

## DROUGHT COPING MECHANISMS IN ARID AND SEMI-ARID LANDS: A CASE STUDY OF CENTRAL DIVISION, ISIOLO DISTRICT, KENYA

**Nelly Ngugi Thurania**

**Student, The Catholic University of Eastern Africa**

**CITATION:** Thurania, N. N. (2013). Drought Coping Mechanisms In Arid And Semi-Arid Lands: A Case Study Of Central Division, Isiolo District, Kenya, *International Journal of Social Sciences and Entrepreneurship*, 1 (3), 208-216

### ABSTRACT

The field excursion focused on investigating, identifying, assessing and analyzing the drought coping mechanisms in arid and semi-arid lands Central Division of Isiolo District was chosen as a case study to illustrate the changes that have taken place in the methods used by the local community in coping with ever present drought conditions. Traditional and modern methods are used as drought coping mechanisms. The effectiveness of both categories of methods is discussed, while alternative measures are suggested. The following were the objectives of the field course: To identify the causes of drought in the spatial and temporal variations of drought. To identify the socio-economic and environmental impacts of drought; To identify and to compare the traditional and modern/contemporary methods of coping with drought; To suggest alternative sustainable methods of coping with drought conditions. Data was obtained from both primary and secondary sources. For primary data observation, informal interviews, lectures and discussions were used as collection tools. For secondary data sources tools used to collect data included newspapers, brochures, DDP plans, textbooks and handouts. The investigation revealed that there were both traditional and modern methods of coping with drought in the Division. However, these could not be fully exploited due to insecurity, time factor, language barrier and poor transport among others. From the information gathered, it was possible to suggest possible recommendation measures which if put in place can reduce vulnerability to drought disaster.

They include; strengthening of the existing early warning systems to capture multi-hazard indicators, establishment of multi-agency disaster rapid response team and strengthening linkages between district and national operation centre. Other measures will entail establishing of contingency funds at division level to facilitate rapid response to disaster, building capacities of local communities through training, awareness creation on the importance of disaster preparedness and support of income generating activities that diversify household income to reduce vulnerability hazards.

*Keywords: Drought, coping mechanisms, arid, semi-arid lands, district, Isiolo, Kenya, vulnerability and diversity.*

## Introduction

The study focused on the drought coping mechanisms in the Central Division of Isiolo District. Drought being a recurrent phenomenon in ASALs has diverse effects on the people living in these areas and on the economy as a whole. Isiolo District falls within the ASALs and the Central Division specifically carries the biggest burden as a result of immigration. It was noted that the causes of drought were both natural and anthropogenic. The central Division is a disaster prone zone. It is vulnerable to hazards such as drought, wild animals, invasion, raids, occasional floods along Ewaso Nyiro river and both livestock and human disease epidemics. The hazards, if left to progress into disaster, would be very costly since massive loss of life is the ultimate outcome. However, if adequate early warning preparedness measures are put in place, the hazards can be prevented from progressing into disasters and the impact of disasters would be minimized.

## Statement of the Problem

The study aimed at drought coping mechanisms. Drought is generally defined as a temporary reduction in water or moisture availability or discrepancies between supply and demand of water. Natural causes include drought defects, sea surface, temperature anomalies (SSTAs) possibly linked to El Niño Southern Oscillation (ENSO) events, poor timing of rains among others. Anthropogenic causes include poor land use practices causing desertification, deforestation

resulting to greater persistence of drought, farming on marginal lands due to population pressures and reduction in the use of traditional drought coping mechanisms due to repeated stress. The study aimed at identifying both traditional and modern methods of coping with the drought in the Central Division then suggests alternatives methods of coping with drought.

### **Literature Review**

Isiolo is one of the thirteen Districts that form the Eastern Province. It borders Marsabit to the north, Garissa and Wajir Districts to the South East and East respectively, Tana River, Nyambene and Meru Districts to the South, Laikipia and Samburu Districts to the West. It is located between longitudes 36°60' and 38°50' East and Latitudes 0°5' and 2° north. Central Division is one of the six Administrative Divisions of Isiolo District. Others include Garbatulla, Sericho, Merti, Oldonyiro and Kiina. Central Division has an area of 1,411 km<sup>2</sup>, four locations and 8 sub locations. The Central Division falls within Isiolo North constituency. The whole district is under Isiolo County Council. Central Division has four wards. The District is hot and dry almost throughout the year with two rainy seasons, that the short and long rains. The short rains occur in October and November while the long rains occur between March and May. The rainfall received in the district is usually scarce and unreliable posting an annual average of 580.2mm. Since rainfall is erratic and unreliable, it cannot support crop farming, hence high food poverty levels. Rain fed crops are grown in the Central Division where black cotton soil can retain some moisture long enough to make short period crops mature. Monsoon winds blow across the District throughout the year, which attain the peak in the months of July and August. This sweeps away all the moisture and evaporation is high, hence reducing humidity. Isiolo District is classified into three climatic zones, namely semi-arid, arid and very arid Central Division experienced semi-arid zone. The annual rainfall in the zone range between 400-650mm. The vegetation is mainly thorn-bush with grass depending on the density of the wood vegetation. Water availability and security influence the population distribution and density. Central division is densely settled due to its well developed infrastructure and being commercial centre.

## **Methodology**

A variety of methods were used to collect data. The most profitable were the lectures given by Ahmed of Alfalah Islamic Centre on drought Management and Mr. Lekakulei of Arid land Resource Management Centre and the Manager of Baraka farm. Informal interviews were conducted with the people of Ngaremara Villages and Bula Pesa slums to establish the traditional drought coping mechanisms. Observation method was used in the Baraka farm, Ngaremara, Turkana villages and General observation of the division. This revealed traditional and modern drought coping mechanisms. Group discussion to consolidate various information gathered in the field. Secondary data sources includes: relevant data from previous research on arid lands in general and Isiolo District and in particular data from other interested stakeholder, for example, DDP plan and textbooks. These provided the archival data for this research.

## **Findings**

### **Causes of Drought in Isiolo District**

Drought is a long period of unusually low rainfall that leads to parching of the ground and withering of vegetation; thus it can develop in few weeks in areas where rainfall is distributed evenly throughout the year. It can also occur in seasons when the onset of the long rains is delayed. In a desert region, drought is described as a succession of unusually dry seasons. Therefore water shortage becomes drought when its consequence causes harm to human beings, domestic and wild animals. Not all water deficiencies are drought, often a drought is declared when it affects the economy. From the foregoing, it is generally agreed that it has reference to prolonged absence of rainfall. Aridity arises from the interaction between the sensitive dry land environments and man's use of the same. Aridity is also due to natural factors. There are two broad categories to the causes of aridity namely: the natural or factors and the human causes. Among the natural causes of aridity in Isiolo District is the distance from the ocean. Isiolo District is far in proximity to Indian Ocean and thus, dry.

Mount Kenya produces rain shadow effects on Isiolo District, which lies on the leeward side. Also seasonal changes in climate, which are expressed in expansion and contraction of dry land belts such that a semi arid region may experience arid conditions at one time and sub-humid conditions at another. Good years lead to accumulation in livestock beyond the capacity of the land. If the subsequent season is lean, catastrophe strikes first because livestock numbers are too many for the available pasture and also due to degradation which results. Livestock also dies in large numbers leaving the pastoral community in desperate need for a means of support. Failure of seasons usually arises from sudden and severe disturbance. Man induces such disturbances. Mans activities in dry land has a lasting effect on vegetation and this adds to aridity. In the Central Division of Isiolo District aridity is a common occurrence because man has penetrated the fragile environment and exploited them without due consideration for their sensitivity and limitation. Human have done this through overstocking which leads to overgrazing and destruction of little vegetation through charcoal burning. Other human causes include poor land use practices causing desertification, farming on marginal lands due to population pressures and reduction in use of traditional coping mechanisms. Drought can be classified as meteorological (shortfall in precipitation measured against regional norms). Hydrological (reduction in catchments and ground water resources). Agricultural (insufficient moisture to maintain plant growth and yields) and socio-economic (shortages of goods and services due to drought). These are manifestation of drought.

### **Spatial and temporal variation of drought**

According to the District Development Plan (2002-2008), drought recurs every other year. However, the cycle of serious drought occurs after every five years. Drought is widespread within the Central Division. However, it is fewer in areas far from the town and Permanent Rivers. Drought is less severe among those living in towns because food is available from the adjacent Meru District at affordable prices. Food becomes more expensive with distance from the town. Those who live along rivers Isiolo and Ewaso Nyiro practice irrigation. Thus the effect of drought is less severe comparatively. Pastoralists who are near the boreholes have an advantage over those living away. However, this is a source of conflict when those who live

away from the boreholes bring their livestock for watering. As a result of these variations, there is a massive migration of people into the town where conditions are between and intra-migrations in search of pasture and water. This contributes to the uneven population in some parts of the districts. Isiolo Town is the only major town in the district and it is located in the Central Division. It draws people from within and without the district; thus high population density. Drought severity varies with time. There are four stages in drought monitoring cycle. They are normal, alert/alarm stage, emergency stage and recovery state. In the normal stage, there are drought preparedness activities such as community capacity building, community capacity vulnerability analysis and contingency planning and community development. In the alert/alarm stage, there are mitigation activities such as animal health activities like de-worming, emergency livestock off-takes, stockpile cereals in remote areas, human health interventions like vaccinations and grazing reserve management. Emergency stage has relief activities like supplementary feeding for vulnerable groups like the elderly, children and pregnant mothers, dry feeding for affected population, rehabilitation of critical boreholes and human health interventions. Recovery stage has reconstruction activities like restocking, rehabilitation of dams and boreholes food for work/cash activities and development of infrastructure. This shows that drought varies with space and time.

### **Socio-Economic and Environmental Impact of Drought**

Economic effects of drought include extensive damage to vegetation and water supply points, lost of livestock, loss of economic growth and development income loss for farmers and pastoralists, increased food prices and losses from tourism. Others include worsening of livestock body condition due to shortage of pasture, reduced milk production due to shortage of pasture and long distance to grazing areas, drop in livestock prices, increased in livestock sales and increased food prices among others. Environmental effects include soil erosion, plant damage, reduction in water quantity and quality, increases in dust and pollutants and pests outbreaks. Among the social effects are food shortage malnutrition and famine, loss of human lives health problems, increase in communicable diseases, decline in living conditions, population migration and conflicts over resources especially pasture and water.

## Conclusions

The aim of the field study was to identify the drought coping mechanisms in the central division of Isiolo district. Both traditional and modern methods of coping with drought were noted. It was also noted that the problem of ASALs requires integrated approach because none of these drought coping mechanisms can be viable alone. The level of poverty in the area is very high. Drought partly contributes to this poverty but there are other contributing factors as well. This has made the inhabitants result to illegal activities like commercial sex, begging and engaging in illegal brews. This was particularly noted in the Bula Pesa and Bula Bao slums.

## Recommendations

The measures are both short term and long term and are aimed at proper management of resources. Grazing practices that allow vegetation to recover need to be adopted. However, whatever strategy is used mobility and flexibility must not be interfered with. Measures to rehabilitate such area include:-

- i. Secluding pastureland for the dry season. This can be achieved by practicing transhumance
- ii. As far as possible, livestock variety should be diverse. This ensures different riches are used. It also increases chances of a farmer being left with some stock when drought strikes. Efforts should be made to protect areas in rangeland subjected to frequent stock movement. Such protection can be by means available and affordable and mutually agreed upon by the inhabitants.
- iii. Dams and watering troughs, where common passages are used destruction is likely to be by browsing and trampling. To avoid degradation such watering points may be developed and deliberately dispersed to spread the risk and avoid concentration.
- iv. Ultimately, destocking may be necessary at times when stock numbers exceed the capacity of the land to sustain them. This calls for an efficient transport network and markets.

- v. Proper use of agricultural land needs to be taught to farmers using demonstration farms and extension services.
- vi. Farmers should be guided in selection of suitable crop varieties or those that can resist salinity.
- vii. Studies and research on land potential should be done to establish the land carrying capacity. Such information is useful and can help in adjustment of livestock numbers, crop choice and intensity. All usage of the semi-arid areas must recognize the limits imposed by rainfall amounts as well as the soil types.
- viii. Wind erosion, which blows away soils, can be encountered by planting shrubs and trees to form shelter belts. These reduce the wind speed and also protect open fields from erosion by wind.
- ix. Land registration gives ownership rights to individuals encouraging them to take responsibility of their own acts. Communal ownership does not encourage good land use.
- x. Drought management efforts should be given the necessary political support, which would in turn avail the required resources for funding conservation programmes. The government should imitate programmes for conservation, monitoring and evaluation as well as required equipments to combat drought.
- xi. Some features must be maintained such as pastoralist, must continually migrate to allow regeneration and avoid overuse of pasture.
- xii. Measures should be put in place to overcome human/wildlife conflict. Protection of people and property will be done through formation of wildlife management committees, translocation of dangerous animals like elephants and construction of wildlife barriers.
- xiii. Benefits from wildlife revenue should reach the grassroots in a way of schools, health facilities and infrastructure. Such benefits allow pastoral communities to take the responsibility in conservation.
- xiv. There is need to educate people on the importance, potential usages and misuse of the environment. The consequences of their herds through overgrazing must be made clear. Research data must be gathered constantly with a view to detect changes in climate and environment. Such information should then be communicated to the communities.



- xv. Diversification of activities. Other than solely relying on animals, inhabitants can take up other activities like quarrying, agro forestry and trade.
- xvi. From the above analysis, it is clear that neither of the two methods is sustainable or viable independently. There is need to incorporate traditional methods of coping with drought in the modern approach to drought, although the two may conflict.

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