

Perceptions of drought and their impact on rural development:
A Study of Central Division, Kitui District, Kenya

By

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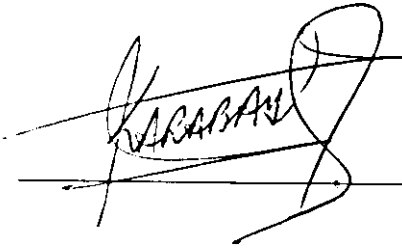


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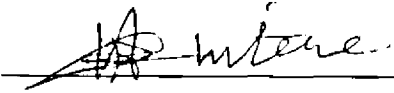
Declaration

This Project Paper is my original work and has not been submitted in any other University for the award of a degree.


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Dedication

To my wife, Hilarie NIZEYIMANA and my daughters AUDREY and ISABELLE, a constant source of quiet strength

Abstract

The research on which this project paper was based meant to study the local perceptions of drought and their impact on rural development in Central Division, Kitui District, Kenya. These perceptions of drought were assessed in the light of socio-economic and demographic factors. The ways through which local communities respond to drought as disaster were identified and the impact of the drought perceptions analyzed.

To capture the local perceptions, this study employs the theoretical models of Symbolic Interactionism, Social Conflict, and Disaster Management due to their presentation of reality as it is constructed by the actors. The data for the study were collected using the survey methods of semi-structured interviews, key Informant interviews and review of secondary data. The interview was the main technique of data gathering. A total of 80 households were interviewed. Of these, 44 (55%) were headed by men and 36 (45%) by women. Sampling was done using Simple Random Sampling technique. Both descriptive and inferential statistics were used in data analysis.

Majority of the respondents (67.50%) were aware of drought and 56.25% perceived the frequency of the drought occurrence to be once in every 3 or 4 years. Drought and hunger were not inseparable concepts. Thus, drought was taken as hunger or famine. The study found three categories of perceived causes of drought and the main factors contributing to this categorization were the level of education and religion. The awareness of drought was found associated with frequency of drought occurrence, experience with drought and respondents' monthly income. Pro-active and reactive actions were identified as responses to drought and while all the pro-active responses were associated with the experience with drought none of the reactive responses to drought was found to be related to the experience with drought.

The study shows an enhanced awareness of the need for more concerted drought management and preparedness measures. Increase in the drought hazard is attributed to the increased frequency and severity of drought as well as an increased societal vulnerability to drought and somehow a combination of the two.

The study concludes that the drought impact is a function of people's vulnerability. Although these people cannot do away with drought as a natural hazard, a lot of sensitization must be done about eliminating those they cause, minimizing those they exacerbate, and reducing their vulnerability to most. Accordingly, three recommendations were formulated.

First, in order to facilitate further research towards drought risk reduction, the study recommends comparative studies of the perceptions of drought to be conducted in other drought prone areas and more detail studies of women's and men's contribution to drought risk reduction to strengthen the gender angle in understanding and dealing with drought.

Secondly, training end users about the value of the information from early warning system in decision making was recommended for drought management policy with promotion of and support to pro-active measures. A vulnerability profile should be seen as an invaluable tool in assessing risk and should be taken as part of drought preparedness planning.

Finally, the study recommends to local communities, to organize themselves to solve their water problems and thus fight poverty resulting from the local perceptions of drought. For as long these communities continue to believe that the responsibility of tackling this poverty lies in the hands of the government, poverty levels among them will remain high. An integrated local development approach based on community-driven priorities and processes should guide the change agenda in Kitui and other ASALs.

Table of content	Pages
Title	i
Declaration	ii
Dedication	iv
Abstract	v
Table of contents	vii
List of tables	x
Abbreviations	xiii
Acknowledgements	xiv
Chapter 1: INTRODUCTION: The drought hazard	1
1.1. BACKGROUND	1
1.2. PROBLEM STATEMENT	5
1.3. OBJECTIVE OF THE STUDY.....	6
1.4. RATIONALE	6
1.5. SCOPE OF THE STUDY	8
1.6. LIMITATIONS OF THE STUDY	9
1.7. DEFINITIONS OF THE KEY TERMS	9
Chapter 2: LITERATURE REVIEW	10
2.0. INTRODUCTION	10
2.1. VARIATION OF DROUGHT PERCEPTIONS	12
2.1.1. Definition of drought	13
2.1.2. Perceptions of drought	14
2.1.3. Responses to drought	15
2.2. RURAL DEVELOPMENT SITUATION	16
2.3. IMPACT ON RURAL DEVELOPMENT	18
2.4. THEORETICAL FRAMEWORK	20
2.4.1. Symbolic Interactionism Theory	20
2.4.2. Social conflict Theory	21
2.4.3. Disaster Management Theory	22
2.4.4. Application of the theories	23
2.4.5. Conclusion	24
2.5. STUDY HYPOTHESES	24
2.6. OPERATIONAL DEFINITIONS OF VARIABLES	25
2.6.1. Hypothesis 1	25
2.6.2. Hypothesis 2	26
2.6.3. Hypothesis 3	27

Chapter 3: RESEARCH METHODOLOGY	29
3.0. INTRODUCTION	29
3.1. SITE SELECTION AND DESCRIPTION	29
3.1.1. Climate and land use	31
3.1.2. Major droughts experienced in Kitui district	31
3.1.3. Demographic profile	32
3.1.4. Units of analysis	32
3.1.5. Units of observation	33
3.2. SAMPLING	33
3.2.1. Sampling at the District level	33
3.2.2. Sampling at the Division Level	34
3.2.3. Sampling at the location level	35
3.2.4. Sampling at the sub-location level	35
3.2.5. Sample size	36
3.3. DATA COLLECTION	36
3.3.1. Semi-structured Interviews	37
3.3.2. Observation	37
3.3.3. Informal interviews	38
3.3.4. Key Informants	38
3.4. DATA ANALYSIS	39
3.4.1. Descriptive statistics	39
3.4.2. Inferential statistics	40
Chapter 4: PRESENTATION OF DATA AND FINDINGS	41
4.0. INTRODUCTION	41
4.1. SOCIO-ECONOMIC CHARACTERISTICS OF THE RESPONDENTS	41
4.1.1. Distribution of respondents by sex	41
4.1.2. Distribution of respondents by age group	42
4.1.3. Distribution of respondents by Religion	43
4.1.4. Distribution of respondents by Level of education	43
4.1.5. Distribution of respondents by marital status	44
4.1.6. Distribution of respondents by household size	45
4.1.7. Distribution of respondents by occupation	46
4.1.8. Distribution of respondents by monthly income	46
4.2. PERCEPTIONS OF DROUGHT	47
4.2.1. Awareness of drought	48
4.2.2. Experience with drought	48
4.2.3. Perceived advantages of settlement	51

4.2.4.	Frequency of drought occurrence	52
4.2.5.	Decision making on action to be taken	53
4.2.6.	Perceived causes of drought	53
4.2.7.	Prediction of drought hazard	56
4.2.8.	Responses to drought	57
4.2.9.	Impact of drought perceptions	63
4.3.	HYPOTHESES TESTING	64
4.3.1.	Hypothesis 1	64
4.3.2.	Hypothesis 2	95
4.3.3.	Hypothesis 3	99
4.3.4.	Conclusions	114

Chapter 5: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS..... 115

5.0.	INTRODUCTION	115
5.1.	SUMMARY OF FINDINGS	115
5.1.1.	Socio-economic and demographic characteristics of the respondents	115
5.1.2.	Perceptions of drought	116
5.1.3.	Factors contributing to drought perceptions	117
5.1.4.	Responses to drought	117
5.1.5.	Impact of drought perceptions on rural development.....	118
5.2.	CONCLUSIONS	118
5.3.	RECOMMENDATIONS	119
5.3.1.	Recommendations for further research	119
5.3.2.	Recommendations for drought management policy.....	120
5.3.3.	Recommendation for local community	122

BIBLIOGRAPHY	123
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APPENDIX: Questionnaire

Table 4.33: Relationship between perception of natural causes accentuated by human interference and level of education.....	78
Table 4.34: Relationship between perception of natural causes accentuated by human interference and marital status.....	79
Table 4.35: Relationship between perception of natural causes accentuated by human interference and household size.....	80
Table 4.36: Relationship between perception of natural causes accentuated by human interference and occupation.....	81
Table 4.37: Relationship between the perception of natural causes accentuated by human interference and experience with drought.....	82
Table 4.38: Relationship between perception of natural causes accentuated by human interference and monthly income.....	83
Table 4.39: Relationship between perception of natural causes accentuated by human interference and personality.....	84
Table 4.40: Relationship between perception of drought as an act of God and sex.....	85
Table 4.41: Relationship between perception of drought as an act of God and age group.....	86
Table 4.42: Relationship between perception of drought as an act of God and religion....	87
Table 4.43: Relationship between perception of drought as an act of God and level of education.....	88
Table 4.44: Relationship between perception of drought as an act of God and marital status.....	89
Table 4.45: Relationship between perception of drought as an act of God and household size.....	90
Table 4.46: Relationship between perception of drought as an act of God and Occupation.....	91
Table 4.47: Relationship between perception of drought as an act of God and experience with drought.....	92
Table 4.48: Relationship between perception of drought as an act of God and monthly income.....	93
Table 4.49: Relationship between perception of drought as an act of God and Personality.....	94
Table 4.50: Summary of the test of hypothesis 1.....	94
Table 4.51: Relationship between awareness of drought and frequency of drought.....	95
Table 4.52: Relationship between awareness of drought and experience with drought....	96
Table 4.53: Relationship between awareness of drought and level of education.....	97
Table 4.54: Relationship between awareness of drought and monthly income.....	98
Table 4.55: Relationship between awareness of drought and occupation.....	98
Table 4.56: Summary of the test of hypothesis 2.....	99
Table 4.57: Relationship between praying to God to give adequate rains and experience with drought.....	100
Table 4.58: Relationship between cultivating subsidiary food crops and experience with drought.....	101
Table 4.59: Relationship between constituting a food stock and experience with drought.....	102
Table 4.60: Relationship between planting drought resistant crops and experience with drought.....	103
Table 4.61: Relationship between going elsewhere to share cropping with relatives or friends and experience with drought.....	104

Table 4.62: Relationship between going elsewhere to find a job as an agricultural labourer and experience with drought.....	105
Table 4.63: Relationship between evacuating the area and experience with drought	106
Table 4.64: Summary of the test of hypothesis 3 (Pro-active responses).....	106
Table 4.65: Relationship between waiting for a free ration and experience with drought.....	107
Table 4.66: Relationship between using food reserve and experience with drought	108
Table 4.67: Relationship between borrowing food from relatives and experience with drought.....	109
Table 4.68: Relationship between asking for loan from institution or private individuals and experience with drought.....	110
Table 4.69: Relationship between reducing household expenditure and experience with drought.....	111
Table 4.70: Relationship between collecting bush food for sale and experience with drought.....	112
Table 4.71: Relationship between selling some of the household assets and experience with drought.....	113
Table 4.72: Summary of the test of hypothesis 3 (Reactive responses).....	114

Abbreviations

ASALs	:	Arid and Semi Arid Lands
CBOs	:	Community Based Organizations
DFRD	:	District Focus for Rural Development
FEMA	:	Federal Emergency Management Agency
FFS	:	Farmer's Field Schools
GDP	:	Gross Domestic Product
IEA-Kenya	:	Institute of Economic Affairs
ISDR	:	International Strategy for Disaster Reduction
KDDP	:	Kitui District Development Plan
NGOs	:	Non-Government Organizations
SASOL	:	Sahelian Solutions
SRDP	:	Special Rural Development Programme
UN	:	United Nations
UNDRO	:	United Nations Disaster Relief Organization
UNESCO	:	United Nations Educational, Scientific and Cultural Organization

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The responsibility for the presentation of the contents and the style of the report, however, rests with the author.

Chapter 1

INTRODUCTION: The drought hazard

1.1. BACKGROUND

Drought is one of the most serious environmental hazards facing global societies. Droughts develop from a complex interaction of factors including land uses, water management practices, weather and human activity. The impact of drought stretches across national boundaries and through a variety of global ecosystems; with greater or lesser frequency its impact is felt around the world.

Zimbabwe, for instance, together with some of the southern Africa bloc has experienced droughts in the recent past. This culminated in the 1991/92 drought, which had a most crippling effect over much of the sub-region with many countries from central Zambia through central Malawi and Mozambique southwards having seasonal deficits of up to 80 per cent of normal rain. This coincided with the beginning of a long-life mature El Nino (1991-95).

The nature of drought impact varies considerably. In highly industrialized societies such as England, the United States of America, the impact is usually measured merely in economic terms as results of reduced domestic and industrial water supplies, increased food costs, reduced sales of agricultural machinery and reduced activity in agricultural service industries. In less industrialized societies like Kenya, the impact is measured in more complex terms. Socio-economic losses may be higher with rural population at risk from shortfalls in domestic water supplies, failure of essential food crops and death of vital livestock resources (Tennakoon, 1986). Although its role may be exaggerated, there is no doubt that the drought continues to contribute to the incidence of famine around the world.

Studying the magnitude of and solutions to drought and famine in Kenya, Wisner and Mbithi (1972) argue that drought losses are of four types, namely: the losses to the government, production loss to the nation, social cost, and retardation of rural development.

The government incurs losses when it is required to provide relief to the drought victims (Wisner and Mbithi, 1972). The government may also incur losses due to lowered direct taxation of wealthy farmers during the period of drought losses and that the state income accrued through indirect taxation also could fall appreciably. Fall in domestic production reduces exports and the demand for imported consumer as well as capital goods would fall because of the fall in farmer's income. Hence, the revenue from export and import duties charged tend to fall (Tennakoon, 1986).

The production losses occur both in the rich and poor countries due to drought. The rich countries, however, would be able to withstand such losses and as such the production losses in those countries may not be that serious. However, in poor countries where there are recurrent food shortages even in years of successful farming, production losses caused due to drought would seriously strain the food supply.

During the drought period, plants wither or bear a fraction of their normal harvest. Because of the acute shortage of grass, fodder and water, cattle lose weight, do not bear calves and even die in considerable numbers in the rural areas. Thus, return to the investment of money and labour in agricultural becomes disappointingly low. As Wisner and Mbithi (1972) point out, these losses retard the economic progress of a nation and after the cessation of a drought; the government and the farmers have to incur heavy expenses on investment to bring the economic activities back to normal.

According to Tennakoon (1986), "the social cost cannot be determined immediately after a drought". Its effects are often felt long after the recession of a drought

mostly by ways of nutritional deficiencies and nutritionally related diseases weakening the quality of labour available in the already undernourished poor countries. Such drawbacks could only be somewhat avoided at a very high medical cost. It is also necessary to mention that the nutritionally related diseases in the families and the resulting labour inefficiencies among the family members often cause long lasting family and kinship stresses from need for mutual help, notably during the peak seasons of agricultural activities.

Unlike in developed countries, in the Third World countries where the population is overwhelmingly rural with very poor agricultural development means, it is difficult to plan a large-scale development in general especially for rural areas. Hence, when the above three types of costs are heavy, notably the direct costs and the social costs, rural development tends to be retarded and that itself is a cost to the nation concerned.

Kenya has experienced several kinds of disasters. The country has a recorded history of disasters dating back to 1899, which until recent times present a definite pattern of occurrences. Disasters that hit Kenya in the last 30 years came from a diversity of hazards, such as droughts, fires, floods, terrorism, collapsing buildings and accidents in the transport industry. It is evident that most of the disasters that have occurred in Kenya are related to extreme climate events, improper land use and professional negligence (National Policy on Disaster Management, 2001).

Drought is a recurrent phenomenon that affects large areas and numbers of people in Kenya. According to the National Policy on Disaster Management (2001), the cumulative effects of these droughts include the erosion of assets, decreasing ability to cope with future droughts, impoverishment of rural communities and depletion of the government coffers. It is, therefore, a priority to the government to strengthen suitable drought preparedness, mitigation and responses structures and activities.

Roughly five times more food had to be brought into southern Africa than that delivered to the Horn of Africa during the famine of 1984-85. The sub-continent, usually a food exporter, had to import 11.6 million tons of food worth over US\$ 4 billion producer and an additional US\$ 200 million of non-food items such as medicines. Regional grain production fell some 60 per cent short of expected levels. There was a virtual collapse of industries since both water shortage and hydropower failures were frequent. The drought therefore led to widespread suffering with loss of cattle and crops (Shumba, 2000).

The 2001 draft paper of the Kenyan National Policy on Disaster Management notes that the effects of drought have become more pronounced in recent decades. For example, in the year 1991/1992, drought in the arid districts led to livestock losses of up to 70 per cent of herds and unprecedented high rates of child malnutrition of up to 50 per cent. During this drought period, 1.5 million people in seventeen arid and semi-arid districts of four provinces received relief food assistance. The 1995 and 1996 rains led to another drought situation, which affected an estimated 1.41 million people. The worst drought emergency in recent years affected the Central, Eastern, Rift Valley, Coast and North Eastern Provinces, with 4.4 million people requiring food assistance in the year 2000. Some of the major causes of drought are deforestation, extreme climate events and improper land use, which threaten the environment and people's livelihoods.

Surprisingly, the traditional view continued to hold that natural disasters among which the drought, are considered as 'acts of God', unpredictable and inevitable. All that could be done was to rescue, relieve and assist the survivors of disasters to re-establish a normal life as soon as possible. Although nothing can be done to prevent natural events, it has been realized that there is much that can and should be done to protect life and property against them. These natural phenomena become hazards when

they pose a threat to persons and property. Ian Davis and Michael Wall (1992) define a disaster as “the impact of a natural phenomenon happening on a population which is in a weak position to handle the effects of such a crisis, causing disruption, damage and casualties”. Therefore, we can prevent or resist to these threats and even live with them if we know how to handle them.

1.2. PROBLEM STATEMENT

In a pre-industrial, pre-literate and very backward rural community, the resource-users in encountering drought do everything in their power to mitigate the negative effects of drought or to adjust to it (Roder and Dupree 1974). When people feel and observe drought and suffer from its effects, they begin to think of drought, attempt to determine its magnitude and even try to understand its causes. They attempt to interpret their sensory situations connected with drought as meaningfully as possible in keeping with the real world situations.

Concerning drought, Saarinen (1966) points out that each person affected by it is likely to have a different conception of it, depending on his/her vital interests and the effect of drought on those interests. Thus an agriculturalist, a meteorologist, a hydrologist, a sub-urban dweller, an economist and even a lay person would not perceive drought in the same way. Each of them would have a different perception, but in all these cases there would be overlaps.

The lay perceptions of drought are rarely studied. Yet this affects people's response mechanisms. Studies of drought for instance Wilsner and Mbithi (1972), Tennakoon (1986) and National Policy on Disaster Management (2001) tend to focus on the modern scientific aspects of drought. This study of Central Division, Kitui District in Kenya, will depart from this tradition and answer the following questions:

- (1) What are the local perceptions of the drought?
- (2) What are the socio-economic and demographic factors influencing those perceptions?
- (3) In what ways do people respond to drought as a disaster?
- (4) What are the impacts of these perceptions and responses to the overall rural development?

1.3. OBJECTIVE OF THE STUDY

The main objective of this study is to study the local perceptions of drought disaster and their impact on rural development. The specific objectives are:

- (1) To assess the local perceptions of drought and their related factors;
- (2) To investigate the socio-economic and demographic factors explaining the perceptions in question;
- (3) To identify the ways through which people respond to the drought;
- (4) To analyze the impacts of the drought perceptions and responses on the overall rural development.

1.4. RATIONALE

This study is deemed important and justified in a number of ways. The problem of drought hazard has not only been a cause of great suffering for the communities but has also acted as critical pace setter in the development of rural areas. This study contributes to the knowledge in disaster management since it highlights the shift from drought relief to drought mitigation. Drought relief is the ending or lessening of destructive effects that are caused by drought. It is a short-term measure as it provides an immediate and temporary solution. In most cases, drought relief is provided in emergency situations and targets the

most vulnerable. However, in drought mitigation, people are making the effects of drought less intense by introducing long-term sustainable measures. The drought mitigation advocates for awareness creation to the target group and this results in change in attitudes and ultimately practices. Therefore, drought mitigation is more permanent as it provides a long-term practical solution (SAFIRE- Zimbabwe 2000).

Other revelations drew the curiosity of research in Kitui district. Kenya is primarily an agricultural country. Agriculture constitutes a shrinking, but important, 25 per cent of Kenya's Gross Domestic Product (GDP). Much of the intermittent strength and overall weakness in GDP and income growth in Kenya can be attributed to changes in agricultural performance (IEA-Kenya 2001). Kitui district's ability to feed herself is being over-stretched by the high rates of population growth (Kitui Development Plan 1989).

Importantly, the Newsweek dated 20th May 1991 reported that there is much talk about 'disaster fatigue' where Western donors are less enthusiastic about unending food aid in drought ridden countries with less signs of progress towards self-sufficiency. This call also for a greater need to examine how aid agencies are mobilizing local resources to build local capacity to cater for food and other basic needs in drought prone-areas.

Ghai ed. (1979) notes that Eastern Province, where Kitui falls, displayed one of the highest incidence of both severe and moderate protein energy malnutrition. According to the IEA-Kenya (2002), 42 per cent of the children under 5 years are malnourished and out of 1,000 babies, 66 die before their first birthday. Health services are situated far from many of the district's residents and 42 per cent of them take more than one hour to get to a dispensary.

Last but not least, this study constitutes an invitation to link disasters and development and to perceive development from the very specific perspective of essential

needs. There is a need of finding out why not implement development plans that will insure the continuous coverage of these needs and prevent populations from falling victims to disasters at regular intervals. From this point of view, Ian Davis and Michael Wall (1992) point out that a development process can be defined as giving the largest possible number of people access to security, food, healthy environment, and health. The findings of this study will be a guideline to development agencies working on drought issues, especially in the arid and semi-arid lands.

1.5. SCOPE OF THE STUDY

The overall objective of the research was to study the local perceptions of drought and their impact on rural development. The field research was carried out in two Sub-locations, Tungutu and Mbusyani of the Changwithya West Location in Central Division of Kitui District. The personal characteristics of the respondents, that is, the sex, age, level of education, marital status, household size, occupation, and monthly income were studied. Also included in the study are the experience with drought, awareness of drought, preparedness and mitigation of drought.

In this regard, the emphasis was lead on four main issues. First, the observation of the environment that includes natural conditions as in land, air and water and the circumstances of social life such as beliefs, values, gender-related tasks and expectations considered as part of the environment as they are seen having a bearing on people's lives. Secondary, it was the investigation of the factors that influence the perceptions in question. Thirdly, it was the analysis of the indigenous knowledge about the drought. Finally, there was the identification of different ways through which local people respond to the drought hazard.

1.6. LIMITATIONS OF THE STUDY

Despite the fact the study was done satisfactorily, it has some limitations. The main difficulty was the long walking distance between households even if the sample of 80 households in relation to the thousands in Central Division seems rather small. A larger sample would have probably generated more dependable data.

Since people in the study area did not do any bookkeeping, figures obtained on monthly incomes were mainly verbal. These could have been either exaggerated or deflated. We had to rely on estimates.

It is possible that some respondents identified themselves with a Christian Church to appear modern and conform to general expectations. It is also possible to have people who hold traditional beliefs and also consider themselves members of a certain Christian faith. What the respondents claimed to be the religion affiliation of their respective households was simply taken as such. As Moser and Kalton (1971:45) argue, every stage of the survey process is a potential source of error be it sampling, interviewing, drafting of questions, editing, tabulation and analysis.

1.7. DEFINITION OF THE KEY TERMS

The following are definitions for terms that appear within this study. Several of these terms have other definitions that are commonly used elsewhere depending on the discipline or perspective. The definitions given hereafter have been tailored to the natural hazard of drought by the FEMA (1997).

- (a) **Environment:** This includes natural conditions as in land, air and water. The circumstances of socio-cultural life such as beliefs, values, norms, gender-related tasks and expectations are also considered as part of the environment as they are seen as having a bearing on people's lives.

- (b) **Vulnerability:** Characteristics of populations, activities, or the environment that make them susceptible to the effects of drought. The degree of vulnerability depends on the environmental and social characteristics of the region and is measured by the ability to anticipate, cope with, resist, and recover from drought.
- (c) **Drought:** Is a deficiency of precipitation from expected or normal that when extended over a season or longer period of time, is insufficient to meet demands. This may result in economic, social, and environmental impacts. It should be considered a normal, recurrent feature of climate. Drought is a relative, rather than absolute, condition that should be defined for each region and each drought differs in intensity, duration, and spatial extent.
- (d) **Perceptions:** this term is taken to mean awareness, views and feelings. It denotes a way of understanding and seeing. It also includes knowledge or realization of current events or situations. The researcher's basic premise is that in every locality, there exists some knowledge of things or phenomena in general. This information is unique to certain places and may not necessarily be similar to existing scientific knowledge. In this study, the focus is on how local people in Kitui District can identify the drought in their region and whether they link it to personal characteristics.
- (e) **Perceptions of drought:** The ability to identify and give the threat characteristics of a drought hazard in the area and link them to the total natural and induced environment. These perceptions may not necessarily concur with those scientifically defined.
- (f) **Awareness of drought:** It is the acquired knowledge of the drought characteristics and effects leading to development of own, indigenous or modern preparedness and strategies based on longstanding experiences of living with drought. That may

be water harvesting and conservation, enhancing biodiversity, storage of food, saving of money and drought tolerant varieties of indigenous crops.

- (g) **Drought impact:** It is a specific effect of drought. People also tend to refer to impacts as consequences or outcomes of drought. These impacts are symptoms of vulnerability.
- (h) **Mitigation:** Short and long term actions, programmes, or policies implemented in advance of drought, or in its early stages, to reduce the degree of risk to people, property, and productive capacity.
- (i) **Preparedness:** Pre-disaster activities designed to increase the level of readiness or improve operational capabilities for responding to drought emergency. It is itself a mitigation action.
- (j) **Response:** Actions taken immediately before, during, or directly after a drought to reduce impacts and improve recovery. Response measures are an important part of drought preparedness but should only be one part of a more comprehensive mitigation strategy.

Chapter 2

LITERATURE REVIEW

2.0. INTRODUCTION

Drought has been said to be one of the causes of a decreasing food production in Kenya (IEA-Kenya 2002). According to Tennakoon (1986), drought did not become an important subject of research until Saarinen systematically inquired into resource-users and resource-managers' perception of and adjustment to drought in the Great Plains in 1966. Thereafter, several attempts were made in Australia, in India, Africa and Central America to study systematically the problem of drought. Some of the cross-cultural studies of natural hazards, including drought, undertaken during the early 1970s and based upon similar techniques, were discussed at the 22nd International Geographical Congress held in Calgary in 1972 under the aegis of Commission on Man and Environment. However, this chapter attempts to provide some analytical review of different scholars' observations in their study about perceptions of drought.

2.1. VARIATION OF DROUGHT PERCEPTIONS

Quoting Taylor, Stewart and Downton (1988), Tobin and Montz (1997) define perception as 'the range of judgments, beliefs and attitudes' that individuals hold. However, behaviour and actions result from these judgments, beliefs and attitudes that Tobin and Montz (1997) refer to as cognition. If a given behaviour depends on the perceived environment, psychological and sociological issues must be incorporated in our analysis. Importantly, there are situational variables that include those related to physical characteristics of the hazard over which the individual tends to have little control as well

as socioeconomic factors that may define the circumstances and sometimes the boundaries in which an individual finds himself/herself.

White (1974) proposed that variation in perception and estimation of danger could be accounted for by the magnitude and frequency of an event, recency and frequency of personal experience, significance of the hazard to the income interest, and personality traits. Thus, situational factors can be subdivided into those associated with the physical environment and those associated with socioeconomic environment in which individuals operate. Cognitive factors can be subdivided into personality or psychological factors that influence perception and attitudinal factors that influence expectations.

2.1.1. Definition of drought

Definition of drought poses one of the most difficult and complex problems in drought hazard research (Tennakoon, 1986). Most natural hazards other than drought have distinct duration and extents that they cover. Their onset is rapid and their intermission and or final cessation are also distinct. On the contrary, these aspects are at least much less clear in drought hazard. 'The beginning, the end, the duration of existence, and the extent of drought are all too uncertain' (Saarinen, 1966). They are not even accepted by all those affected by it. Therefore, each person may have a different concept of drought, 'depending on his/her location, his vital interest and the effect of drought on these interests' (Saarinen, 1966). Then, drought means different things to different people' (Heathcote, 1969). There is no doubt that the definitions easily acceptable to all are difficult to make.

Rathjens (1971) is one scholar who has shown that man's reckless interference notably with arid zone vegetation and its consequences such as lowering of groundwater table, increase in mineral salt in surface soils, reduction in soil humidity, deterioration of grazing land and damaging soil erosion increase the drought effects.

Murton (1972) shows that when natural vegetation is destroyed due to the increasing population pressure on land, even with extensive reforestation, it is difficult to get anywhere near the restoration of original vegetation and this increases the severity of drought.

Views on how frequently drought occurs and when it occurs how serious it is, vary very widely from individual to individual within the same community and from community to community (Tennakoon, 1986). Sometimes, what people said to be drought periods in the past may not be really reflected in the rainfall regimen of the same period with respective areas.

It is revealed that in technologically advanced countries even the farmers in the high drought risk areas tend to deny drought as a major or frequent threat to their activities. They would consider it only as a kind of hindrance but controllable by system and careful farm management (Heathcote, 1972).

Therefore, it would follow that given two areas with more or less similar drought intensity, in the area which is occupied by a technologically advanced society, the resource use would be more efficient than in the other area which is occupied by technologically less advanced society. However, denying the threat of drought even by a technologically advanced society may not be the most effective strategy.

Summing up all these ideas in the context of this study, drought is seen as 'a condition of climatic dryness that is severe enough to reduce soil moisture and water below the minimum necessary for sustaining plant, animal, and human life'

2.1.2. Perceptions of drought

A prevailing issue in natural hazards research has been to understand those factors that influence individual perception of natural hazards, with an eye toward understanding and

influencing or guiding responses and actions (Tobin and Montz, 1997). However, the physical environment, the socioeconomic climate, and psychological characteristics all influence the perceived world in one way or another. Thus, Tobin and Montz combine psychological variables with attitudinal characteristics in a set they term 'cognitive factors' which includes personality characteristics that influence one's propensity to take or avoid risk. Another set of 'situational factors' complicates an individual's range of choices and according to White (1974), these situational factors include a person's physical location in relation to the hazardous area as well as income, age, and social system factors that may affect a person's ability to undertake specific actions.

Tennakoon (1986) shows that there are many factors that condition the variation of drought perceptions such as experience of living and working within the drought zones; recency of experience of living and working outside the drought areas; perceived advantages of settlements; varying aridity of settlements within the drought areas; frequency, magnitude and recency of drought experienced; location of activities of vital interest; lack of alternative opportunities; lack of high ratio of reserves to potential loss and the drought losses incurred.

2.1.3. Responses to drought

2.1.3. Responses to drought

People are adaptable and likely to take constructive action as the need dictates. This does not mean that major problems may not exist, that planning is not required, that people necessarily know the safest or the most appropriate response to take, or that assistance from outside the community is not helpful or required.

Adjustments to drought are often categorized in two ways in contemporary drought hazard literature (Tennakoon 1986). One method is in terms of the affected persons' level of technological efficiency of coping with drought. Accordingly, the

adjustments are to be folk or pre-industrial, the modern or technological, and the comprehensive or industrial (Kates 1970).

The other method followed is to classify them as those which affects the basic causes of hazards, modify the hazard effects, modify the loss potential of man and his work, and deals with recurrent losses by simply sharing them with others (Berry et. al., 1987). Wisner and Mbithi (1972) offer a similar classification. Its five types are those affecting the rainfall sources, increase moisture availability to crops, reduce moisture needs, accept or ensure one-self against losses, and distribute or share losses.

It is important to underline the fact that adjustments to drought in drought-prone area do not end immediately after the cessation of the drought. The people affected by drought losses need to recover. A new life has to be started with these resources again to face a drought, for they know for certain that drought will come again sooner or later though they do not know exactly when.

2.2. RURAL DEVELOPMENT SITUATION

In Kenya like in many other African countries, there is need to constantly search for better approaches to meet the acute needs of rural areas. Hunter (1966) argues that rural development must have first priority in the plans of developing countries simply because the misery is most pressing in rural areas. Mbithi (1972) quotes the Sheffield's definition of rural development as " a multi-sectoral inter-ministerial coordinated set of action programmes aimed at improving incomes, the welfare and employment opportunities of rural people".

From the traditional quantitative measures of poverty, the overall poverty line has been calculated by summing the food expenditure level that brought about a requisite food energy intake, which, according to the Ministry of Finance and Planning

(2000), was previously identified as 2,250 Calories, and an allowance for non-food expenditure. The Ministry of Finance and Planning (2002) notes for instance that in 1997, the overall poverty line was placed at KSh 1,239 per month per adult in rural areas and KSh 2,648 in urban areas.

In his MA Thesis, Mutie (1993) notes that the post-independent Kenya has witnessed intensified government efforts in the pursuit of better rural conditions of living. This idea has been supported by Heyer et al (1971) who has noted the government's initiation of the 1966 Kericho Conference which advocated for "Coordinated Pilot Projects for Kenya's Rural Development" and led to the Special Rural Development Programme (SRDP) in 1971.

Without highlighting the areas that were least or more developed, Mbithi and Barnes (1974) wrote that by the time of independence, the Kenyan government faced "the problem of uneven rural development inherited at the independence which remained unsolved". They have highlighted the Kenya Development Plan 1974 – 1978 that had an approach on basic needs and stating the potentiality of planning at the district level.

According to the Development Plan 1979 – 1983, this development became a reality in 1983 when the government adopted the District Focus for Rural Development (DFRD) with "Alleviation of Poverty" as the main theme. The fourth Development Plan treats poverty as a central problem in Kenya's progress. Inadequate food supply and lack of other basic needs are considered in the plan as aspects of poverty that needs to be alleviated.

In Kitui District, characteristics of poverty are quite common. According to the IEA-Kenya (2002), 65 per cent of Kitui population is counted among the absolute poor making it one of poorest districts in Kenya. Wisner and Mbithi (1972) have cited Kitui district as one of the areas where drought is experienced usually on a yearly basis.

During the colonial period, the government initiated some projects in Kitui in order to improve the area's living conditions. Among other things, O'leary (1979) cites agriculture and water development as the colonial government's contribution. For example, by 1951, the colonial government had initiated construction of 130 earth-dams with 55 of them constructed in 1950 alone (Akong'a, 1985).

According to Mutie (1993), the Swynnerton Plan (1954) made it possible for Kitui district to receive an Assistant Agricultural Officer and ten African Farm Instructors and such extension of services have been of some incentive for greater food production.

2.3. IMPACT OF DROUGHT ON RURAL DEVELOPMENT

Studies of local perceptions of drought on Kitui District should have led to a more accurate understanding of basic human behaviour when facing drought hazard for further examination of the many problems that exist, and for a better appreciation of the many factors that are likely to influence actions taken to mitigate the drought effects in the District.

Kitui district has suffered from cumulative effects of droughts including the erosion of assets, decreasing ability to cope with future droughts, and impoverishment of rural communities (National Policy on Disaster Management, 2001). The effect of the 1991/92 drought in the arid districts led to livestock losses of up to 70 per cent of herds and unprecedented high rates of child malnutrition of up to 50 per cent. During this drought, 1.5 million people in seventeen arid and semi-arid districts including Kitui received relief food assistance.

Kitui District experienced rain failure again at the end of 1995 and in 1996 leading to another drought situation that affected an estimated 1.41 million people. The

worst drought emergency in recent years affected the Central, Eastern, Rift valley, Coast and North Eastern Provinces with 4.4 million people requiring food assistance in the year 2000. Some of the major causes of drought are deforestation, extreme climate events and improper land use that threaten the environment and people's livelihoods. Unfortunately, nothing has been reported about how local people perceived, adjusted, and responded to these droughts.

Frequency of famines in Kitui led the government to recommend minor irrigation schemes, the diversification in crops by the use of the hybrid Katumani maize, the provision of free seeds for people to in time and the use of fertilizer as coping measures for disaster mitigation (Akong'a, 1985).

For instance, according to the village elder, during 1992 famine people of Changwithya Locations approached the area member of parliament to ask the government to supply them with food. Again this was free food as opposed to food for work. The elder sums up his discussion by saying that, long ago people did not know what to do in order to respond to drought. However, they are currently registered in farmer's field schools where they are taught of appropriate methods of farming in their area. They have learned that even the lowest amount of rain can still produce a meaningful harvest. According to the NGO field officer, the 1992 famine saw a large number of people move to towns in search of jobs. Other people looked for jobs in other neighbouring areas where they worked for food. He added that this famine led to high levels of school dropouts.

The Sessional paper N° 4 of 1981 on Food Policy notes that projects should be geared towards self-sufficiency in food production to enhance food security. The paper notes the need for improvements in soil fertility and emphasis should be put on crops with the highest return. The Sessional Paper N° 1 of 1986 on Economic Management for Renewed Growth also puts emphasis on food security. Maize production in Kitui for

example is set increase by 10 per cent from 49,975 tons then, per year. This is intended to make the area more self-sufficient in food production.

2.4. THEORETICAL FRAMEWORK

The literature review reveals the existence of various categories of meanings as attached by interacting individuals in given social settings. The experience of drought hazard attains local interpretations. In any area, there is some localized knowledge of drought and its causes and people respond to the drought in their own way depending on their philosophies of drought and the way they perceive it. The social interpretation is evident. The Symbolic Interactionism Theory can be used to capture the local perceptions of drought in the study region.

Nonetheless, when seen as a disaster, drought management becomes a cause of social conflict within a society, especially in the relief and rehabilitation phases of the disaster management cycle. This conflict is more felt in the recovery phase where, with the increasing scientific knowledge in disaster management, it becomes necessary to integrate the disaster mitigation mechanisms within the national development planning programmes. The social conflict theory will help us to capture the concept of linking disaster and development.

2.4.1. Symbolic Interactionism Theory

According to David Jary and Julia Jary (2000), Symbolic Interactionism is a theoretical approach in the minority tradition emanating from US sociology. This tradition seeks to explain action and interaction as the outcome of the meanings that actors attach to things and to social action, including themselves.

The term 'Symbolic Interactionism' was coined in 1937 by Herbert Blumer who summarizes the main principles of the approach in terms of three propositions (Blumer, 1969). He argues first that human beings act towards things on the basis of the meanings that things have for them; these meanings arise out of social interaction; and social action results from a fitting together of individual lines of action.

For symbolic interactionists, meanings do not reside in the objects but emerge from social processes. Emphasis is placed on the active, interpretative, and constructive capacities or competence, possessed by human actors, as against the determining influence of social structures suggested by theoretical approaches such as functionalism.

How people perceive themselves and their situations is the key to human behaviour and adaptation in any given environment. Whatever may be the magnitude, the frequency or the impact of the drought, the important thing is the people's definition of the situation. The lay perceptions are in fact crucial instruments in the local environment. They relate to the perceived causes of drought and the rational responses to it.

The relevant thing is not the scientific conception of the drought but its subjective picture painted by the victims. For this study, it is imperative to understand how local people perceive the drought as a disaster, how they can mitigate it in their day-to-day life towards a sustainable development.

2.4.2. Social conflict Theory

Social conflict is based on Lewis Coser's Conflict Functionalism (1956). The aim of Coser's conflict theory is to clarify and consolidate a conceptual framework that is useful for understanding the social conflict. He tries to show that functionalism can handle questions of change and conflict. His emphasis is on functions, rather than the

dysfunctions, of social conflict. Coser wants us to view conflict as an integral part of normal social processes, not as some sort of problem.

Because of this emphasis on the functional attributes of conflict and conflict as a factor leading to greater levels of social integration, social conflict is indicated as a theory to use in order to understand the interaction between disaster managers and development planners especially with this assumption that conflict may increase social adjustment, adaptation and integration. The application of this theory is more elaborated in the next section.

2.4.3. Disaster Management Theory

Human being is exposed to both natural and technological disasters. The aim of Disaster Management Theory is to ensure prompt and appropriate action in disaster situation and to reduce the potential losses. The four main aspects of Disaster Management are mitigation, preparedness, disaster response, and disaster recovery covering relief assistance, rehabilitation, and reconstruction phases of the disaster cycle (UNIDRO, 1992).

The growing body of knowledge on the relationships between disasters and development indicates four themes. That is, disasters set back development programming destroying years of development initiatives; rebuilding after disaster provides significant opportunities to initiate development programmes; development programmes can increase an area's susceptibility to disaster; and development programmes can be designed to decrease the susceptibility to disasters and negative consequences. Accordingly, the Disaster Management Theory will be also applied to this study.

2.4.4. Application of the theories

This study is being undertaken in the context of a new conceptualization of the relationship between disasters and development. Rarely a week goes by when a major disaster is not reported in the media ranging from natural to technological or a combination. Unfortunately, every disaster results in death and destruction, and frequently wipes out years of development programming and sets the slow course of improvement in third world countries further behind, wasting precious resources.

For a long time, the cause and effect relationship between disasters and social and economic development was ignored. Ministries of Planning and Finance and other development planners did not concern themselves with disasters. At best, development planners hoped that disasters would not occur and, if they did, were most effectively handled by relief from donor countries and relief organizations. Development programs were not assessed in the context of disasters, neither from the effect of the disaster on the development program, nor from the point of whether the development programs increased either the likelihood of a disaster or increased the potential damaging effects of a disaster (Stephenson 1994).

Disasters were seen in the context of emergency response not as a part of long-term development programming. When a disaster did occur, the response was directed to emergency needs and cleaning up. Communities under disaster distress were seen as unlikely places to institute development. The post-disaster environment was seen as too turbulent to promote institutional changes aimed at promoting long-term development. According to IEA-Kenya (2002), development requires institutional and structural transformations of societies to speed up economic growth, reduce level of inequality and eradicate absolute poverty.

Over time, the effects of disasters can seriously degrade a country's long-term potential for sustained development and cause governments to substantially modify their economic development priorities and programs. At the same time, disasters often provide opportunities for development (Stephenson, 1994). They can improve the atmosphere in favor of change and create a rationale to establish development programs such as job training, housing construction and land reform. However, poor management of the relief and rehabilitation responses may have severe negative implications for development for years to come, and may even increase vulnerability to future hazard.

2.4.5. Conclusion

This study highlights the importance of considering the likely potential, risks and consequences of disasters as part of development program planning. It emphasizes the opportunities for preventing and mitigating damage and disruption that arise when disaster considerations are integrated into project planning for development. This study of perceptions of drought and their impact on rural development in Kitui district, underlines the need to consider emergency responses in the context of development and the integration of development considerations into emergency response planning.

2.5. STUDY HYPOTHESES

1. Perceived causes of drought are related to individual personal characteristics (sex, age group, religion, level of education, marital status, household size, occupation, monthly income, and individual personality);
2. The awareness of drought is associated with the frequency of drought occurrence, experience with drought, educational background, occupation, and monthly income;

3. The responses to drought hazard are related to the experience with drought.

2.6. OPERATIONAL DEFINITIONS OF VARIABLES

In this section, operational definitions are given to dependent and independent variables used in the study hypotheses.

2.6.1. Hypothesis 1:

The survey has revealed three different causes of drought. That is, the physical events beyond human control, the natural causes accentuated by human interference, and the perception of drought as an act of God. Therefore, operational definitions corresponding to different variables are given hereafter.

(a) Dependent variable:

Perceived causes of drought: Any clue of a drought mentioned by respondents to be a cause of drought. The respondents will 'Agree' or 'Disagree' with the mentioned cause of drought.

(b) Independent variables:

Socio-economic factors of respondents: These include all the respondent's characteristics that can influence the perception of drought. That is, Sex, Age group, Religion, Level of education, marital Status, Household size, Occupation, Monthly income, and Personality:

- **Sex:** It refers to the respondent's sex e.g. male or female
- **Age group:** The respondent's age refers to as number of years since the respondent's birth. According to the respondents' age, the age group will be either 'Active' or 'Non-active'.

- **Religion:** Religious affiliation refers to the orientation of the respondent towards a particular religion or the other. Therefore, the respondents will belong either to the 'Catholic', 'Protestant', 'Muslim' or other religion.
- **Level of education:** This denotes the number of years the respondent has had in formal schooling that is then conventionally differentiated as either 'none', 'primary', 'secondary', 'university' or other level.
- **Marital status:** The respondent's marital status refers to as 'single', 'married', 'unmarried', 'divorced', 'separated', 'widow' or other status.
- **Household size:** Number of people living together who share meal and all living accommodation. The household size will be '1', '2', '3' or more.
- **Occupation:** People in the study area are involved in income generating activities. The respondents' occupation will be classified among the following groups of income generating activities: 'Farming', 'Business', 'Civil servant' or other.
- **Monthly income:** The monetary payment periodically received for goods or services, or from other sources as rents or investments. According to defined poverty line in the study area, the monthly income will be 'poor' when below or 'fair' when on or above the defined poverty line.
- **Personality:** The ability to take or not take decision to do something in order to prepare oneself for drought hazard. Personality will be classified in the category of people who 'Decide' or 'Do not decide'.

2.6.2. Hypothesis 2:

Awareness of drought is the acquired knowledge of the drought characteristics and effects leading to development of own, indigenous or modern preparedness and strategies based on longstanding experiences of living with drought.

(a) Dependent variable:

Awareness of drought: According to the number of actions taken prior in order to prepare for drought, people in the study area will be classified as 'Aware' or 'Not aware' of drought.

(b) Independent variables:

- **Frequency of drought occurrence:** This is the number of drought occurrences within a given period of time. According to the respondents' answers, the frequency will be expressed in a 'specified number of times' or as 'irregular'.
- **Experience with drought:** The number of times the respondent has been personally living with drought since his/her birth. Given that the droughts are different in magnitude, people will be classified into two categories of level of experience, that 'High' or 'Low' level of experience.
- **Educational background, occupation, and monthly income variables** have been defined within the above hypothesis.

2.6.3 Hypothesis 3:

The research has developed two different categories of responses. That is, the pro-active and reactive categories of responses. Therefore, operational definitions corresponding to different variables are given hereafter.

(a) Dependent variable

- **Pro-active response to drought:** This is any action taken prior to drought occurrence in order to lessen its impact. In the study area, people will be classified differently. Those who do 'Agree' and those who 'Disagree' to take such actions.

- **Reactive response to drought:** This is any action taken during or immediately after the drought occurrence in order to lessen its impact. In the study area, people will be classified differently. Those who do 'Agree' and those who 'Disagree' to take such actions.

(b) Independent variables:

- **Experience with drought:** this variable has been defined within the above hypothesis 2.

Chapter 3

RESEARCH METHODOLOGY

3.0. INTRODUCTION

This chapter describes the procedures that were followed in conducting the study. This entails a description of the study site, sampling design, data gathering, and data analysis tools. The study primarily relied on first-hand qualitative data collection techniques such as interview schedule, informal interviews and observation. A combination of the various methods of data collection was adopted so as to avoid errors arising from the use of a single technique. However, it should be noted that these tools may also yield quantitative data. Once collected, the data were coded, grouped and interpreted by use of both descriptive and inferential statistics.

3.1. SITE SELECTION AND DESCRIPTION

Kitui district was selected for study out of many other arid and semi-arid lands. Other dry areas in Kenya include Machakos, Isiolo, and Garissa districts, much of the North-Eastern provinces and the coastal zones covering areas like Tana River, Kilifi, and Taita Taveta districts. The selection of Kitui district was based on the facilities offered to the researcher for data collection process.

Kitui district is one of the twelve districts of Eastern Province. Kitui district borders Machakos and Makweni districts to the west, Mwingi to the north, Tana River to the east and Taita Taveta to the south. It is located between Latitudes $0^{\circ} 3.7'$ and $3^{\circ} 0'$ South and Longitudes $37^{\circ} 45'$ and $39^{\circ} 0'$ East.

As shown in the following Table 3.1, the district covers an area of approximately $20,555.75 \text{ km}^2$ including $6,309.01 \text{ km}^2$ occupied by the uninhabited Tsavo

National Park. There are eight divisions in the district. Mutomo division is the largest with 5,287.42 km² while Chuluni division is the smallest being only 539.20 km².

Table 3.1
Area of the Kitui District by Division

Division	Area km ²
Central	765.48
Chuluni	539.20
Mutitu	614.45
Mutomo	5,287.42
Yatta	1,166.14
Kabati	795.69
Mwitika	3,249.35
Ikutha	1,829.01
(Tsavo National Park)	(6,309.01)
Total area	20,555.74

Source: Kitui District Development Plan 1997-2001

Kitui district lies between 400m and 1,800m above the sea level and generally slopes from west to east. To the eastern side of the district lies the Yatta Plateau, which stretches from north to south between rivers Athi and Tana.

The central part of the district has slightly lower elevation of between 600m and 900m above the sea level and is traversed by hilly ridges separated by wide low lying areas. The eastern side of the district is almost plain with shallow widely spaced valleys. There some hills which just out from this plain. The highest areas in the district are Kitui Central, Mutitu hills and Yatta Plateau. Due to the high altitude these areas receive more rainfall than other parts of the district and are therefore the most productive.

3.1.1. Climate and land use

The climate of the district can be described as hot and dry for most of the year and it is characterized as an arid and semi-arid area with very unreliable rainfall. The high rate of evaporation, combined with unreliable rain, limit intensive and meaningful land use and other related development activities. The district experiences two rain seasons with long rains coming from April to May and short rains from November to December. There are dry periods falling between June to September and January to February.

The amount of rainfall received is highly influenced by topographical of the landscape. The hills such as Mumoni in Kitui Central and Mutitu in the eastern parts of the district receive 500-760mm per year. The Endau Hills receive 500-1,050mm per year, while the eastern and southern areas receive less than 500mm. The minimum mean annual temperatures vary from 14°C to 18°C in the western parts and 18°C to 22°C in the eastern parts. The maximum mean annual temperatures on the other hand range from 26°C to 30°C in the western and 30°C to 34°C in the eastern parts. The district is composed of eight administrative divisions. That is, Central, Chuluni, Yatta, Kabati, Mutomo, Mutitu, Ikutha, and Mwitika. The divisions are further divided into 38 locations and 134 sub-locations.

3.1.2. Major droughts experienced in Kitui district

Kitui district has suffered from cumulative effects of droughts including the erosion of assets, decreasing ability to cope with future droughts, and impoverishment of rural communities (National Policy on Disaster Management 2001).

Kitui district has suffered from the 1991/92 drought where 1.5 million people in seventeen arid and semi-arid districts received relief food assistance. The district experienced another drought due to rain failure at the end of 1995 and in 1996 that

affected an estimated 1.41 million people countrywide. In the year 2000, the district experienced the worst drought emergency that affected the Central, Eastern, Rift valley, Coast and North Eastern Provinces with 4.4 million people requiring food assistance. According to the District Development Plan 1997-2001, some of the major causes of drought are deforestation, extreme climate events and improper land use that threaten the environment and people's livelihoods.

3.1.3. Demographic profile

The 1989 population census recorded a population of 412,528 people in the district. This population was growing at a rate of 3.3 per cent during the inter-census period of 1979-1989. This population was projected to grow from 537,466 people in 1997 to 574,215 in 1999 and was supposed to rise to 613,478 people in 2001. These projections were based on the 1989 population census assuming a growth of 3.3 per cent. In 1989, there were 70,815 households that were projected to increase to 142,716 in 2001. According to the District Development Plan 1997-2001, the population densities vary from division to division. Central and Kabati divisions had the highest population densities in 1989 while Mutomo division had the lowest density. This is due to its arid climatic conditions. The trend was projected to continue throughout the plan period.

3.1.4. Units of analysis

A unit of analysis refers to those units that the researcher initially describes for the purpose of aggregating their characteristics in order to describe some larger groups or abstract phenomenon. They are therefore the individual units about which descriptive or explanatory statements are to be made. In this study, the units of analysis were the

households and drought perceptions. The later are phenomena mainly experienced by households.

3.1.5. Units of observation

A unit of observation is the subject, object, item or entity from which the researcher measures the characteristics or obtains the data required in the research study. In this study, the units of observation were the heads of the households and key informants drawn from stakeholders in the district.

3.2. SAMPLING

Sampling is necessary because of financial, resource and time constraints. It is not possible to observe every element of a large parent population (Odegi-Awuondo 1994). As the research was carried out in Changwithya West Location, it was not possible to interview 22,630 people living in the four sub-locations. It is not just time consuming but impracticable within the given time frame. It could also require expensive resource outlay in terms of personnel, equipment and money. The sample was selected from the 8,311 households and more specifically, among the 1,681 households in Tungutu and Mbusyani sub-locations.

3.2.1. Sampling at the District level

Purposive sampling was used at this stage. The general strategy is to identify important sources of variation in the population and then select a sample that reflects this variation (Singleton, 1988). According to Mugenda (1999), purposive sampling allows a researcher to use cases that have the required information with respect to the objectives of the study.

The Development plan notes that land potential determines largely population densities among divisions. Central and Chuluni divisions have high densities due to high land potentials, while the low population densities in Yatta and Mutomo are attributed to low land potentials. Central division was purposively selected for this study. The reasons were that it is part of the high potential land and more accessible.

3.2.2. Sampling at the Division Level

At this level, a simple random sampling was applied to select a location for the study using the lottery technique. According to Singleton (1988), the defining property of a simple random sampling is that every possible combination of cases has an equal chance of being included in the sample. In Central division, there are 7 locations. The first step was to agree on the sample frame. Then the researcher assigned numbers to the locations in the sample frame where the numbers run in series, '1' being for the first and '7' the last location.

Table 3.2
Sample frame of locations

Serial Number	Location Name
1	Name of the Location N°1'
:	:
i	Name of the Location N°i'
:	:
7	Name of the Location N°7

Source: Adapted from Odegi-Awuondo (1994)

The numerals without the corresponding location's name were written on individual pieces of paper of equal size, weight and texture for them to be fair. They were carefully folded and rolled into balls of the same shape and size, and then placed into a basket. The papers

were thoroughly mixed. A neutral person was chosen to shake the basket and then picked one paper whose name was the Changwithya location then selected as the location for the study.

3.2.3. Sampling at the location level

At the location level, as for the of the Changwithya location, two sub-locations were to be randomly selected. The selection was done from a sample frame of the four sub-locations. Tungutu and Mbusyani sub-locations were randomly selected for the study.

3.2.4. Sampling at the sub-location level

In their offices, Ms Margaret Munyange and Mr. Augustus Mutanzi Kasilia Assistant Chief of Mbusyani and Tungutu Sub-locations, helped to sample randomly the households to be covered by the research. The following Table 3.3 shows the sample frames of the households were presented.

Table 3.3
Sample frame of households

Serial Number	Head of household Name
1	Name of the Head of the household N°1'
:	:
i	Name of the Head of the household N°i'
:	:
N	Name of the Head of the household N°N'

Source: Adapted from Odegi-Awuondo (1994)

Here again, the numerals without the corresponding names of the heads of households, were written on individual pieces of paper of equal size, weight and texture for them to be fair. They were carefully folded and rolled into balls of the same shape and size, and then

placed into a basket. The papers were thoroughly mixed. A neutral person was chosen to shake the basket and then picked randomly one by one till the sample size.

3.2.5. Sample size

In this study, a sample of 80 households was used. This sample size was adequate for the statistical analysis. It was appropriate because of the given time for the research. Importantly, this sample was supplemented by information gathered from the Key Informants, observation and secondary data resources.

3.3. DATA COLLECTION

There are various methods of data collection and their application usually depends on the nature of the study. In this study, primary data were obtained through interview schedules and observation checklists. The researcher conducted himself the interviews assisted by one field guide in each sub-location and one interpreter.

The study area was Changwithya West Location that was made up of Utooni, Musyani, Tungutu, and Mulutu/Nduumoni Sub-locations. The Location was selected purposively and has a total population of 22,630 people living in 4,311 households. Owing to the vastness of the Location, two Sub-locations were randomly selected namely: Mbusyani and Tungutu Sub-locations. Mbusyani Sub-location has a population of 2,702 people living in 475 households while Tungutu has a population of 7,193 people living in 1,206 households. The researcher interviewed a total of 80 respondents who were household heads selected randomly from the 1,681 households in Tungutu and Mbusyani Sub-locations.

3.3.1. Semi-structured Interviews

The main data were gathered using semi-structured interviews based on a pre-prepared interview schedule. An interview schedule is a set of questions that are administered to the researched by the researcher and/or his/her assistants or mailed to the respondents with instructions on why and how to answer the questions (Kerlinger 1964).

For the interview schedule, the relationship with the respondents was very important. A good understanding with them has been there for rapport and the questionnaire was well prepared and this has contributed to establish a good relationship. In this research the interview schedule was the major tool of data collection. Most of the questions were open-ended so as to give the respondents a chance to articulate themselves exhaustively.

There were four different categories of questions. The first set of questions aimed to gather information on the background characteristics of the respondents. The second category was to on the assessment of local perceptions of drought and included questions on factors influencing these perceptions. The third category was focusing on the identification of different ways through which people respond to the drought and the last category was about the impact of the above drought perceptions on the overall rural development.

3.3.2. Observation

During this research, observation involved an accurate watching and noting of phenomena. This study used observation to supplement the data gathered through the interview schedule. Among the observed issues were the coping mechanisms used in drought mitigation, preparedness, relief, and recovery phases as well as indigenous general knowledge in early warning systems.

3.3.3. Informal interviews

According to Cohen (1981), scholars have often had to deal with delicate social relationships of a dynamic nature. This underscores the need to keep on being open-minded and at times cultivate informal links with the researched. In such situation, the researcher talked with people but he did not ask for formal interaction. The conversation took place passively without any detailed procedures.

This study adopted informal interviews in order to develop the pieces of information gained in other methods. Many people in the study area wanted to know what the research team was doing. A conversation has been developed and the researcher has benefited from a thread of information. People were allowed to freely articulate their views once the theme of the study was explained.

3.3.4. Key Informants

Finally, unstructured interviews or oral interviews were also utilized to gather information from key informants to capture the problem of local perceptions of drought. This helped a lot to clarify questions in the household questionnaire since the researcher cannot communicate in local language, a criteria that was used in selection of field guides and the interpreter. Very useful information has been collected from the key informants. Appointments were made and later on discussions held with each key informant. These informants included: Mr. Augustus Mutanzi Kasilia, Assistant Chief of Tungutu Sub-location; Ms Margaret Munyange, Assistant Chief of Mbusyani Sub-location; Mr. Mathew Kitema, Chairman of a local SDA primary school; Mr. Sam Mutiso, Field Officer of SASOL Foundation, a local NGO; and Mzee Mulwa Kingau, the Ilima/Kiteta village elder from Mbusyani Sub-location who was quite knowledgeable on the subject.

3.4. DATA ANALYSIS

The researcher had to make sense of the raw data collected by a systematic organization, presentation and interpretation. This necessitated the use of statistics. Hinkle et al. (1982) have defined statistics to include the theory and procedures used for the purpose of understanding data. Such procedures are the mathematical calculations for summarizing the data as well as the high order statistics for making generalization. Both aspects of statistics were used in this study. It was the best way of describing the respondents' perceptions of drought.

3.4.1. Descriptive statistics

These procedures were used for organizing, summarizing and presenting the collected data. Blalock (1978) argues that descriptive statistics are important tools aimed at giving a concise picture to the data. Useful techniques of this category of statistics include the mean, mode, range, percentage, tables, pie charts, graphs and the standard deviation. The mean and the mode are used to show the location of cases in the distribution while the percentage are used to standardize the scores so that it will be known what each case would score if the total is a hundred. The range helps to show the difference between the maximum and the minimum scores. Tables, graphs and pie charts are pictorial representations of data. The standard deviation that is the square root of the mean squares of the deviations of individual items from their arithmetic mean helps to measure the dispersion of scores from the arithmetic mean. Standard deviation is very useful in determining how significant the deviations are from the mean for various variables that are being compared in a distribution. This gives a quick impression of the findings.

3.4.2. Inferential statistics

Inferential statistics are used for the ultimate purpose of research, that is, to generalize the results from the sample to the population. The sole requirement is that the sample must have been randomly selected, hence representative of the target population. Random sampling process has been used in this study and cross-tabulation was used as the basis for the computation of Chi-Square that is a statistical technique establishing relationship between two variables both of which are categorical in nature.

Chapter 4

PRESENTATION OF DATA AND FINDINGS

4.0. INTRODUCTION

In this chapter, the research findings are presented using descriptive Statistics. These Statistics were concerned with arranging, summarizing and conveying the characteristics of a range of numbers. According to Mugenda and Mugenda (1999:117), descriptive Statistics help the researcher to meaningfully describe a distribution of scores or measurements using a few indices or Statistics. Such statistics used in this chapter include frequencies and percentages.

4.1. SOCIO-ECONOMIC CHARACTERISTICS OF THE RESPONDENTS

The research findings presented in this section were related to the socio-demographic characteristics of the respondents. The section presents respectively investigated households, the distribution of respondents by sex, age group, religion affiliation, level of education, marital status, household size, occupation, and monthly income.

4.1.1. Distribution of respondents by sex

Out of the total sample of 80 households, 36 (45.00%) were headed by women. Of the 36 respondents, 13 (16.25%) were from Mbusyani Sub-location and 23 (28.75%) were from Tungutu Sub-location. As table 4.1 shows, the remaining 44 (55.00%) households were headed by men with 27 (33.75%) from Mbusyani Sub-location and 17 (21.25%) from Tungutu Sub-location.

Table 4.1
Distribution of respondents by sex

Sex	Sub-location				Total	
	Tungutu		Mbusyani		Frequency	%
	Frequency	%	Frequency	%		
Male	17	21.25	27	33.75	44	55.00
Female	23	28.75	13	16.25	36	45.00
Total	40	50.00	40	50.00	80	100.00

Source: Survey data

4.1.2. Distribution of respondents by age group

The KDDP (1997-2001:11) views the district population in terms of active and non-active people. It classifies the group of people between 15 and 59 years old as constituting a labour force group while classifying the population between 0 and 14 years and over 60 years as economically inactive. The variable age has been therefore categorized into two namely 'active' for the household heads under 60 years and 'non-active' for the household heads over 60 years old. Table 4.2 shows the Distribution of respondents according to this categorization. Out of 80 respondents in the study area 54 (67.50%) respondents were active among whom, 31 (38.75%) were male household heads and 23 (28.75%) respondents were female household heads. The remaining 26 (32.50%) respondents were classified inactive and was number includes equally, 13 (16.25%) male and female household heads.

Table 4.2
Distribution of respondents by age group

Age group	Male		Female		Total	
	Frequency	%	Frequency	%	Frequency	%
Active	31	38.75	23	28.75	54	67.50
Non-active	13	16.25	13	16.25	26	32.50
Total	44	55.00	36	45.00	80	100.00

Source: Survey data

4.1.3. Distribution of respondents by Religion

In the study area, none of the respondents lacked a religious affiliation and the field survey has revealed only two religious affiliations. That was Catholic and Protestant religions. They constitute the two categories of the variable 'Religious Affiliation'. The following table 4.3 shows that the majority of respondents, was 43 (53.75%) were affiliated to the Protestant religion and the remaining 37 (46.25%) respondents belong to the Catholic religion. In the study area, majority of both male 24 (30.00%) and female 19 (23.75%) household heads were affiliated to the Protestant religions.

Table 4.3
Distribution of respondents by Religion

Religion	Male		Female		Total	
	Frequency	%	Frequency	%	Frequency	%
Catholic	20	25.00	17	21.25	37	46.25
Protestant	24	30.00	19	23.75	43	53.75
Total	44	55.00	36	45.00	80	100.00

Source: Survey data

4.1.4. Distribution of respondents by Level of education

Education provides people with skills required to sustain and improve the quality of life. It has therefore direct or indirect impact on the quality of life. In Kitui district, Kabati and Central Divisions lead in the number of schools and enrolment owing to better facilities (KDDP 1997-2001:38).

As it was shown in table 4.4, 27 (33.75%) respondents have never been in school. In this category, women were majority with 17 (21.25%) against 10 (12.50%) men without any educational background. 28 (35%) respondents have done their primary education with a very strict respect of gender issues, that was 14 (17.50%) of both men and women. At the secondary level, there were 25 (31.25%) respondents with 20 (25%)

men and only 5 (6.25%) women. These findings were supported by the UNESCO Institute for Statistics (2001) showing that in Kenya, the estimated literacy rate was 88% for men and 73% for women.

Table 4.4
Distribution of respondents by level of education

Level of education	Male		Female		Total	
	Frequency	%	Frequency	%	Frequency	%
None	10	<i>12.50</i>	17	<i>21.25</i>	27	<i>33.75</i>
Primary	14	<i>17.50</i>	14	<i>17.50</i>	28	<i>35.00</i>
Secondary	20	<i>25.00</i>	5	<i>6.25</i>	25	<i>31.25</i>
Total	44	<i>55.00</i>	36	<i>45.00</i>	80	<i>100.00</i>

Source: Survey data

4.1.5. Distribution of respondents by marital status

The field survey revealed that 65 (81.25%) respondents were married and 15 (16.75%) were widowed. Of the 65 (81.25%) married respondents, 39 (48.75%) were male household heads and 26 (32.50%) were female household heads. Among the widowed, only 5 (6.25%) were male household heads and 10 (12.50%) were female household heads. It has been observed also that in both cases the majority was from Tungutu Sub-location with respectively 30 (37.50%) married and 10 (12.50%) widowed. In Mbusyani Sub-location, there were 33 (41.25%) married respondents and 7 (8.75%) widowed respondents. The following table 4.5 shows the distribution of respondents by marital status.

Table 4.5
Distribution of respondents by Marital Status

Marital status	Male		Female		Total	
	Frequency	%	Frequency	%	Frequency	%
Married	39	48.75	26	32.50	65	81.25
Widowed	5	6.25	10	12.50	15	18.75
Total	44	55.00	36	45.00	80	100.00

Source: Survey data

4.1.6. Distribution of respondents by household size

On the average, the size of a household in the study area was 5 people. In the selected location, there was a population of 22,630 people living in 4,311 households. This observation gives an average of 5 people living in single household. Also, the total number of households in the study area was 1,681 and the total population was 9,895 people. These statistics give also an average of 5 people by household. Therefore, two categories have been defined for the variable household size. That was the 'small' size for households with at most 5 people and 'big' category for households with at least 6 people. Table 4.6 shows that 36 (45%) respondents were heads of small size households and 44 (55%) respondents were heads of big size households.

Table 4.6
Distribution of respondents by household size.

Size	Male		Female		Total	
	Frequency	%	Frequency	%	Frequency	%
Small	24	30.00	12	15.00	36	45.00
Big	20	25.00	24	30.00	44	55.00
Total	44	55.00	36	45.00	80	100.00

Source: Survey data

4.1.7. Distribution of respondents by occupation

The field survey revealed that 65 (81.25%) out of 80 respondents were farmers and 15 (18.75%) were involved in business. Table 4.7 shows that in both cases, majorities were male household heads with respectively 36 (45%) male household heads involved in farming activities against 29 (36.25%) female household heads and 8 (10%) male household heads doing business against 7 (8.75%) female household heads.

Table 4.7
Distribution of respondents by occupation

Occupation	Male		Female		Total	
	Frequency	%	Frequency	%	Frequency	%
Farmer	36	45.00	29	36.25	65	81.25
Business	8	10.00	7	8.75	15	18.75
Total	44	55.00	36	45.00	80	100.00

Source: Survey data

4.1.8. Distribution of respondents by monthly income

Incomes in Kitui district were unevenly distributed because areas of high and medium potential are found in Central, Chuluni and Kabati Divisions have higher incomes as they get it from sale of crops and livestock products (KDDP, 1997-2001: 47). The Ministry of Finance and Planning (2002) notes that the overall poverty line was Ksh 1,239 per month per adult in rural areas and Ksh 2,648 in urban areas. Two categories have been defined for the variable income using the rural poverty line equal to KSh 1,500. The following table 4.8 shows that the variable 'income' has been defined as 'poor' or 'fair' and respondents classified accordingly. In the study area, 52 (65%) out of the 80 respondents were poor and the majority of them were female household heads; that was 29 (36.25%) against 23 (28.75%) female household heads.

Table 4.8
Distribution of respondents by Monthly income

Monthly Income	Male		Female		Total	
	Frequency	%	Frequency	%	Frequency	%
Poor	23	28.75	29	36.25	52	65.00
Fair	21	26.25	7	8.75	28	35.00
Total	44	55.00	36	45.00	80	100.00

Source: Survey data

4.2. PERCEPTIONS OF DROUGHT

In Kitui district, drought and hunger were not inseparable concepts. Thus drought was taken as hunger or famine. In addition, drought was seen as part of life and seasons since it has been with these people all the years. Any discussion of drought touches on lack of water in the area. As such, people see lack of water as a sign of drought while others see drought as a sign of famine. This is evident when people start trekking for over 10 km in search of water, both for domestic use and livestock. During famine there was inadequate food for people and livestock.

When people in Kitui feel and observe drought and suffer from its effects, they begin to determine its magnitude and even try to understand its causes. They attempt to interpret their sensory situations' connected with drought as meaningfully as possible in keeping with the real world situations. This process was considered as the people's perception of drought.

The number of droughts identified and their magnitude visualized by respondents in was study show a marked variation. The factors that condition was varied perception of drought as evidenced by the field survey include: experience with drought;

perceived advantages of settlements; awareness of drought; frequency and magnitude of droughts experienced; and the individual personality.

4.2.1. Awareness of drought

According to the survey, all the 80 respondents said that they were aware of the drought that affected their community. But this was not enough to categorize them. Table 4.18 summarizes the answers to the question about the concrete actions taken to lessen the drought impact. These answers have been used to categorize the respondents as 'aware' or not aware' of drought. Table 4.9 gives the Distribution of respondents according to the awareness of drought. Respondents were either aware or not aware of drought.

Table 4.9
Distribution of respondents by awareness of drought

Awareness of drought	Male		Female		Total	
	Frequency	%	Frequency	%	Frequency	%
Aware	32	<i>40.00</i>	22	<i>27.50</i>	54	<i>67.50</i>
Not aware	12	<i>15.00</i>	14	<i>17.50</i>	26	<i>32.50</i>
Total	44	<i>55.00</i>	36	<i>45.00</i>	80	<i>100.00</i>

Source: Survey data

4.2.2. Experiences with drought

The majority of the respondents had very seldom ventured out of the study area (Central Division) to live and work, even temporarily. Table 4.10 below shows that 61 (76.25%) respondents were born in their resident Sub-locations. The 16 (20%) of the remaining 19 (24%) respondents were women and have come to their present resident sub-locations from neighbouring sub-locations within Kitui district and very few from the neighbouring district of Machakos.

Table 4.10
Distribution of respondents by origin

Origin	Male		Female		Total	
	Frequency	%	Frequency	%	Frequency	%
Native	41	51.25	20	25.00	61	76.25
Not native	3	3.75	16	20.00	19	23.75
Total	44	55.00	36	45.00	80	100.00

Source: Survey data

Drought was found to be a common issue and well known by all ages old and young but the old seemed to have more details on it. Different droughts could be heard from all ages and old people could give out the oldest known droughts using the names of famines. The middle age could give at least two, and the young could give only one drought.

Though some droughts had greater impacts, there were also some other normal droughts that occur annually from the month of May to the month of October and others start earlier depending on the rain regimen. Respondents mentioned an average of five well-known droughts every two decades by reference to the famine names. They started by '*Yua ya Nzalukangye*' in 1924. During this famine people used to camp at the Indian shops and could only keep blinking their eyes since they did not understand the Indian language hence the name '*Nzalukangye*'. '*Yua ya Kakuti*' in 1929 was the famine that killed many people. In 1930, people suffered from another famine to which they gave the name of '*Yua ya Silanga*'. The word '*silanga*' means dam in kamba language and this was the famine that engulfed the district during the digging of colonial dams. Five years later, in 1935, people experienced what they called '*Yua ya Mavindi*'. The word '*mavindi*' means animal bones and people sold bones for export as a way of responding to drought. During the drought in 1942, the only food available was cassava. Cassava means '*manga*' in kamba language and people gave to this drought the name of '*Yua ya Manga*'.

In 1944, people experienced another drought and suffered very much from famine. They called it '*Yua ya Ngie*', famine where there were many desert locusts that were also eaten as food. This was followed in 1946 by '*Yua ya Mutu Mutune*' meaning red flour also called '*Yua ya Mutuluvi*'. '*Mutuluvi*' is finger millet flour that was almost red to many people. During this famine people were given red flour relief food. In 1950, people suffered from another drought and they were selling '*sisal*' called '*makonge*' in kikamba, as the only means of responding to the resulting famine then called '*Yua ya Makonge*'. It was in 1961 and this drought period was finally marked by '*Yua ya Ndeke*', and '*ndeke*' means aeroplane. During this famine, relief food was distributed using aeroplanes.

The following drought in 1965 was marked by '*Yua ya Mutu wa Nganu*' and '*mutu wa nganu*' means wheat flour. During this famine, the only food available in shops was wheat flour. One year later in 1966, there was '*Yua ya Masinga*'. It was the famine during which Kitui people bought food from '*Masinga*' area in Machakos district. In 1978, more than ten years later, a cattle disease called '*Longosa*' wiped a lot of cattle in Kitui area. This was the famine that affected livestock more than people. It has been called '*Yua ya Longosa*'. The more recent drought was in 1984 that was marked by '*Yua ya Nikwa Ngwete*' famine. Literally, '*Nikwa Ngwete*' means to die while having the means. It was a famine where there was no food to buy yet people had the money.

Finally, more recently, in 1991/1992, people said that they had another drought but the resulting famine has not been given a name. They know it by the year. In 1999/2000, people suffered from drought and they were given relief food by the government supervised by NGOs. Also, according to key informants, was famine had no name signifying that it was not major. They mentioned another famine called '*Ngomanisye*' meaning to go round. Respondents did not mention this famine because

they could not guess the year in which it occurred. But it was believed to be before 'Yuu ya Kakuti' and this was between 1924 and 1929.

The youngest household heads were aged between 20 and 29 years. Considering that every 3 to 4 years, people in the study area experience a significant drought, it was possible to consider that any respondent who has personally experienced more than 7 consecutive droughts has a 'high level' of experience with drought while the other category was considered as having a 'low level' of experience with drought. The following table 4.11 shows the Distribution of respondents according to their experience with drought in the study area.

Table 4.11
Distribution of respondents by experience with drought

Experience	Male		Female		Total	
	Frequency	%	Frequency	%	Frequency	%
Low level	29	36.25	26	32.50	55	68.75
High level	15	18.75	10	12.50	25	31.25
Total	44	55.00	36	45.00	80	100.00

Source: Survey data

4.2.3. Perceived advantages of settlement

Any settlement offers advantages and disadvantages to its occupants. Generally, the advantages have to outweigh the disadvantages present in a particular settlement for the individuals to select that settlement to reside permanently. In the view of residents, there have to be good reasons for them to occupy their present settlements of recurrent drought hazard. Questioned on the perceived advantages of the settlements, respondents mentioned as many as 8 reasons of living in their present settlements. Table 4.12 below gives these reasons.

Table 4.12
Perceived advantages of settlement

Rank	Reason	Frequency	(%)
1	Presence of friends and relatives	46	57.50
2	Presence of some privileges by being born here	35	43.75
3	Low cost of living;	18	22.50
4	Rains occur in time;	17	21.25
5	Availability of agricultural labour;	17	21.25
6	Limited damages to crops from wild animals	14	17.50
7	Availability of non-farm employment opportunities;	8	10.00
8	Availability of grazing land for cattle.	8	10.00

Source: Survey data

4.2.4. Frequency of drought occurrence

Views on drought frequency vary from individual to individual within the study area. 45 (56.25%) of respondents thought that drought occurs every 3 to 4 years and 35 (43.75%) said that drought occurs irregularly. Of the 44 male respondents, 20 (25%) shared the view about the drought irregularity while 24 (30%) clearly said that they experienced drought in a period of 3 to 4 years. However, women in the same study area perceived the drought differently, while 15 (18.75%) out the 36 female respondents thought that the drought appeared irregularly, 21 (26.25%) said that the drought occurred every 3 to 4 years.

Table 4.13
Distribution of respondents by frequency of drought

Frequency	Male		Female		Total	
	Frequency	%	Frequency	%	Frequency	%
Irregular	20	25.00	15	18.75	35	43.75
Once in 3-4 yrs	24	30.00	21	26.25	45	56.25
Total	44	55.00	36	45.00	80	100.00

Source: Survey data

4.2.5. Decision making on action to be taken

The individual personality factor that affects an individual's perception of drought proved to be difficult to measure and even more troublesome to assess in terms of significance in the adjustment process. However, different answers to the question of knowing if respondents decide on their own which action to take in order to lessen the drought impact facilitated this assessment. Table 4.14 shows that respondents have been classified into two categories, that was, 'Decision and 'No-Decision' categories.

Out of the 80 respondents, 13 (16.25%) of them do not decide on what to do neither on which action to take when they see drought ahead. Importantly, those who decide personally on what to do and which action to take in order to lessen the drought impact were 67 (83.75%) respondents. 40 (50%) of them were men and 27 (34%) were women. The following table 4.14 shows the distribution of respondents by personality.

Table 4.14
Distribution of respondents by personality

Personality	Male		Female		Total	
	Frequency	%	Frequency	%	Frequency	%
Decision	40	<i>50.00</i>	27	<i>33.75</i>	67	<i>83.75</i>
No-Decision	4	<i>5.00</i>	9	<i>11.25</i>	13	<i>16.25</i>
Total	44	<i>55.00</i>	36	<i>45.00</i>	80	<i>100.00</i>

Source: Survey data

4.2.6. Perceived causes of drought

Local people in the study area seemed to have some ability to reason out the causes of drought though their reasoning need not necessarily agree with scientific reasoning. As scientists were entitled to their opinions and their reasoning, local people were also entitled to have their own ways of reasoning out the causes of drought. When asked what could be the causes of drought, respondents mentioned as many as three causes. That is,

the physical events beyond human control, natural causes accentuated by human interference, and act of God.

4.2.6.1. Physical causes

It could be scientifically explained that it was the physical causes that were responsible for the atmospheric weather phenomena and the natural disasters were connected with them. The data provided in Table 4.15 show that local people's beliefs support this explanation. Only 30 (37.50%) respondents do not agree among them 16 (20%) women and 14 (17.50%) men.

Table 4.15
Perception of physical events beyond human control

Answer	Male		Female		Total	
	Frequency	%	Frequency	%	Frequency	%
Yes	30	<i>37.50%</i>	20	<i>25.00%</i>	50	<i>62.50%</i>
No	14	<i>17.50%</i>	16	<i>20.00%</i>	30	<i>37.50%</i>
Total	44	<i>55.00%</i>	36	<i>45.00%</i>	80	<i>100.00%</i>

Source: Survey data

4.2.6.2. Natural causes

It could be said that when a forest is destroyed by haphazard clearing, the wind velocity increases and carries away the rain clouds, which would otherwise have given abundant rainfall. People could understand that this leads to water shortages. They do not see man's indirect but very detrimental interference with nature as a serious cause of drought. The following table 4.16 shows that the majority of respondents 43 (53.75%) tend to think that human interference with nature does not cause drought.

Table 4.16
Perception of natural causes accentuated by human interference

Answer	Male		Female		Total	
	Frequency	%	Frequency	%	Frequency	%
Yes	24	30.00%	13	16.25%	37	46.25%
No	20	25.00%	23	28.75%	43	53.75%
Total	44	55.00%	36	45.00%	80	100.00%

Source: Survey data

4.2.6.3. Act of supernatural powers

The survey revealed two very important elements. First, only two religions exist within the study area and the majority of the respondents, 43 (53.75%) were affiliated to the Protestant religion and the remaining 37 (46.25%) respondents belong to the Catholic religion. Secondly, the educational background was very low where the majority of respondents, 28 (35.00%) have done their primary education level, 25 (31.25%) respondents their secondary level and 27 (33.75%) respondents without any educational background. This may explain why people rely very much in supernatural powers as shown by table 4.17 below.

Table 4.17
Perception of drought as an act of God

Answer	Male		Female		Total	
	Frequency	%	Frequency	%	Frequency	%
Yes	38	47.50%	34	42.50%	72	90.00%
No	6	7.50%	2	2.50%	8	10.00%
Total	44	55.00%	36	45.00%	80	100.00%

Source: Survey data

4.2.7. Prediction of drought hazard

It was quite logical to expect that people living in an area of limited and highly variable rainfall keep a close watch on every season's rainfall behaviour. It was therefore, equally logical to expect most of such people to know, at least, the salient characteristics of seasonal rainfall with some symptoms of its likely adequacy or inadequacy. In Kenya for instance, "if August and September were cloudy ... and if the lightning in October was weak ... or if the Masolo birds do not appear early" some farmers consider that the rains during their main cultivation season to come were going to be poor (Wisner and Mbithi, 1972). In the study area, the key informants have mentioned some important indigenous early warning systems that were used to predict the weather.

It has been established from non-structured questionnaire and key informants, that there were local indicators of drought that include observing the reproductive behaviour of such indigenous trees as '*Muamba*', that is a baobab, '*Muthumula*' which is a tamarindus indica and the mango tree. It was said that when mangoes bear a lot of fruits, people know that the following season will be a drought period. This is scientifically viable since mangoes need a lot of water stress to start flowering and bear fruits.

When the '*Muamba*' bears a lot of fruits, people know that there was a looming drought. In addition, if the '*Muthumula*' tree does not shed its leaves by September, people prepare for a serious hunger. This was also understandable because the tree sheds its leaves when it was about to rain. Failure to shed, its leaves by September was a sign that the rains will be delayed.

It was also established that people have a sense of the seasons and know exactly when rains should start. If rains come late, they know that the season will be of poor harvest signifying hunger. The Assistant Chief of Mbusyani Sub-location said that if

the cold spell prolongs up to September, rains only pour for three weeks and the crops dry up. However, the Assistant Chief of Tungutu Sub-location put it that if rains come after 1st November, people know that there will be drought.

The occurrence of '*Ngie*', meaning locusts was also seen as a sign of looming drought and subsequent famine. In addition, if rains start with a lot of lightening, thunder with and a lot of wind, people know that the season will be a bad one and most likely there will be no yield there by culminating to hunger. It was also noted that if there was a lot of rains in the coastal area of Kenya, people in Kitui know automatically that there will be very little rain in their area. This was taken as very serious early warning for drought and famine in their area.

Surprisingly, the lining of the moon commonly referred to as '*Kivuo*' was used to predict drought. Thus if the lining was small, there will be a corresponding low yield and consequently hunger.

Finally, according to the Assistant Chief of Tungutu Sub-location, long time ago, people in the study area used to think that drought was caused by their own iniquities against their god. According to one key informant, they used to sacrifice a black bull under a '*Muumo*' tree. As generation passed, was trend of perception has died out since the current generations were aware that drought was caused by weather or climate changes.

4.2.8. Responses to drought

Response to hazard was related to perception of the phenomena themselves and to awareness of drought of opportunities to make adjustments. Rarely were individuals unaware of the existence of possible hazards, yet their perception and definition of the threat may differ from the estimates of professionals and experts (Burton, 1993:47). Two

categories of responses to drought have been observed during the fieldwork. That is, the pro-active and reactive responses.

4.2.8.1. Pro-active responses

Pro-active responses are illustrated by concrete actions taken prior to the drought occurrence in order to lessen its impact. When questioned on the concrete actions taken to lessen the drought impact, respondents in the study area mentioned as many as 7 actions.

That was:

Table 4.18
Pro-active responses to drought

Responses	Frequency	%	Rank
1. Pray to God to give adequate rains	79	98.75	1
2. Cultivate subsidiary food crops	75	93.75	2
3. Constitute a food stock	72	90.00	3
4. Plant drought resistant crops	71	88.75	4
5. Go elsewhere to share cropping with relatives or friends	42	52.50	5
6. Go elsewhere to find a job as an agricultural labourer	34	42.50	6
7. Evacuate the area.	2	2.50	7

Source: Survey data

According to the area Assistant Chief of Tungutu Sub-location, people make bricks for sale during the drought period. Others engage in charcoal burning while others do casual labour in farms of those endowed with money. Since there were many sand dams in the area built up by a local NGO called Sahelian Solutions (SASOL), people also plant vegetables for sale as a way of responding to drought. However, planting of vegetables

cannot be generalized to the whole location since these dams have not yet been spread to the entire area.

Started in June 2001, the Farmers' Field Schools (FFS), an effort of the Ministry in charge of agriculture, help people to respond to drought. Most people attending FFS have started growing hybrid crops such as 4141 and 511 for maize, and B1 and B9 for beans. It was surprisingly asserted that, if people have beans and no maize, they consider themselves to be hunger stricken. This was because the people's staple food was maize that can be consumed as *kitheri*, *muthokoi*, porridge and/or *ugali*.

4.2.8.2. Reactive responses

Reactive responses to drought include reactive measures illustrated by concrete actions taken as reactive measures when drought strikes in order to cope with its effects. In the study area, respondents mentioned as many as 7 different reactive actions taken during drought in order to lessen the effect of drought. Table 4.19 below illustrates these actions.

Table 4.19
Reactive responses to drought

Responses	Frequency	%	Rank
1. To wait for a free ration provided by government or any other humanitarian agency	45	56.25	6
2. To use food reserves	79	98.75	1
3. To borrow food from relatives	68	85.00	2
4. To ask for loan from institution or private individuals	19	23.75	7
5. To reduce household expenditure	68	85.00	3
6. To collect bush food for sale	57	71.50	4
7. To sell some of the household assets.	47	58.75	5

Source: Survey data

According to the village elder, during the colonial period, people relied on food handouts from colonialists. Such food was mainly potatoes. After independence, the government has continued to give relief food, mainly yellow maize. Arguably, the elder pointed out that when there was famine, some men run away from their homes and these men were kept by richer women, while others engage in excessive drinking to forget the drought-related problems at home. Food handouts were common not only because people had no money, but because there was no food to buy. This was clearly exemplified by the 1984 *Nikwa Ngwete* famine. He further said that during this time, the government gave free food to the affected Kitui community.

About the free ration provided by government or other humanitarian agencies, 45 (56.25%) respondents agree that they wait for such intervention. Among them, 23 (28.75%) women and 22 (27.50%) men. Within the 35 (43.75%) who do not agree with it, majority were male household heads with 22 (27.50%) and 13 (16.25%) female household heads.

On the use of food reserves, only 1 (1.25%) respondent, a female household head from Tungutu Sub-location said that she does not use the food reserves during the drought period. She was also the only respondent who claimed to have a monthly income greater than Ksh 4,500. The remaining 79 (98.75%) respondents use their food reserves. 72 (90%) of them were forced to use even their seeds for next plantation. 40 (50%) were male household heads and 32 (40%) were female household heads.

While 12 (15%) respondents only among whom 7 (8.75%) male household heads and 5 (6.25%) female household heads said that they do not borrow food from their relatives, the majority of respondents said that they borrow food from their relatives; that was 68 (85.00%) respondents. As many as 37 (46.25%) of them were male household heads and 31 (38.75%) female household heads. Among the 68 respondents, 30 (37.50%)

said that they have problem to pay back what they borrowed because of lack of means and 38 (47.50%) do not have problem to pay back what they have borrowed. In both cases, majority were male household heads with 16 (20%) having problem for paying back and 21 (26.25%) without problem.

Out of the 80 respondents, only 19 (23.75%) ask for a loan from other community members. One may think that the other 61 (76.25%) respondents do not ask for loan because they have their own means. They do not ask for loan mainly because they know that even others do not have means.

People in the study area go also for bush food collection in order to respond to drought. During the drought period, as many as 57 (71.25%) respondents said that they collect bush food such as honey, fruits, nuts among others for sale. Majority of them were found in Mbusyani Sub-location that was relatively far from the township center compared to Tungutu Sub-location.

When asked if they sell some of their household assets during the drought, 47 (58.75%) respondents said that they do sell some their household assets and majority of them were 24 (30.00%) female household heads. It was also important to notice that Tungutu Sub-location has 29 (36.25%) who do sell and 11 (13.75%) who do not sell their household assets against 18 (22.50%) and 22 (27.50%) in Mbusyani Sub-location. The sold assets include livestock such as goats, chicken, cows, donkeys among others and household properties such as radios, beans, pieces of land, and firewood.

Finally, in responding to drought, a very significant number of respondents said that they reduce household expenditure. When asked in which ways they do reduce it, 4 (5.00%) respondents, respectively 2 (2.50%) in Tungutu and Mbusyani Sub-locations said that they send their children to live with relatives. Only 2 (2.50%) respondents respectively 1 (1.25%) from each one of the two covered Sub-locations claimed to

withdraw children from school because of lack of money. As many as 62 (77.50%) respondents said that they reduce food intake by cutting down meals in order to expenditures. The last mentioned way of reducing household expenditure was to stop buying luxurious things like soap, skin care products; cooking products like sugar and salt as well as stopping visits to health care centers when they were sick.

4.2.8.3. Women and drought risk reduction

The key informants put it that any response to drought in a community was the work of women. As managers of the family, they take control of managing the little resources in the family during times of drought. They start small income generating activities including selling of 'Muamba' fruit. During drought, they take control of planning in the family. For instance, one key informant highlighted the fact that if a woman does not do planning for the family, the household falls. Indeed, men do not do any planning since their money was mostly used in alcohol drinking with friends while that of women was for the family. Women were thus more sensitive to the survival of the family during famine period.

It was categorically asserted that women respond in a variety of ways to drought. Once the men run away from home, women were mostly engaged in casual labour to earn money to purchase food for stuffs for the children. In case where there was inadequacy of casual labour, some women take the risk of engaging themselves in prostitution as a way of earning income and thus responding to drought. This was said to be a hidden response to drought situation, but it was becoming really common. The local people have even given a name for those women who go for prostitution during drought. They were commonly referred to as '*Mathaa*', a less judgment term for a prostitute.

Specifically, in Tungutu Sub-location, women engage in small income generating activities making very little but crucial profits. Some make as little profit as 20

shillings. Most of them engage in basket weaving and sell them very cheaply for quick money. Others set up businesses for sewing clothes, mostly repairing clothes. This was a business that fetches very little profit especially when the labour and time invested were costed.

Other women engage in digging of terraces in their farms as a long-term adjustment or response to drought. They know that a terraced farm will have a better yield than one that was not. This activity was mostly carried out by women in groups called '*Mwethya*'. Other times, women fetch water for their husbands to make bricks for sale. In nutshell, the key informant concluded that women perceive themselves as more affected by drought than men.

As a result, women exhibit a more responsible behaviour towards the family during drought periods. Indeed, drought was said to distress mothers when their children cry asking for food, when children get sick because of diseases resulting from drought, when children get dirty because there was no water to bath them or simply when children drop from schools either for assistance in earning income or because there was no money to pay for them. This was seen as a driving force making women to work extra hard.

4.2.9. Impact of drought perceptions

The ways in which people respond to drought were classified into two main categories. First, the answers show that people were economically affected and the following facts have been mentioned: crop failure and poor harvest; a decline in aggregate food supply; an increase of prices for basic food stuffs; hunger and famine; a serious lack of water for human beings and animals; and lack of pasture leading to loss of livestock.

The other category was social in nature and the following facts have been highlighted: family discord leading to separation, an increase in number of thieves; a greater number of men run away from their families; loss of employment and loss of family income; an increased number of children dropping from schools; lack of wood for fuel; and increased diseases due to lack of water and food shortages.

4.3. HYPOTHESES TESTING

Hypotheses guiding the research expressed the relationship between defined variables that were all of them categorical in nature. The statistical technique to be used was therefore the Chi-square test that, according to Mugenda (1999:134), was a form of count occurring in two or more mutual exclusive categories. The technique compares the proportion observed in each category with what would be expected under the assumption of independence between the two variables. After establishing the significance level of the test before-hand, if the observed frequency greatly departs from what was expected, then the null hypotheses stating that the two variables were independent of each other were rejected and conclude therefore that one variable was related to the other. This section presents the results of the tests. The interpretation of these results is done in section 4.3.4 which summarizes the research hypotheses testing

4.3.1. Hypothesis 1

Perceived causes of drought are related to individual socio-economic and demographic factors (sex, age group, religion, level of education, marital status, size of household, occupation, experience with drought, monthly income, and personality). The three perceived causes are tested. That is, the perception of physical events beyond human

control, the natural causes accentuated by human interference, and the perception of drought as an act of God.

4.3.1.1. Perception of physical events beyond human control

(a) Relationship between the perception of physical events beyond human control and sex.

H_A : There is a relationship between the perception of physical events beyond human control and sex.

H_0 : There is no relationship between the perception of physical events beyond human control and sex.

Table 4.20
Relationship between perception of physical events beyond human control and sex.

Sex	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Male	30	37.50	14	17.50	44	55.00
Female	20	25.00	16	20.00	36	45.00
Total	50	62.50	30	37.50	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 1.35

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $1.35 < 3.84$, then the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The

conclusion is that there is **no relationship** between the perception of physical events beyond human control and sex.

(b) Relationship between the perception of physical events beyond human control and age group.

H_A : There is a relationship between the perception of physical events beyond human control and age group.

H_0 : There is no relationship between the perception of physical events beyond human control and age group.

Table 4.21
Relationship between perception of physical events beyond human control and age group.

Age group	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Active	37	<i>46.25</i>	17	<i>21.25</i>	54	<i>67.50</i>
No-active	13	<i>16.25</i>	13	<i>16.25</i>	26	<i>32.50</i>
Total	50	<i>52.50</i>	30	<i>37.50</i>	80	<i>100.00</i>

Source: Survey data

Calculated Chi-square (χ^2) = 2.17

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $2.17 < 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between the perception of physical events beyond human control and age group.

(c) **Relationship between the perception of physical events beyond human control and religion.**

H_A : There is a relationship between the perception of physical events beyond human control and religion.

H_0 : There is no relationship between the perception of physical events beyond human control and religion.

Table 4.22
Relationship between perception of physical events beyond human control and religion

Religion	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Catholic	18	22.50	19	23.75	37	46.25
Protestant	32	40.00	11	13.75	43	53.75
Total	50	62.50	30	37.50	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 5.37

Degree of freedom (DF) = (2-1)(2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was greater than the one from the table, that was $5.37 > 3.84$, therefore, the null hypothesis (H_0) was rejected and the research hypothesis (H_A) was accepted. The conclusion is that there is a **relationship** between the perception of physical events beyond human control and religion.

(d) **Relationship between the perception of physical events beyond human control and level of education.**

H_A : There is a relationship between the perception of physical events beyond human control and level of education.

H_0 : There is no relationship between the perception of physical events beyond human control and level of education.

Table 4.23
Relationship between perception of physical events beyond human control and level of education

Level of education	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
None	13	16.25	14	17.50	27	33.75
Primary	16	20.00	12	15.00	28	35.00
Secondary	21	26.25	4	5.00	25	31.25
Total	50	62.50	30	37.50	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 7.19

Degree of freedom (DF) = (3-1)(2-1) = 2

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 5.99

The calculated Chi-square was greater than the one from the table, that was $7.19 > 5.99$, therefore, the null hypothesis (H_0) was rejected and the research hypothesis (H_A) was accepted. The conclusion is that there is a **relationship** between the perception of physical events beyond human control and level of education.

(e) Relationship between the perception of physical events beyond human control and marital status.

H_A: There is a relationship between the perception of physical events beyond human control and marital status.

H₀: There is no relationship between the perception of physical events beyond human control and marital status.

Table 4.24
Relationship between perception of physical events beyond human control and marital status

Marital status	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Married	41	51.25	24	30.00	65	81.25
Widowed	9	11.25	6	7.50	15	18.75
Total	50	62.50	30	37.50	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 0

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $0 < 3.84$, therefore, the null hypothesis (H₀) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between the perception of physical events beyond human control and marital status.

(f) Relationship between the perception of physical events beyond human control and household size.

H_A: There is a relationship between the perception of physical events beyond human control and household size.

H₀: There is no relationship between the perception of physical events beyond human control and household size.

Table 4.25
Relationship between perception of physical events beyond human control and household size

Household size	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Small	21	26.25	15	18.75	36	45.00
Big	29	36.25	15	18.75	44	55.00
Total	50	62.50	30	37.50	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 0.52

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $0.52 < 3.84$, therefore, the null hypothesis (H₀) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between the perception of physical events beyond human control and household size.

(g) Relationship between the perception of physical events beyond human control and occupation.

H_A: There is a relationship between the perception of physical events beyond human control and occupation.

H₀: There is no relationship between the perception of physical events beyond human control and occupation.

Table 4.26
Relationship between perception of physical events beyond human control and occupation

Occupation	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Farmer	43	53.75	22	27.50	65	81.25
Business	7	8.75	8	10.00	15	18.75
Total	50	62.50	30	37.50	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 1.38

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was 1.38 < 3.84, therefore, the null hypothesis (H₀) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between the perception of physical events beyond human control and occupation.

(h) Relationship between the perception of physical events beyond human control and experience with drought.

H_A: There is a relationship between the perception of physical events beyond human control and experience with drought.

H₀: There is no relationship between the perception of physical events beyond human control and experience with drought.

Table 4.27
Relationship between perception of physical events beyond human control and experience with drought

Experience with drought	Agree*		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
High level	22	27.50	3	3.75	25	31.25
Low level	28	35.00	27	33.75	55	68.75
Total	50	62.50	30	37.50	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 9.02

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was greater than the one from the table, that was $9.02 > 3.84$, therefore, the null hypothesis (H_0) was rejected and the research hypothesis (H_A) was accepted. The conclusion is that there is a **relationship** between the perception of physical events beyond human control and experience with drought.

(i) Relationship between the perception of physical events beyond human control and monthly income.

H_A : There is a relationship between the perception of physical events beyond human control and monthly income.

H_0 : There is no relationship between the perception of physical events beyond human control and monthly income.

Table 4.28
Relationship between perception of physical events beyond human control and monthly income

Monthly income	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Poor	43	53.75	25	31.25	68	85.00
Fair	7	8.75	5	6.25	12	15.00
Total	50	62.50	30	37.50	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 0.17

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $0.17 < 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between the perception of physical events beyond human control and monthly income.

(j) Relationship between the perception of physical events beyond human control and personality.

H_A : There is a relationship between the perception of physical events beyond human control and personality.

H_0 : There is no relationship between the perception of physical events beyond human control and personality.

Table 4.29
Relationship between perception of physical events beyond human control and personality

Personality	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Decide	43	53.75	24	30.00	67	83.75
Not decide	7	8.75	6	7.50	13	16.25
Total	50	62.50	30	37.50	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 0.39

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $0.39 < 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between the perception of physical events beyond human control and personality.

4.3.1.2. Perception of natural causes accentuated by human interference

(a) **Relationship between the perception of natural causes accentuated by human interference and sex.**

H_A : There is a relationship between the perception of natural causes accentuated by human interference and sex.

H_0 : There is no relationship between the perception of natural causes accentuated by human interference and sex.

Table 4.30
Relationship between perception of natural causes accentuated by human interference and sex.

Sex	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Male	24	30.00	20	25.00	44	55.00
Female	14	17.50	22	27.50	36	45.00
Total	38	47.50	42	52.50	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 1.82

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $1.82 < 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between the perception of natural causes accentuated by human interference and sex.

(b) Relationship between the perception of natural causes accentuated by human interference and age group.

H_A : There is a relationship between the perception of natural causes accentuated by human interference and age group.

H_0 : There is no relationship between the perception of natural causes accentuated by human interference and age group.

Table 4.31
Relationship between perception of natural causes accentuated by human interference and age group.

Age group	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Active	27	33.75	27	33.75	54	67.50
Non-active	10	12.50	16	20.00	26	32.50
Total	37	46.25	43	53.75	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 0.92

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $0.92 < 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between the perception of natural causes accentuated by human interference and age group.

(c) **Relationship between the perception of natural causes accentuated by human interference and religion**

H_A : There is a relationship between the perception of natural causes accentuated by human interference and religion.

H_0 : There is no relationship between the perception of natural causes accentuated by human interference and religion.

Table 4.32
Relationship between perception of natural causes accentuated by
human interference and religion.

Religion	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Catholic	12	15.00	25	31.25	37	46.25
Protestant	25	31.25	18	22.50	43	53.75
Total	37	46.25	43	53.75	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 5.06

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was greater than the one from the table, that was $5.06 > 3.84$, therefore, the null hypothesis (H_0) was rejected and the research hypothesis (H_A) was accepted. The conclusion is that there is a **relationship** between the perception of natural causes accentuated by human interference and religion.

(d) Relationship between the perception of natural causes accentuated by human interference and level of education.

H_A : There is a relationship between the perception of natural causes accentuated by human interference and level of education.

H_0 : There is no relationship between the perception of natural causes accentuated by human interference and level of education.

Table 4.33
Relationship between perception of natural causes accentuated by
human interference and level of education.

Level of education	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
None	8	10.00	19	22.75	27	33.75
Primary	11	13.75	17	21.25	28	35.00
Secondary	18	22.50	7	8.75	25	31.25
Total	37	46.25	43	53.75	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 8.75

Degree of freedom (DF) = (3-1) (2-1) = 2

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 5.99

The calculated Chi-square was greater than the one from the table, that was $8.75 > 3.84$, therefore, the null hypothesis (H_0) was rejected and the research hypothesis (H_A) was accepted. The conclusion is that there is a **relationship** between the perception of natural causes accentuated by human interference and level of education.

(e) Relationship between the perception of natural causes accentuated by human interference and marital status.

H_A : There is a relationship between the perception of natural causes accentuated by human interference and marital status.

H_0 : There is no relationship between the perception of natural causes accentuated by human interference and marital status.

Table 4.34
Relationship between perception of natural causes accentuated by human interference and marital status.

Marital status	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Married	33	41.25	32	40.00	65	81.25
Widowed	4	5.00	11	13.75	15	18.75
Total	37	46.25	43	53.75	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 2.98

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $2.98 < 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between the perception of natural causes accentuated by human interference and marital status.

(f) Relationship between the perception of natural causes accentuated by human interference and household size.

H_A : There is a relationship between the perception of natural causes accentuated by human interference and household size.

H_0 : There is no relationship between the perception of natural causes accentuated by human interference and household size.

Table 4.35
Relationship between perception of natural causes accentuated by human interference and household size.

Household size	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Small	17	21.25	19	23.75	36	45.00
Big	20	25.00	24	30.00	44	55.00
Total	37	46.25	43	53.75	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 0

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $0 < 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between the perception of natural causes accentuated by human interference and household size.

(g) Relationship between the perception of natural causes accentuated by human interference and occupation.

H_A : There is a relationship between the perception of natural causes accentuated by human interference and occupation.

H_0 : There is no relationship between the perception of natural causes accentuated by human interference and occupation.

Table 4.36
Relationship between perception of natural causes accentuated by human interference and occupation.

Occupation	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Farmer	33	<i>41.25</i>	32	<i>40.00</i>	65	<i>81.25</i>
Business	4	<i>5.00</i>	11	<i>13.75</i>	15	<i>18.75</i>
Total	37	<i>46.25</i>	43	<i>53.75</i>	80	<i>100.00</i>

Source: Survey data

Calculated Chi-square (χ^2) = 2.98

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $2.98 < 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between the perception of natural causes accentuated by human interference and occupation.

(h) Relationship between the perception of natural causes accentuated by human interference and experience with drought.

H_A : There is a relationship between the perception of natural causes accentuated by human interference and experience with drought.

H_0 : There is no relationship between the perception of natural causes accentuated by human interference and experience with drought.

Table 4.37
Relationship between the perception of natural causes accentuated by human interference and experience with drought.

Experience with drought	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
High level	16	20.00	9	11.25	25	31.25
Low level	21	26.25	34	42.50	55	68.75
Total	37	46.25	43	53.75	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 3.75

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $2.98 < 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between the perception of natural causes accentuated by human interference and experience with drought.

(i) **Relationship between the perception of natural causes accentuated by human interference and monthly income.**

H_A : There is a relationship between perceived natural causes accentuated by human interference and monthly income.

H_0 : There is no relationship between perceived natural causes accentuated by human interference and monthly income.

Table 4.38
Relationship between perception of natural causes accentuated by human interference and monthly income.

Monthly income	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Poor	33	<i>41.25</i>	35	<i>23.75</i>	68	<i>85.00</i>
Fair	4	<i>5.00</i>	8	<i>10.00</i>	12	<i>15.00</i>
Total	37	<i>46.25</i>	43	<i>53.75</i>	80	<i>100.00</i>

Source: Survey data

Calculated Chi-square (χ^2) = 1.58

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $1.58 < 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between the perception of natural causes accentuated by human interference and monthly income.

(j) Relationship between the perception of natural causes accentuated by human interference and personality.

H_A : There is a relationship between the perception of natural causes accentuated by human interference and personality.

H_0 : There is no relationship between the perception of natural causes accentuated by human interference and personality.

Table 4.39
Relationship between perception of natural causes accentuated by human interference and personality.

Personality	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Decide	31	38.75	36	45.00	67	83.75
Not decide	6	7.50	7	8.75	13	16.25
Total	37	46.25	43	53.75	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 0

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $0 < 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between the perception of natural causes accentuated by human interference and personality.

4.3.1.3. Perception of drought as an act of God.

(a) **Relationship between the perception of drought as an act of God and sex.**

H_A : There is a relationship between the perception of drought as an act of God and sex.

H_0 : There is no relationship between the perception of drought as an act of God and sex.

Table 4.40
Relationship between perception of drought as an act of God and sex.

Sex	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Male	38	47.50	6	7.50	44	55.00
Female	34	42.50	2	2.50	36	45.00
Total	72	90.00	8	10.00	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 4.80

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was greater than the one from the table, that was $4.80 > 3.84$, therefore, the null hypothesis (H_0) was rejected and the research hypothesis (H_A) was accepted. The conclusion is that there is a **relationship** between the perception of drought as an act of God and sex.

(b) Relationship between the perception of drought as an act of God and age group.

H_A : There is a relationship between the perception of drought as an act of God and age group.

H_0 : There is no relationship between the perception of drought as an act of God and age group.

Table 4.41
Relationship between perception of drought as an act of God and age group.

Age group	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Active	37	46.25	17	21.25	54	67.50
Non-active	13	16.25	13	16.25	26	32.50
Total	50	62.50	30	37.50	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 2.17

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $2.17 < 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between the perception of drought as an act of God and respondents' age group.

(c) Relationship between the perception of drought as an act of God and religion.

H_A : There is a relationship between the perception of drought as an act of God and religion.

H_0 : There is no relationship between the perception of drought as an act of God and religion.

Table 4.42
Relationship between perception of drought as an act of God and religion.

Religion	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Catholic	29	36.25	8	10.00	37	46.25
Protestant	43	53.75	0	0.00	43	53.75
Total	72	90.00	8	10.00	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 8.89

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was greater than the one from the table, that was $8.89 > 3.84$, therefore, the null hypothesis (H_0) was rejected and the research hypothesis (H_A) was accepted. The conclusion is that there is a **relationship** between the perception of drought as an act of God and monthly income.

(d) Relationship between the perception of drought as an act of God and level of education.

H_A : There is a relationship between the perception of drought as an act of God and level of education.

H_0 : There is no relationship between the perception of drought as an act of God and level of education.

Table 4.43
Relationship between perception of drought as an act of God
and level of education.

Level of education	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
None	24	30.00	3	3.75	27	33.75
Primary	29	36.25	0	0.00	29	36.25
Secondary	19	23.75	5	6.25	24	30.00
Total	72	90.00	8	10.00	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 8.26

Degree of freedom (DF) = (3-1) (3-1) = 4

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 5.99

The calculated Chi-square was greater than the one from the table, that was $8.26 > 3.84$, therefore, the null hypothesis (H_0) was rejected and the research hypothesis (H_A) was accepted. The conclusion is that there is a **relationship** between the perception of drought as an act of God and level of education.

(e) **Relationship between the perception of drought as an act of God and marital status.**

H_A : There is a relationship between the perception of drought as an act of God and marital status.

H_0 : There is no relationship between the perception of drought as an act of God and marital status.

Table 4.44**Relationship between perception of drought as an act of God and marital status.**

Marital status	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Married	33	<i>41.25</i>	32	<i>40.00</i>	65	<i>81.25</i>
Widowed	4	<i>5.00</i>	11	<i>13.75</i>	15	<i>18.75</i>
Total	37	<i>46.25</i>	43	<i>53.75</i>	80	<i>100.00</i>

Source: Survey data

Calculated Chi-square (χ^2) = 2.98

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $2.98 < 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between the perception of drought as an act of God and marital status.

(f) Relationship between the perception of drought as an act of God and household size.

H_A : There is a relationship between the perception of drought as an act of God and household size.

H_0 : There is no relationship between the perception of drought as an act of God and household size.

Table 4.45

Relationship between perception of drought as an act of God and household size.

Household size	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Small	32	40.00	4	5.00	36	45.00
Big	40	50.00	4	5.00	44	55.00
Total	72	90.005	8	10.00	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 0

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $0 < 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between the perception of drought as an act of God and household size.

(g) Relationship between the perception of drought as an act of God and occupation.

H_A : There is a relationship between the perception of drought as an act of God and occupation.

H_0 : There is no relationship between the perception of drought as an act of God and occupation.

Table 4.46**Relationship between perception of drought as an act of God and occupation.**

Occupation	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Farmer	62	77.50	3	3.75	65	81.25
Business	10	12.50	5	6.25	15	18.75
Total	72	90.00	8	10.00	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 8.08

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was greater than the one from the table, that was $8.08 > 3.84$, therefore, the null hypothesis (H_0) was rejected and the research hypothesis (H_A) was accepted. The conclusion is that there is a **relationship** between the perception of drought as an act of God and occupation.

(h) Relationship between the perception of drought as an act of God and experience with drought.

H_A : There is a relationship between the perception of drought as an act of God and experience with drought.

H_0 : There is no relationship between the perception of drought as an act of God and experience with drought.

Table 4.47
Relationship between perception of drought as an act of God
and experience with drought.

Experience with drought	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
High level	22	27.50	3	3.75	25	31.25
Low level	50	62.50	5	6.25	55	68.75
Total	72	90.00	8	10.00	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 0.21

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $0.21 < 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between the perception of drought as an act of God and experience with drought.

(i) **Relationship between the perception of drought as an act of God and monthly income.**

H_A : There is a relationship between the perception of drought as an act of God and monthly income.

H_0 : There is no relationship between the perception of drought as an act of God and monthly income.

Table 4.48
Relationship between perception of drought as an act of God
and monthly income.

Monthly income	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Poor	63	78.75	5	6.25	68	85.00
Fair	9	11.25	3	3.75	12	15.00
Total	72	90.00	8	10.00	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 6.00

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was greater than the one from the table, that was $6.00 > 3.84$, therefore, the null hypothesis (H_0) was rejected and the research hypothesis (H_A) was accepted. The conclusion is that there is a **relationship** between the perception of drought as an act of God and monthly income.

(j) Relationship between the perception of drought as an act of God and personality.

H_A : There is a relationship between the perception of drought as an act of God and personality.

H_0 : There is no relationship between the perception of drought as an act of God and personality.

Table 4.49

Relationship between perception of drought as an act of God and personality.

Personality	Agree		Disagree		Total	
	Frequency	%	Frequency	%	Frequency	%
Decide	62	77.50	5	6.25	67	83.75
Not decide	10	12.50	3	3.75	13	16.25
Total	72	90.00	8	10.00	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 4.97

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $4.97 > 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is a **relationship** between the perception of drought as an act of God and personality

Table 4.50
Summary of the test of hypothesis 1

Contributing factors		Perceived causes of drought		
		Physical events beyond human control	Natural causes accentuated by human interference	Act of God
1	Sex	No	No	Yes
2	Age group	No	No	No
3	Religion	Yes	Yes	Yes
4	Level of education	Yes	Yes	Yes
5	Marital status	No	No	No
6	Household size	No	No	No
7	Occupation	No	No	Yes
8	Experience with drought	Yes	No	No
9	Monthly income	No	No	Yes
10	Personality	No	No	Yes

Source: Survey data

4.3.2. Hypothesis 2:

There is a relationship between awareness of drought and the frequency of the drought occurrence, experience with drought, educational background, income, and occupation.

(a) Relationship between awareness of drought and frequency of drought occurrence.

H_A : There is a relationship between the awareness of drought and the frequency of drought occurrence.

H_0 : There is no relationship between the awareness of drought and the frequency of drought occurrence.

Table 4.51
Relationship between awareness of drought and frequency of drought occurrence.

Frequency	Aware		Not aware		Total	
	Frequency	%	Frequency	%	Frequency	%
Irregular	20	25.00	15	18.75	35	43.75
Once in 3-4 years	38	47.50	7	8.75	45	56.25
Total	58	72.50	22	27.50	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 6.34

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was greater than the one from the table, that was $6.34 > 3.84$, therefore, the null hypothesis (H_0) was rejected and the research hypothesis (H_A) was

accepted. The conclusion is that there is a **relationship** between awareness of drought and the frequency of drought occurrence.

(b) Relationship between awareness of drought and experience with drought

H_A : There is a relationship between awareness of drought and the individual experience with drought.

H_0 : There is no relationship between awareness of drought and individual experience with drought.

Table 4.52
Relationship between awareness of drought and experience with drought

Experience	Aware		Not aware		Total	
	Frequency	%	Frequency	%	Frequency	%
High level	22	27.50	3	3.75	25	68.75
Low level	36	45.00	19	23.75	55	31.25
Total	58	62.50	22	27.50	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 4.65

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was greater than the one from the table, that was $4.65 > 3.84$, therefore, the null hypothesis (H_0) was rejected and the research hypothesis (H_A) was accepted. The conclusion is that there is a **relationship** between awareness of drought and the individual experience with drought.

(c) Relationship between awareness of drought and educational background

H_A : There is a relationship between awareness of drought and educational background.

H_0 : There is no relationship between the awareness of drought and educational background.

Table 4.53
Relationship between awareness of drought and level of education

Level of education	Aware		Not aware		Total	
	Frequency	%	Frequency	%	Frequency	%
None	16	20.00	11	13.75	27	33.75
Primary	22	27.50	7	8.75	29	36.25
Secondary	20	25.00	4	5.00	24	30.00
Total	58	72.50	22	27.50	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 5.09

Degree of freedom (DF) = (3-1) (2-1) = 2

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 5.99

The calculated Chi-square was less than the one from the table, that was $5.09 < 5.99$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between awareness of drought and the individual educational background.

(d) Relationship between awareness of drought and monthly income

H_A : There is a relationship between awareness of drought and the monthly income.

H_0 : There is no relationship between the awareness of drought and the monthly income.

Table 4.54
Relationship between awareness of drought and monthly income

Monthly income	Aware		Not aware		Total	
	Frequency	%	Frequency	%	Frequency	%
Poor	34	42.50	18	22.50	52	65.00
Fair	24	30.00	4	5.00	28	35.00
Total	58	72.50	22	27.50	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 4.36

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was greater than the one from the table, that was $4.36 > 3.84$, therefore, the null hypothesis (H_0) was rejected and the research hypothesis (H_A) was accepted. The conclusion is that there is a **relationship** between awareness of drought and the individual monthly income.

(e) **Relationship between awareness of drought and occupation.**

H_A : There is a relationship between awareness of drought and occupation.

H_0 : There is no relationship between the awareness of drought and occupation.

Table 4.55
Relationship between awareness of drought and occupation.

Occupation	Aware		Not aware		Total	
	Frequency	%	Frequency	%	Frequency	%
Farmer	51	63.75	18	22.50	69	86.25
Business	7	8.75	4	5.00	11	13.75
Total	58	72.50	22	27.50	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 0.53

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $0.53 < 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between awareness of drought and the individual occupation.

Table 4.56
Summary of the test of hypothesis 2

Is there any relationship between	Frequency of drought	Experience with drought	Level of education	Monthly Income	Occupation
Awareness of drought	Yes	Yes	No	Yes	No

Source: Survey data

4.3.3. Hypothesis 3:

Responses to drought were related to experience with drought. Tests are done for the two categories of responses. That is, pro-active and reactive responses to drought.

4.3.3.1. Proactive responses

(a) **Relationship between praying to God to give adequate rains and experience with drought.**

H_A : There is a relationship between praying to God to give adequate rains as a response to drought and experience with drought.

H_0 : There is no relationship between praying to God to give adequate rains as a response to drought and experience with drought.

Table 4.57
Relationship between praying to God to give adequate rains and experience with drought

Experience with drought	Praying to God to give adequate rains constitutes a response to drought.					
	AGREE		DISAGREE		TOTAL	
	Frequency	%	Frequency	%	Frequency	%
High level	25	31.25	0	0	25	31.25
Low level	53	66.25	2	2.50	55	68.75
Total	78	97.50	2	2.50	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 2.06

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $2.06 < 3.84$, therefore, the null hypothesis (H_0) was rejected and the research hypothesis (H_A) was accepted. The conclusion is that there is **no relationship** between praying to God to give adequate rains as a response to drought and experience with drought.

(b) Relationship between cultivating subsidiary food crops and experience with drought

H_A : There is a relationship between cultivating subsidiary food crops as a response to drought and experience with drought.

H_0 : There is no relationship between cultivating subsidiary food crops as a response to drought and experience with drought.

Table 4.58
Relationship between cultivating subsidiary food crops and experience with drought

Experience with drought	Cultivating subsidiary food crops constitutes a response to drought					
	AGREE		DISAGREE		TOTAL	
	Frequency	%	Frequency	%	Frequency	%
High level	20	25.00	5	6.25	25	31.25
Low level	32	40.00	23	28.75	55	68.75
Total	52	65.00	28	35.00	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 4.06

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $4.06 > 3.84$, therefore, the null hypothesis (H_0) was rejected and the research hypothesis (H_A) was accepted. The conclusion is that there is a **relationship** between cultivating subsidiary food crops as a response to drought and experience with drought.

(c) Relationship between constituting a food stock and experience with drought

H_A : There is a relationship between constituting a food stock as a response to drought and experience with drought.

H_0 : There is no relationship between constituting a food stock as a response to drought and experience with drought

Table 4.59
Relationship between constituting a food stock and experience with drought

Experience with drought	Constituting a food stock constitutes a response to drought.					
	AGREE		HYPOTHESIS		TOTAL	
	Frequency	%	Frequency	%	Frequency	%
High level	22	27.50	3	3.75	25	31.25
Low level	33	41.25	22	27.50	55	68.75
Total	55	68.75	25	31.25	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 6.73

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $6.73 > 3.84$, therefore, the null hypothesis (H_0) was rejected and the research hypothesis (H_A) was accepted. The conclusion is that there is a **relationship** between constituting a food stock as a response to drought and experience with drought.

(d) Relationship between planting drought resistant crops and experience with drought

H_A : There is a relationship between planting drought resistant crops as a response to drought and experience with drought.

H_0 : There is no relationship between planting drought resistant crops as a response to drought and experience with drought.

Table 4.60
Relationship between planting drought resistant crops and experience with drought

Experience with drought	Planting drought resistant crops constitutes a response to drought					
	AGREE		DISAGREE		TOTAL	
	Frequency	%	Frequency	%	Frequency	%
High level	21	26.25	4	5.00	25	31.25
Low level	39	48.75	16	20.00	55	68.75
Total	60	75.00	20	25.00	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 11.34

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $11.34 > 3.84$, therefore, the null hypothesis (H_0) was rejected and the research hypothesis (H_A) was accepted. The conclusion is that there is a **relationship** between planting drought resistant crops as a response to drought and experience with drought.

(e) Relationship between going elsewhere to share cropping with relatives or friends and experience with drought

H_A : There is a relationship between going elsewhere to share cropping with relatives or friends as a response to drought and experience with drought.

H_0 : There is no relationship between going elsewhere to share cropping with relatives or friends as a response to drought and experience with drought.

Table 4.61
Relationship between going elsewhere to share cropping with relatives or friends and experience with drought

Experience with drought	Going elsewhere to share cropping with relatives or friends constitutes a response to drought.					
	AGREE		DISAGREE		TOTAL	
	Frequency	%	Frequency	%	Frequency	%
High level	19	23.75	6	7.50	25	31.25
Low level	26	32.50	29	36.25	55	68.75
Total	45	56.25	35	43.75	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 5.91

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $5.91 < 3.84$, therefore, the null hypothesis (H_0) was rejected and the research hypothesis (H_A) was accepted. The conclusion is that there is a **relationship** between going elsewhere to share cropping with relatives or friends as a response to drought and experience with drought.

(f) Relationship between going elsewhere to find a job as an agricultural labourer and experience with drought

H_A : There is a relationship between going elsewhere for a job as an agricultural labourer as a response to drought and experience with drought.

H_0 : There is no relationship between going elsewhere for a job as an agricultural labourer as a response to drought and experience with drought.

Table 4.62
Relationship between going elsewhere to find a job as an agricultural labourer and experience with drought

Experience with drought	Going elsewhere for a job as an agricultural labourer constitutes a response to drought.					
	AGREE		DISAGREE		TOTAL	
	Frequency	%	Frequency	%	Frequency	%
High level	16	20.00	9	11.25	25	31.25
Low level	19	23.75	36	45.00	55	68.75
Total	35	43.75	45	56.25	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 5.91

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was greater than the one from the table, that was $5.91 > 3.84$, therefore, the null hypothesis (H_0) was rejected and the research hypothesis (H_A) was accepted. The conclusion is that there is a **relationship** between going elsewhere for a job as an agricultural labourer as a response to drought and experience with drought.

(g) Relationship between evacuating the area and experience with drought

H_A : There is a relationship between evacuating the area as a response to drought and experience with drought.

H_0 : There is no relationship between evacuating the area as a response to drought and experience with drought.

Table 4.63
Relationship between evacuating the area and experience with drought

Experience with drought	Evacuating the area constitutes a response to drought.					
	AGREE		DISAGREE		TOTAL	
	Frequency	%	Frequency	%	Frequency	%
High level	1	1.25	24	30.00	25	31.25
Low level	1	1.25	54	67.50	55	68.75
Total	2	2.50	78	97.50	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 0

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $0 < 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between evacuating the area as a response to drought and experience with drought.

Table 4.64
Summary of the test of hypothesis 3 (Pro-active responses)

Is there any relationship between	Experience with drought
1. Praying to God to give adequate rains	No
2. Cultivating subsidiary food crops	Yes
3. Constituting a food stock	Yes
4. Planting drought resistant crops	Yes
5. Going elsewhere to share cropping with relatives	Yes
6. Going elsewhere to find a job as an agricultural labourer	Yes
7. Evacuating the area	No

Source: Survey data

4.3.3.2.Reactive responses

(a) **Relationship between waiting for a free ration and experience with drought.**

H_A : There is a relationship between waiting for free ration as a reactive response to drought and experience with drought.

H_0 : There is no relationship between waiting for free ration as a reactive response to drought and experience with drought.

Table 4.65
Relationship between waiting for a free ration and experience with drought

Experience with drought	Do you wait for a free ration during drought?					
	YES		NON		TOTAL	
	Frequency	%	Frequency	%	Frequency	%
High level	13	16.25	12	15.00	25	31.25
Low level	32	40.00	23	28.75	55	68.75
Total	45	56.25	35	43.75	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 0.23

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $0.23 < 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between waiting for free ration as a reactive response to drought and experience with drought.

(b) **Relationship between using food reserve and experience with drought**

H_A : There is a relationship between using food reserves as a reactive response to drought and experience with drought.

H_0 : There is no relationship between using food reserves as a reactive response to drought and experience with drought.

Table 4.66
Relationship between using food reserve and experience with drought

Experience with drought	Do you use food reserves during drought?					
	YES		NON		TOTAL	
	Frequency	%	Frequency	%	Frequency	%
High level	24	30.00	1	1.25	25	31.25
Low level	55	68.75	0	0.00	55	68.75
Total	79	98.75	1	1.25	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 1.06

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $1.06 < 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between using food reserves as a reactive response to drought and experience with drought.

(c) **Relationship between borrowing food from relatives and experience with drought**

H_A : There is a relationship between borrowing food from relatives as a reactive response to drought and experience with drought.

H_0 : There is no relationship between borrowing food from relatives as a reactive response to drought and experience with drought.

Table 4.67
Relationship between borrowing food from relatives and experience with drought

Experience with drought	Do you borrow food from relatives during drought?					
	YES		NON		TOTAL	
	Frequency	%	Frequency	%	Frequency	%
High level	23	28.75	2	2.50	25	31.75
Low level	45	56.25	10	12.50	55	68.25
Total	68	85.00	12	15.00	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 1.78

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $1.78 < 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between borrowing food from relatives as a reactive response to drought and experience with drought.

(d) Relationship between asking for loan from institution or private individuals and experience with drought

H_A : There is a relationship between asking for loan from institution or private individuals as a reactive response to drought and experience with drought.

H_0 : There is no relationship between asking for loan from institution or private individuals as a reactive response to drought and experience with drought.

Table 4.68
Relationship between asking for loan from institution or private individuals and experience with drought

Experience with drought	Do you ask for loan during drought?					
	YES		NON		TOTAL	
	Frequency	%	Frequency	%	Frequency	%
High level	5	6.25	20	25.00	25	31.25
Low level	14	17.50	41	51.25	55	68.75
Total	19	23.75	61	76.25	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 0.32

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $0.32 < 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between asking for loan from institution or private individuals as a reactive response to drought and experience with drought.

(e) **Relationship between reducing household expenditure and experience with drought**

H_A : There is a relationship between reducing household expenditure as a reactive response to drought and experience with drought.

H_0 : There is no relationship between reducing household expenditure as a reactive response to drought and experience with drought.

Table 4.69
Relationship between reducing household expenditure and experience with drought

Experience with drought	Do you reduce household expenditure during drought?					
	YES		NON		TOTAL	
	Frequency	%	Frequency	%	Frequency	%
High level	22	27.50	3	3.75	25	31.25
Low level	46	57.50	9	11.25	55	68.75
Total	68	85.00	12	15.00	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 0.45

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $0.45 < 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between reducing household expenditure as a reactive response to drought and experience with drought.

(f) Relationship between collecting bush food for sale and experience with drought

H_A: There is a relationship between collecting bush food for sale as a reactive response to drought and experience with drought.

H₀: There is no relationship between collecting bush food for sale as a reactive response to drought and experience with drought.

Table 4.70
Relationship between collecting bush food for sale and experience with drought

Experience with drought	Do you collect bush food for sale during drought?					
	YES		NON		TOTAL	
	Frequency	%	Frequency	%	Frequency	%
High level	17	21.25	8	10.00	25	31.25
Low level	40	50.00	15	18.75	55	68.75
Total	57	71.50	23	28.75	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 0.29

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $0.29 < 3.84$, therefore, the null hypothesis (H₀) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between collecting bush food for sale as a reactive response to drought and experience with drought.

(g) Relationship between selling some of the household assets and experience with drought

H_A: There is a relationship between selling some of the household assets as a reactive response to drought and experience with drought.

H_0 : There was a relationship between selling some of the household assets as a reactive response to drought and experience with drought.

Table 4.71
Relationship between selling some of the household assets and experience with drought

Experience with drought	Do you sell some of your household assets?					
	YES		NON		TOTAL	
	Frequency	%	Frequency	%	Frequency	%
High level	13	16.25	12	15.00	25	31.25
Low level	34	42.50	21	26.25	55	68.75
Total	47	58.75	33	41.25	80	100.00

Source: Survey data

Calculated Chi-square (χ^2) = 0.97

Degree of freedom (DF) = (2-1) (2-1) = 1

Level of significance (α) = 5%

Chi-square from the table (χ^2) = 3.84

The calculated Chi-square was less than the one from the table, that was $0.97 < 3.84$, therefore, the null hypothesis (H_0) was accepted and the research hypothesis (H_A) was rejected. The conclusion is that there is **no relationship** between selling some of the household assets as a reactive response to drought and experience with drought.

Table 4.72
Summary of the test of hypothesis 3 (Reactive responses)

Is there any relationship between	Experience with drought
1. Waiting for a free ration	No
2. Using food reserve	No
3. Borrowing food from relatives	No
4. Asking for a loan from institution or private individuals	No
5. Reducing household expenditure	No
6. Collecting bush food for sale	No
7. Selling some of the household assets	No

Source: Survey data

4.3.4. Conclusion

The results of the tests show that the level of education and religious affiliation contribute to people's perceptions of drought. The awareness of drought is found to be associated with the frequency of drought occurrence, experience with drought, and the monthly income. Importantly, while most of the pro-active responses were associated with the experience with drought, none of the reactive responses was found to be related to the experience with drought. In conclusion, the drought is a matter of knowledge. The risk associated with drought for the affected community was a product of the exposure to the drought hazard and the vulnerability of local people to the event and there was nothing that can be done to alter the drought occurrence because it is a normal part of climate. There is, therefore, need for a concerted drought management and preparedness measures.

Chapter 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0. INTRODUCTION

In the preceding chapters, perceptions of drought, factors contributing, responses to drought and drought impacts have been discussed separately and the research hypotheses tested. This chapter presents the summary, conclusions and recommendations of the study. It consists of three sections: the overview of the study findings; conclusions drawn from the findings; and the respective recommendations for further research, drought management policies for the study area, and specific recommendations to the local community.

5.1. SUMMARY OF FINDINGS

This section groups together the findings of the study. It summarizes the socio-economic and demographic characteristics of the respondents, the perceptions of drought, the factors contributing to the perceptions of drought, the pro-active as well as reactive actions taken in response to drought, and the impact of the drought perceptions on the overall rural development.

5.1.1. Socio-economic and demographic characteristics of the respondents

In the study area, 67.50% of people fall into the category of active age group and the survey shows two categories of marital status, married (81.25%) and widowed (18.75%). The size of the household was classified as "big", with 55% of the researched households having more than 5 people. Concerning religious issues, 53.75% of people belong to the Protestant religion, while 46.25% are Catholics.

The level of educational was moderate as evidenced by the fact that 33.75% of the respondents have never been to school. A further 35% claimed to have done their primary education while only 31.75% had secondary school education. The later is the highest level of education in the study area. The majority (65%) live under the rural poverty line with a monthly income of less than KSh 1,500. As sources of income, 81.25% were involved in farming activities and 18.75% were running small scale business activities.

Majority of the respondents (67.50%) were aware of drought and 56.25% perceived the frequency of the drought occurrence to be once in every 3 or 4 years. The main advantage with the settlement was the presence of friends and relatives followed respectively by the presence of some privileges by being born in the area, low cost of living, rains occurring in time, availability of agricultural labour, limited damages to crops from wild animals, availability of non-farm employment opportunities, and the availability of grazing land for cattle in the last position.

5.1.2. Perceptions of drought

In Kitui district, drought and hunger were not inseparable concepts. Thus, drought was taken as hunger or famine. The major reason why people perceive drought as famine was the accompanying reality of food shortage. When there was drought, there was hardly enough water to grow food, to drink and to water the livestock.

Thus, when people start investing a lot of time in searching for water, it becomes apparently clear that there was famine. To these people, the time spent in search of water becomes the indicator of drought and not the lack of water. This was because even if they spent days at the water source, at the end of the stay they will get water.

Three categories of perceived causes of drought have been identified and people in the study area had a good knowledge about the drought prediction. The indicators included local people's sense of seasons; the occurrence of "Ngie" seen as a sign of looming drought and subsequent famine; the lining of moon referred to as "Kivuo"; as well as the reproductive behaviour of indigenous trees such as "Muamba", "Muthumula", and Mangoes.

5.1.3. Factors contributing to the perceptions of drought

The main factors contributing to the different perceived causes of drought were the level of education and religion. These two factors are also the main components of illiteracy in the study area. However, the study shows also that the age group, marital status, and household size do not influence at all the perceived causes of drought. This is because the drought hazard is a matter of knowledge and not a simply a question of culture and social affairs.

The study shows that there is a relationship between awareness of drought and frequency of drought occurrence, experience with drought and monthly income. However, this relationship does not exist with level of education as well as for the respondents' occupation.

5.1.4. Responses to drought

Responses to drought hazard were classified into two main categories. That is, the "pro-active" responses including all actions taken long time before the drought occurrence, and the "reactive" responses grouping the actions taken during the drought period. While all the pro-active responses were associated with the experience with drought except praying to God to give adequate rains and evacuating the area as responses to drought, none of the

different reactive responses to drought was found to be associated with the experience with drought.

5.1.5. Impact of the perceptions of drought on rural development

The general contention was that drought inhibits people from working or participating in rural development activities. The reason was that during droughts there was an increase in such diseases as cholera, making many children drop out of schools to do casual labour. This was utterly displeasing to the parents and any activity that seems to address the issue of drought was highly appreciated.

However, according to the field officer of a local NGO, the failure of past efforts to address drought has made the people suspicious and skeptical in participating in certain development activities. At first, people participate with suspicion, and once the first results were seen, then participation increases. The morale of the people was boosted by success of a project and not as a result of drought.

5.2. CONCLUSIONS

In the study area, a drought is when people go for a long period without rainfall. Drought threatens lives and livestock. It leads to poor harvest, lack of pasture for livestock, diseases, hunger and famine. However, drought does not happen randomly. Rather, it can be predicted and precautions can be taken to reduce its harmful impacts. It has some unique characteristics that require different approaches to monitor its development and cessation and assess potential impacts on people and society. Because of the slow-onset nature of drought, it is essential that early warning systems have the capacity to detect the early emergence of rainfall deficiencies that will normally be the best indicator of an incipient drought period.

The study shows an enhanced awareness of the need for more concerted drought management and preparedness measures. Increase in the drought hazard is the result of the increased frequency and severity of drought as well as an increased societal vulnerability to drought and somehow a combination of the two.

5.3. RECOMMENDATIONS

The study findings and the above related conclusions show that the drought impact is a function of people's vulnerability. While these people cannot do away with drought as a natural hazard, a lot of sensitization must be done about eliminating those they cause, minimizing those they exacerbate, and reducing their vulnerability to most. In this section, recommendations are formulated for further research, drought management policy, and some specific actions to be done by local community in order to lessen the incidence and impact of drought.

5.3.1. Recommendations for further research

Based on the study findings, the following specific issues are recommended for further research:

- (a) In order to facilitate further research towards drought risk reduction, priority should be given to 'comparative studies of the perceptions of drought' to be conducted in other drought prone areas.
- (b) During droughts, fresh food is scarce in the markets. A study of 'decline in aggregate food supply' is crucial so as to show the commonly available foods during droughts.

- (c) During droughts, both urban dwellers, who depend on piped water, and rural dwellers, who depend on water from rivers, natural springs and wells, face an acute water shortage. Prolonged acute water shortage for domestic use is a major cause of disease outbreaks such as typhoid and cholera. A study of 'water shortage and resulting diseases' could contribute to better understanding of these illnesses, which limit local people's participation in water and other development activities.
- (d) During droughts, pastures and grasses dry up. It becomes harder and harder to find food for animals. Livestock is in danger due to shortage of pastures and water. They become weak and die. A study of 'loss of pastures and loss of livestock' will further improve the scientific and local knowledge of the drought impacts on the affected communities.
- (e) A long period of drought can be devastating especially to rural people, who depend on wood fuel for domestic purposes. Trees dry up and die because of the decrease in soil moisture. New seeds do not germinate. Wildfires occur more easily which can further deplete wood-stocks and can lead to destruction of property and life. A study on 'drought and loss of wood fuel' could enrich efforts to increase local people's knowledge in environment prevention.
- (f) This study touches on how women are affected by, and respond to, drought. A more detail study of 'women's and men's contribution to drought risk reduction' will help to strengthen the gender angle in understanding and dealing with drought.

5.3.2. Recommendations for drought management policy

The following are critical recommendations for drought management:

- (a) Drought early warning systems are an essential component of drought preparedness plans and policies, and their design and development should be the

mandate of the local administration that can be assisted by existing local community-based organizations. An early warning system for drought must not only encompass mechanisms and procedures for the collection and analysis of information in a timely manner, but also for the dissemination of that information through locally appropriate channels to potential end users.

- (b) Training end users about the value of the information from the early warning system in decision making is also essential. Once an incipient drought period was identified or forecast, there should be continuous information flow on expected onset and timing, intensity, cessation, duration, spatial extent and changes in spatial coverage through time, and the estimation of economic, social, and environment impacts.
- (c) The approach to drought in the past has been generally reactive and response oriented, that was, through crisis management. Pro-active measures need to be promoted and supported.
- (d) The risk associated with drought for this community was product of the exposure to the drought hazard and the vulnerability of local people to the event and there was nothing that can be done to alter its occurrence because drought was a normal part of climate. Local administration with any assistance from existing NGOs and CBOs, should conduct ongoing risk assessments to determine who and what was most at risk to drought and why.
- (e) A vulnerability profile is an invaluable tool in assessing risk and should be completed as part of drought preparedness planning. The most vulnerable sectors such as health and education, as well as vulnerable groups such as children, elders, and people with chronic sickness can be systematically addressed as part of this planning process.

5.3.3. Recommendation to the local community

For the local community, the study recommends the following:

- (a) Local communities should no longer wait for the government or other development partners to initiate or take lead in water development projects. They should be supported to organize themselves to solve their water problems and thus fight poverty resulting from the local perceptions of drought. For as long these communities continue to believe that the responsibility of tackling ~~the~~ this poverty lies in the hands of the government, poverty levels among them will remain high.
- (b) Although people cannot control the rain and the water, they should be sensitized that can take certain measures to ensure that a drought does not become a major disaster. For instance, they should:
 - i) Keep food reserves in a community pool. This will be done after every bumper harvest and the stored food can later be used during drought;
 - ii) Grow more drought resistant crops such as millet, cassava and sweet potatoes. These crops need little water and can be preserved for a long time after harvest;
 - iii) Monitor weather patterns and rainfall. This should be done by listening to the radio for more information as to upcoming weather changes.
- (c) Local communities should be facilitated to renew their commitment to relying more on local resources rather than external handouts. This is one way of enhancing pro-active responses to drought.
- (d) An integrated local development approach based on community-driven priorities and processes should guide the change agenda in Kitui and other ASALs.

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APPENDIX: QUESTIONNAIRE

My names are Célestin KARABAYINGA, a student at the University of Nairobi, Department of Sociology. I have come here to learn about how drought affects people living in this area. I am interested in your District because it is one of the most affected by the drought. The information I collect here is for academic purpose and you have been selected to participate in this process. I would like to ask you some questions about how drought affects your community and the information you will give me will be strictly confidential. It is not necessary to give me your names.

1) Personal characteristics

a) Name of the sub-location

b) Sex: Female Male

c) Age (years):

Under 20	21-30	31-40	41-50	51-60	Above 60

d) Religion:

Catholic	Protestant	Muslim	Traditionalist	Other (Specify)

e) Educational background:

None	Primary	Secondary	University	Other (Specify)

f) Marital status:

Single	Married	Divorced	Separated	Widowed	Other (Specify)

g) How many people do you have in your household?

Female	Male	Total

h) Occupation:

Farmer	Business(man/woman)	Civil servant	Other (Specify)

i) What is your monthly income (in Ksh.)?

<500	501-1,000	1,001-1,500	1,501-2,000	2,001-2,500	>2,501

2) Have you been born in this area?

Yes No

If No, you are from which region (specify)? _____

3) What are the main reasons of staying in this area?

4) Are you aware of the drought that affects your community?

Yes No

5) How many droughts have you personally experienced?

1	2 - 4	5 - 7	8 - 10	11 - 13	14 - 15	>15

6) (a) What is the frequency of drought occurrence in your area?

At irregular intervals	Once in 3-4 years	Once in 5-7 years	Once in 8-10 years	Once in over 10 years

(b) Specify the years in which you have experienced drought

(c) What were their main impacts?

7) For you, what are the causes of drought (PROBE)?

Do you think		Answer	
		Yes	No
1	They are physical events beyond human control?		
2	They are natural causes exacerbated by human interference?		
3	It is an act of God?		
4	It is a bad luck?		
5	You do not know?		
Other (specify): _____			

8) Do you decide on your own which action to take in order to lessen the drought impact? Yes No

If No, do you need other community members' ideas to decide on what to do to protect your family against drought impact? Yes No

9) (a) What actions do you take in preparation against the drought ahead?

(b) Are there specific actions undertaken by men and women separately to prepare against drought (PROBE)? _____

14) During the period of drought, do you reduce household expenditure? Yes No

If yes, please specify:

Do you	Yes	No
Send children to live with relatives?		
Withdraw children from schools?		
Reduce food intake (cut down meals)?		
Other (specify): _____		

15) During the drought period, do you collect bush food produce (honey, fruits, nuts, wood, etc.) for sale? Yes No

16) During the drought period, do you sell some of your assets? Yes No

If yes, please specify which ones: _____

17) (a) Name different ways in which drought impacts your community. _____

(b) Are there special impacts of drought on the wellbeing of men and women? (PROBE)

18) Any other issue to add? _____

Thank you for your cooperation.

ISSUES TO RAISE WITH KEY INFORMANTS

- 1) How people in this area perceive drought in general?**
- 2) What are the factors influencing those perceptions?**
 - (a) Situational factors
 - (b) Psychological factors
- 3) In what ways did people in this area respond to drought as a disaster?**
 - (a) In 1991/1992
 - (b) In 1995/1996
 - (c) In 2000
- 4) What are the impacts of these perceptions on the overall rural development?**
 - (a) Social
 - (b) Economic
 - (c) Environmental/ecological
- 5) What about the indigenous knowledge in drought impact reduction?**
 - (a) Prediction of drought
 - (b) Early warning systems
 - (c) Responses to drought

Thank you for your cooperation.