population about which information is desired. According to Mugenda and Mugenda (2012), target population is the members of a real or hypothetical set of people, events or objects the researcher wishes to generalize the results of the research. The target

respondents included pastoralists from Isiolo North Sub- County. This population is spread across the constituency in Isiolo North Sub- County. In this study the households are recognized as the basic unit of analysis which include more than one individual (although a single individual can also constitute a household), who share economic activities necessary for the survival of the household and for the generation of wellbeing for its members. The rural poor, dependent on pastoralism constitutes the target population while the unit of analysis will be the household with the household head serving as the unit of observation for the study. According to Kenya National Bureau of Statistics (KNBS, 2009) the Isiolo North Sub-County had a population of 143,294 at the end of year 2009 making a total of 14,325 households in the Sub-County spreading across the entire County. According to the County Government (2017) 75% of the families in Isiolo North Sub- County are dependent on pastoralism for their upkeep. For the purpose of this study, the household heads of approximately 14,325 in each of the five districts were involved. The study also selected key informants who include local leaders (usually local chiefs, elders, and community/clan leaders), livestock officers, arid and semi-arid land officials, politicians (like MCAs, MPs and County Government officials), pastoralists from Isiolo North Sub- County and civil society personnel (e.g. NGOs and politicians like MCAs, MPs and County Government officials). This was done through the County governments who assisted the researcher to identify those persons who had lived in the area for more than ten years. All these data sources constitute the units of analysis.

### **Sample Size and Sampling Procedure**

This research used purposive sampling. In this study the researcher selected strata's which included government officials from relevant departments including water, livestock, drought management, provincial administration among others, NGOs officials who worked in the county in last sequence of droughts, officials and community chairpersons from the constituencies in the County who are directly involved in pastoralist drought management. This study employed purposive sampling technique to sample locations for data collection in the County. The purpose of choosing this method was to avoid bias and ensuring a representative sample is selected. Households studied were randomly selected. Owing to the large population of the households, the study made use of Krejcie and Morgan Sampling method to select the corresponding sample for such a big population. According to Krejcie and Morgan (1970), a sample corresponding to the target population of 14,325 is 384. This implied that a total of 375 households were sampled. To avoid biasness, 187 households were selected randomly and conveniently from each of the constituencies. No sample frame was prepared for the key informants and focus group discussion participants. Key informants are people perceived to have particular insight or opinions about the topic under study. In this study, the main criteria for selecting the key informants was their extensive knowledge of the cultural practices related to drought, both today and in the past, and their length of stay in the study site. As such, five government technical staff and five stakeholders' key informants were drawn using purposive sampling technique for administration

of data collection instruments. Accordingly a total of 384 respondents were selected to participate in this study.

### **Data Collection**

Data was collected using both quantitative and qualitative methods including documents review, questionnaire administration to the various stakeholders, key informant interview and Focused Group Discussions. The researcher relied on self-administered questionnaires. A questionnaire is a research instrument that gathers data over a large sample (Kombo & Tromp, 2006). The advantages of using questionnaires are that the person administering the instrument has an opportunity to establish rapport, explain the purpose of the study and explain the meaning of items that may not be clear. Questionnaires give respondents freedom to express their views or opinions and also to make suggestions. Questionnaires are also anonymous. Anonymity helps to produce more candid answers than it is possible in an interview. On the other hand, the disadvantages of questionnaires include that the researcher has no control over participant interpretation, they can at times realize low response rates, there is usually uncertainty about who actually filled out the questionnaire, and they can be rendered useless with non-literate, illiterate populations or hard-to-reach populations. The researcher sought a research permit from the University of Nairobi and thereafter wrote letters to the authorities in Isiolo North Sub- County to be allowed to do the study. The selected samples were visited and the questionnaires administered to the respondents. The respondents were assured that strict confidentiality would be maintained in dealing with their identities. The completed questionnaires were collected at the agreed time. Individuals who are participating in the drought management programs were interviewed on issues relating to influence of pastoralist drought management on pastoralists' livelihoods in Isiolo North Sub-County. These included livestock officers, arid and semi-arid land officials, politicians (like MCAs, MPs and County Government officials) and civil society personnel (e.g. NGOs). Key informants and community leaders were also invited while community members, group of men, women and youth constituted focus group discussions. Each of these groups was handled as a separate entity.

### **Data Analysis and Presentation**

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

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

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

Where: Y is livelihoods of pastoralists,  $X_1$ = drought contingency planning,  $X_2$ = drought relief strategy,  $X_3$  = rehabilitation mechanism and  $X_4$  = policies for drought resilience. Further,  $\beta_1, \beta_2, \beta_3$  and  $\beta_4$  = Regression Coefficients and  $\varepsilon$  = Error term.

The multiple R square (R squared) was used to measure the goodness of fit of the overall model. The model measured the amount of variation in the dependent variable (livelihood) explained by the overall model and ranged between 0 and 1. The closer it was to 1 then the more significant moderating effect and thus the better the model. Conclusions were then drawn from the findings and recommendations made.

## **RESEARCH RESULTS**

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

The study also found that most of the areas in Isiolo North Sub-County are frequently struck by drought and water scarcity putting the pastoralists at a great drought disaster. Accordingly, there are drought disaster risk management interventions in the various areas studied in Isiolo North. Drought was found to have a huge negative effect on the pastoralists. Loss of pasture which causes fall in herd productivity, long distance migration and changes in wealth distribution was a major effect of drought on pastoral household; loss of water and loss of income are the main effects of drought on pastoral. From the study, drought risk is a product of a region's exposure to the natural hazard and its vulnerability to extended periods of water shortage. Accordingly, the most common sources of water in the County are dams, followed by well then boreholes, river

and finally tapped water. This is an implication that there are no reliable sources of water to cushion the pastoralists against drought. The study established that majority of the pastoralists didn't obtain any relief to get out of the drought problem, others obtained relief from the authorities, family or own initiatives, assistance from relatives and from friends residing outside the area.

The study also found that the pastoralists are familiar with drought contingency planning to a great extent. The drought contingency planning was found to be very much effective on drought disaster risk reduction in Isiolo North. The pastoralist communities are involved in drought contingency planning as a drought disaster risk reduction to a great extent. There is a high level of involvement of the pastoralist communities are involved in drought contingency planning hence can enhance drought disaster risk reduction disaster. This is because contingency plans generated at the community level are expected to form the basis for district/regional contingency plans. The pastoralists are involved in drilling of contingency boreholes used during drought, strengthening the existing village committees through capacity building, offloading and storage of food aid, facilitating distribution, targeting and registration of the vulnerable household and identification of water trucking points, source of information of cases of sick persons and identify malnourished children. It was clear from the study that drought contingency plans are response oriented with little emphasis on mitigation, there is very little link between preparedness, early warning and early action/ response and drought contingency plans are insufficient to coordinate interagency drought contingency planning. However, it was unclear on whether contingency planning has not helped people to be on time because it had not told people when action would be needed. The study found that there are various aspects that affect the drought contingency planning as a strategy of disaster risk reduction in Isiolo North. They include timeliness of the plans, inter-agency coordination, response and recovery actions, fund management and drought preparedness with great extents, while decision making tools and drought cycle management affect the drought contingency planning as a strategy of disaster risk reduction in Isiolo North to moderate extents.

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

The study finally found that the pastoralists are knowledgeable about rehabilitation mechanism as a mitigation strategy. The study established that rehabilitation mechanism as a mitigation strategy is not carried at the right time of the drought cycle. From the study, the whole process of



rehabilitation mechanism as a drought mitigation strategy in Isiolo North was rated to be less effective. The study found that direct livestock purchase and micro financing livestock traders are much effective in influencing drought disaster risk reduction in Isiolo North, while income generation, agro-marketing, food security, transport subsidy for livestock traders, water harvesting and capacity building are fairly effective in influencing drought disaster risk reduction in Isiolo North.

**INFERENCE ANALYSIS**

To establish the relationship between the independent variables and the dependent variable, the study conducted multiple regression analysis. The model summary for the regression is shown in Table 1.

**Table 1: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.908 <sup>a</sup>	.825	.789	0.752

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

According to Table 1, the four variables that were studied (drought contingency planning, policies for resilience, drought relief strategy and rehabilitation mechanism) explain 82.5% of the livelihoods of pastoralists as represented by the R<sup>2</sup>. This thus means that the variables (drought contingency planning, policies for resilience, drought relief strategy and rehabilitation mechanism) contribute 82.5% to the livelihoods of pastoralists while other aspects not studied in this study contribute 17.5% of livelihoods of pastoralists.

The Analysis of variance (ANOVA) was used to determine whether there was a regression relationship between the study variables. The F-ratio in the ANOVA table tested whether the overall regression model was good and fit for the data. The results obtained are presented in Table 2.

**Table 2: ANOVA**

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

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

Dependent Variable: Livelihoods of pastoralists

From the ANOVA statistics in Table 2, the processed data had a significance level of 0.000 which shows that the model is fit to predict the relationship between the independent and the dependent variables. The F calculated at 5% Level of significance was 3.804. Since F calculated is greater than the F critical (F-Critical= 1.99 at 4, 328), this shows that the overall model was significant i.e. there is a significant relationship between various strategic positioning studied and livelihoods of pastoralists. Statistical tests of ANOVA reveal that the four variables are crucial for livelihoods of pastoralists.

**Table 3: Multiple Regression Analysis**

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

The regression model ( $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \epsilon$ ) therefore becomes;

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

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

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

## **CONCLUSIONS**

The study concludes that most of the areas in Isiolo North Sub-County are frequently struck by drought and water scarcity putting the pastoralists at a great drought disaster. There are drought disaster risk management interventions in the areas. Drought risk is a product of a region's exposure to the natural hazard and its vulnerability to extended periods of water shortage. The most common sources of water in the County are water pans, followed by well then boreholes, river and finally tapped water. The pastoralists didn't obtain any relief to get out of the drought problem, others obtained relief from the authorities, family or own initiatives, and assistance from relatives and from friends residing outside the area.

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

The study further concludes that that drought relief strategy affects drought disaster risk reduction in Isiolo North. The study deduces that the pastoralists are knowledgeable about drought relief strategy and the drought relief strategy on drought disaster risk reduction in Isiolo North has been moderately effective. The drought relief strategy on drought disaster risk reduction in Isiolo North Sub-County is quite effective. From the study findings, it was clear that Veterinary interventions support, preserving fodder for animals, livestock supplementary feeds, controlled grazing and alternative feeding of animals influence drought disaster risk reduction in Isiolo North. Community level dialogue when pursued under the right circumstances is a tremendous instrument for creating and maintaining peace. If we operate with the general assumption that people who talk to each other would rarely fight; or at the very least would not allow misunderstandings to deteriorate into physical confrontation, then ipso facto, maintaining a dialogue between communities should serve the same purpose. At other times they seek the support of government in the form of security as they water and pasture their livestock.

Education and the influence of modernization is also having an impact on the viability and continued relevance of pastoralist. Civil society organizations including religious organizations, women and youth should take a lead in peacebuilding initiatives, explore more traditional and customary of establishing the root causes of conflict hence more attention is given to local problem solving method.

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

## **RECOMMENDATIONS**

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

There is a need to enhance community communication and feedback mechanism in the county. The county information and communication infrastructure was wanting and the available channels of communication do not effectively deliver information to the communities. Further, there is need to the government to strengthen the autonomous adaptation processes of the pastoralists to improve their capacity to cope with and recover from drought. The pastoralists have local communal and household strategies that they use to manage drought and such

mechanisms need to be recognized by the government in planning and policy formulation and implementation. The study recommends that approaches and intervention measures taken by the government be communicated effectively so as to benefit the community as well to save the county and country. Further the study recommended that government should commit itself in distribution of drugs so as to effectively mitigate drought.

The study also recommends that the government of Kenya and development agencies working in the area need to invest in the provision of credit facilities to the pastoralists to assist them in coping with droughts. During good season, the pastoralists can convert some of the stock in to cash and deposit with credit providers. Such cash can be used in the post drought period to purchase animals for restock. The study recommends that water should be availed to all pastoralists. Further, the study recommended that challenges facing management of water and other points of water should fully be resolved to ensure that there is effective supply of water to all without favoritism.

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

## **REFERENCES**

- Abdulfatah, H.S. (2012) Factors influencing implementation of drought mitigation strategies in Kenya: case of Isiolo North Sub-County. Available on: <http://erepository.uonbi.ac.ke:8080/xmlui/handle/123456789/7310>. Accessed on 5<sup>th</sup> May, 2018.
- Action Aid (2012) *East Africa drought*. Available online at: <http://www.actionaid.org/what-we-do/emergencies-conflict/current-emergencies/east-africa-drought>
- Aklilu, Y & Wekesa, M. (2001). *Livestock and Livelihoods in Emergencies: Lessons Learnt from the 1999-2001 Emergency Response in the Pastoral Sector in Kenya*. OAU-IBAR, Nairobi, Kenya.
- Barton, D. & Morton, J. (2001). Livestock Marketing and Drought Mitigation in Northern Kenya. In J Morton (ed.) *Drought, Planning and Pastoralists: Experiences from Northern Kenya and Elsewhere*, NRI, Chatham.
- Blench, R. & Marriage, Z. (2008). *Drought and livestock in semi-arid Africa and the Near East. Introductory essay with annotated bibliography*. Draft - Prepared for circulation at FAO electronic conference Drought and livestock in semi- arid Africa and the Near East.
- Cooper, D.R & Schindler, P.S., (2011), *Business Research Methods* (8<sup>th</sup> edn) New York McGraw-Hill:

- Cordaid & IIRR (2011). Community Managed Disaster Reduction: Experiences from the horn of Africa
- Downing, T.E. & Bakker, K. (2000). Drought discourse and vulnerability. Chapter 45, in Ecology and Society.
- Gallopín, G.C, (2006). Linkages between Vulnerability, Resilience and Adaptive capacity, Global Environmental Change
- Hazell, P, ( 2001) \_Strategies for the Sustainable Development of Dry lands Areas
- Hisdal, H. & Tallaksen, L.M., (2010). Assessment of the Regional Impacts of Drought in Europe. *Drought event definition*. Technical Report No 6.
- Huho, J. & Kosonei, R. (2014) Understanding Extreme Climatic Events for Economic Development in Kenya. *Journal Of Environmental Science, Toxicology And Food Technology* 8(2), 14-24
- Hussein, K. & Nelson, J. (2003) *Sustainable livelihoods and livelihood diversification*. IDS Working Paper 69.
- ISDR Africa Regional Unit, (2007), *Review of Disaster Risk Reduction in Sub- Saharan Africa Region, Disaster Risk Reduction profile of Sub-Sahara African (SSA) Countries*. Draft Report. Nairobi, Kenya.
- ISDR. (2009). *Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters*. Geneva.
- Kanwar, S., (2008) *Local Level Coordination: Good Practices and Tools from the Tsunami Response and Recovery Experience in Tamil Nadu, India*. UNDP, New Delhi.
- Kebebew, F. (2001). Traditional Coping Strategies of the Afar and Borana Pastoralists in Response to Drought. Institute of Biodiversity Conservation and Research Direse Tsegaye, Mekelle University Gry Synnevåg, Noragric. *Dryland Coordination Group Report* No. 11.
- Kirkbride, M. & Grahn R. (2008). *Survival of the Fittest: Pastoralism and Climate Change in East Africa*. Oxfam Briefing Paper 116, August. Oxfam International. Available at <http://www.oxfam.org>.
- Kivaria, K. (2007). Pastoral Coping Mechanism to Drought and Floods. Available at [www.mifngo.go.tz/documents\\_storage/ahn.doc](http://www.mifngo.go.tz/documents_storage/ahn.doc). (Accessed 30th April, 2018).
- Mkutu, K. (2011). Pastoralism and conflict in the Horn of Africa. Africa Peace Forum/Saferworld/University of Bradford, December 2001.
- Morton, J. (2011) *Pastoralism, Drought and Planning: Lessons from Northern Kenya and Elsewhere*. Chatham, UK: Natural Resources Institute.
- Morton, J. & Sear, C. (2005) Challenges for Drought Management in West Asia and North Africa Paper presented to Ministerial Meeting on Opportunities for Sustainable



Investment in the Rainfed Areas of West Asia and North Africa, Rabat, Morocco and forthcoming as chapter of book published by IFAD.

- Morton, J.F., (2007). The impact of climate change on stakeholder and subsistence agriculture.
- Mugenda, O., & Mugenda, G. (2012). *Research Methods: Quantitative and Qualitative Approaches*. Nairobi, Kenya: ACTS.
- Muhuba, H.A. (2013) *An Assessment of Community Based Drought Cycle Management as a Strategy for Disaster Risk Reduction: The Case of Community Drought Cycle Management in Wajir County*. Research Project, Master of Arts Project Planning and Management, University Of Nairobi.
- Musimba S.K. (2014) *Role of Community Participation in Drought Risk Management In Kilifi County, Kenya*. Research Project, Master of Arts Project Planning and Management, University Of Nairobi.
- Ndikumana J., Stuth J., Kamidi R., Ossiya S., Marambii R. & Hamlett P. (2010). *Coping mechanisms and their efficacy in disaster-prone pastoral systems of the Greater Horn of Africa. Effects of the 1995–97 drought and the 1997–98 El Niño rains and the responses of pastoralists and livestock*. ILRI Project Report.
- Nori, M. & Davies J. (2006). *Change of Wind or Wind of Change: Climate Change, Adaptation and Pastoralism*. World Initiative for Sustainable Pastoralism, IUCN.
- O’Meagher, B. (2003). Economic aspects of drought and drought policy. In: Botterill, L.C., & Fisher, M., (eds.), *Beyond drought: People, policy and perspectives*. Australia
- Olukoye, G.A. (2003): Natural resource – use conflicts and management among the Gabra of North Horr Division, Northern Kenya. *Egerton Journal*, 4 (2 & 3): 99-109.
- Olukoye, G.A; W.N Wamicha; J.I Kinyamario; J.I Mwanje & J.W. Wakhungu. (2003) Community participation in wildlife management: experiences, issues and concerns from northern rangelands of Kenya. *African Journal of Range and Forage Science*: 20 (2), 1791 – 1797.
- Orodho, J. A. (2004). *Techniques of Writing Research Proposals and Report* Reata Printers, Nairobi.
- Oxfam (2002) *Evaluation Report of the Drought Mitigation Programme in Wajir, Moyale, Isiolo and Turkana Districts of Kenya, October 1999-March 2001*, Acacia Consultants, Nairobi:.
- Oxfam (2007). *Evaluation Report of the Drought Mitigation Programme in Wajir, Moyale, Isiolo and Turkana Districts of Kenya, October 1999-March 2001*. Nairobi: Acacia Consultants.
- Sandford S. & Habtu Y. (2000) *Emergency response interventions in pastoral areas of Ethiopia*. A report commissioned by the UK Department for International Development.

- Scoones (2001) Drought Planning and Livestock in Southern Zimbabwe" in Morton, J. (ed.) *Pastoralism, Drought and Planning: Lessons from Northern Kenya and Elsewhere*, NRI.
- Scoones, I. (2005). *New directions in pastoral development in Africa*. Pp. 1-36 of *Living with Uncertainty* (ed.) Ian Scoones. London: Intermediate Technology Publications.
- Scoones, I., & Wolmer, W. (2016). *Livestock, disease, trade and markets: policy choices for the livestock sector in Africa*. Institute of Development Studies Working Paper.
- Stockwatch (2012) *Livestock-Related Drought Mitigation Projects in Kenya: Participatory evaluation of social and economic impacts of interventions at the household level: Samburu District*. Stockwatch, Nairobi.
- Thornton, P.K., Jones, P.G., Owiyo, T.M., Kruska, R.L., Herrero, M., Kristjanson, P., Notenbaert, A., Bekele, N. & Omolo, A. (2016). *Mapping climate vulnerability and poverty in Africa*. International Livestock Research Institute, Nairobi, Kenya.
- UNDP (2011). *Factoring Weather and Climate Information and Products into Disaster Management Policy, a Contribution to Strategies for Disaster reduction in Kenya*. Nairobi Kenya.
- UNISDR. (2007). *Words into Action: A guide for implementing the Hyogo Framework*. Geneva: UNISDR.
- Walter, J. (Ed.) (2004) *World Disasters Report 2004: Focus on Community Resilience*. Bloomfield, CT: Kumarian.
- Wamugi, I. & Muchemi, J. (2011) *Strengthening Community Managed Drought Risk Reduction in Northern Kenya and Southern Ethiopia (SCMDRR)- Mapping of grazing corridors for the Garre and Degodia clans in Wajir and Mandera Counties in Northern Kenya and Moyale Dolo Ado, Filtu and Hudet Woredas in Southern Ethiopia*
- Wilhite D.A., (2010): *Drought. A Global Assessment*, Natural Hazards and Disasters Series, Routledge Publishers, U.K
- Wilhite, D. A & Olga (2012) *Drought preparedness in the sub-Saharan Africa context*. *Journal of Contingency and Crisis Management*
- Zwaagstra, L., Sharif, Z., Wambile, A., de Leeuw, J., Said, M.Y., Johnson, N., Njuki, J., Ericksen, P. & Herrero, M., (2010). *An assessment of the response to the 2008/2009 drought in Kenya. A report to the European Union Delegation to the Republic of Kenya*. ILRI, (International Livestock Research Institute) Nairobi, Kenya, 108 p.