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COPING STRATEGIES FOR DROUGHT INDUCED FOOD SHORTAGE: THE CASE OF SMALL HOLDER FARMERS IN FEDIS DISTRICT, EAST HARERGHE ZONE, OROMIYA REGIONAL STATE

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Acknowledgement

This thesis reached to final stage as a result of direct and indirect input contributed from different peoples and organizations which was impossible otherwise. Thus, I would like to acknowledge for their indispensable contributions to my success.

First and foremost, I would like to thank my advisor Dr.Yohannes Abera for two most invaluable inputs to my work starting from proposal development to final research stage. Firstly: for his dedication to read and comment my work without getting bored. Secondly: for streamlining study concepts towards right truck from beginning to the end. Thank you for both!!!

My special thanks also goes to district and PA level office holders of Fedis district for their unreserved support throughout data collection process. I am greatly value the support that I have got from respective PAs Development Agents and administrators during data collection period at the study site especially in organizing focus group discussions, in providing and supporting me all necessary information for wealth ranking and other help. Without their support, this research thesis was not reached this stage. In addition, I would like to thank all my key informants, group discussion participants, and respondent households who provided me the necessary information in three study PAs.

Moreover, I would like to thank my family and relatives for their encouragement, love and follow up throughout my research work.

Above all, I thank ALMIGHTY God for his help throughout my life and giving me strength to carry out all activities of this research work.

Thank you all!

Anteneh Derribew

Abstract

The central theme of this study was to explore how farm households cope with drought induced food shortage and investigating effectiveness of coping strategies in building the resilience of farmers' livelihoods at Fedis district. In order to meet these objectives, various data collection and analysis techniques were employed. The necessary data were generated from primary and secondary data sources to triangulate or crosscheck one data collection methods with the other so that its reliability could be maximized. Hence, field observation, household survey, key informant interview and focus group discussions were the principal means of generating primary sources of data while secondary data were obtained from various governmental and nongovernmental organizations' documents and reports, books and academic research papers. The data collected through household survey were coded and entered into Statistical Package for Social Sciences (SPSS) and analyzed by using descriptive as well as inferential statistical techniques such as frequency, percentage, one way ANOVA, correlation, An independent sample t-test and cross tabulation of different variables.

The study findings revealed that the intensity and frequency of drought has been increasing in the last few decades. In line with this, the number of population exposed for food shortage have been increasing and dependency on external food sources become prevalent recently. Vulnerability to food shortages has been increasing owing to low entitlement to productive assets (land, farm oxen), traditional farm operations which undermine the coping capacity of the farm households. Besides, the biophysical and socio-economic factors constraining the major livelihoods activities thus the farm households could not obtain the required benefits for their daily life. The cumulative effects of recurrent drought and the aforementioned aggravating factors unable the farm households to cover their family's annual food requirements even under normal circumstances.

The farm households develop different coping strategies to overcome the problems of food shortage. The identified coping strategies were changing consumption patterns, borrowing, appealing for food aid, eating wild foods, migration to surrounding urban areas, selling fuel wood and charcoal, pulling children out of school and trading. Depending up on their wealth status, the farm households employ one or the combinations of these strategies to smooth food consumption patterns during drought induced harvest failures.

The coping strategies effectiveness in building the resilience of farmers' livelihoods was also measured against the pre developed indicators. Thus, changing consumptions patterns, receiving food aid, migration, selling fuel wood and charcoal, pulling children out of school were not effective coping strategies. These are strategies that can undermine the future livelihoods of the farm households since they were at very high cost. On the other hand, petty trading and borrowing are most preferred future drought coping strategies by the farm households and needs to be strengthened.

Based on the study findings, different actions by the government and non government organizations need to be undertaken to enhance the coping capacity and ensure the effectiveness of coping strategies have been recommended for better and secure livelihoods in the future.

Key words: coping strategies, coping capacity, effectiveness

List of Acronyms

AMSL	Above Mean sea Level
CGIR	Consultative Group on International Agricultural Research
CISP	International Committee for the Development of peoples (Italian NGO)
DPPC	Disaster prevention and preparedness office
EHZFO	East Hareaghe Zone Finance Office
ENN	Emergency Nutrition Network
FAO	Food and Agricultural Organization
GO	Government Organization
Ha	Hectare
HCS	Human Coordination System
HHDs	Households
IFAD	International Fund for Agricultural Development
ILO	International Labor Organization
MOFED	Ministry of Finance and Economic Development
NDMAI	National Disaster Management of India
NGO	Non Government Organization
PASDEP	Plan for Accelerated and Sustained Development to End Poverty
PSNP	Productive Safety net Program
SERA	Strengthening Emergency Response Abilities
SPSS	Statistical Package for Social Sciences
TLU	Topical Livestock Unit
UN	United Nations
USAID	United State Agency for International Development

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Evidence indicates that extreme weather events such as drought, heat and cold waves, heavy storms, floods, rising sea levels and increasing irregularities in seasonal rainfall are increasing with the changing climate. These have been affecting the global food production system, distribution infrastructures, incidence of food emergencies and livelihoods assets (FAO, 2008). Drought is the most climatic phenomenon affecting the livelihoods of millions of population worldwide throughout human history as compared to other climatic induced disasters (IFAD, 2009). It is the trigger of food shortage in lowering yields in crop and livestock production, increasing plant and animal diseases, livestock deaths, insect infestation, forest and range fires, damage to fish habitat, land degradation and soil erosion. Apart from these, it affects human health by increasing the risk of malnutrition, water and food borne diseases (FAO, 2011).

Africa is the most vulnerable continents because of deep poverty, diseases, poor governance, weak institutions, limited access to capital and markets, poor infrastructures and inadequate technology which are responsible for lowering the adaptive capacity (Haakansson, 2009). Ethiopia like other developing countries has been exposed to different disasters. Drought is the most common causes of disaster and food crisis in terms of frequency, area coverage and number of people affected (DPPC, 2004). In the last three decades in general (1970-1996), 25 drought events associated with food shortage and famine led to the deaths of 1,200,367 peoples and 60,880,064 affected (USAID, 2003). The DPPC (2004) also noted that there were many drought events occurred even before 1970s which sought for external support. Therefore, Ethiopia as one of the droughts stricken countries in the world is vulnerable to chronic food shortages for the last several decades (ENN, 2011). According to USAID (2003), these are mainly attributed to poor policy and inappropriate use of human and natural resources. These made more than half of population unable to meet the basic requirement for their livelihood even under normal climatic conditions.

Like other parts of the country, Oromiya region is dependent on rain fed agriculture and most areas are suitable for crop production. It is only some parts of the region suffering

from shortages of rainfall. The Southern and Eastern parts; Borena, Bale, East and West Harerghe and rift valley areas are generally not conducive for crop production and vulnerable to recurrent drought (Ahmed *et al.,* 2011). East Harerghe is known for their structural food insecurity, proneness to drought and famine. Staple food crop production, maize and sorghum are constrained by erratic and unpredictable rainfall pattern. These are worsened by high population pressure on land, lack of water resource and soil degradation (UN, 2003).

In order to cope up with drought induced food shortage, the smallholder farmers adopt different strategies which in turn led them to frequent food crisis (IFAD, 2009). In addition to these, based on their economic status, sex, age and other characteristics they use external food assistance like emergency food aid from GOs and NGOs, participating in food security related projects to get relief from drought stress (Abdullahi, 2006 cited Firehiwot, 2007). Despite of these, vulnerability to food shortage has been increasing in the last few years.

1.2 Statement of the Problem

The population of Fedis district has been food insecure for the last 30 years. Agricultural productivity has been declining from time to time owing to recurrent drought and other environmental related factors (SERA, 2000). Belaineh (2002) similarly argues that the study area is known for the occurrence of recurrent droughts and a repeatedly recorded shortage of food as well as migration of the majority of its population to neighboring towns and districts during food shortages.

The frequency and severity of drought has been increasing 1970s afterwards. It has been occurred within ten years interval in between 1974 and 1994. However, since 1994, it has occurred in 1999 within an interval of five years. After 1999, it has been occurring yearly. In line with the increasing frequency of drought events, vulnerability to drought effects has been increasing at the study area (SERA, 2000). The Livelihoods study report by East Harerghe Zone (2008) also noted that the area is known by food deficit every year. However, little attention is given by government and non-government organizations for such areas despite they have been persistently hit by severe food shortage

The small scale farmers in the study area are not the passive recipient of the drought effects. They have been employing different survival strategies based on their wealth status. The farmers are using to sell their assets, migrating to nearby towns in search for employment to

access food items. In addition to these, the federal as well as the nongovernmental organizations providing targeted relief support to the affected groups. However, there is no adequate survey conducted so far to understand whether these coping strategies are exacerbating vulnerability or mitigate the effects of drought at the study area. Besides, the vast knowledge of the population with regard to drought coping mechanisms is not yet surveyed at the study area.

Therefore, there is need for research to understand how the small scale farmers cope with drought induced food shortage and its effectiveness through self developed indicators so as to design appropriate coping options and interventions which are important to enhance the resilience of farmers to drought related shocks. The results of study are helpful to understand the local situation and design appropriate coping options which enhance the resilience of farmers' livelihood in the study area.

1.3 Objectives of the study

1.3.1. General objective

To explore whether the coping strategies employed by the farm households enhance the resilience of farmers' livelihoods to drought related shocks or exacerbating vulnerability.

1.3.2 Specific objectives

- To identify farm households' major coping strategies for drought induced food shortage.
- To assess the effectiveness of coping strategies through self developed indicators.

1.4 Research questions

- What are the major coping strategies employed by farm households to cope with drought induced food shortage?
- Do the households' coping strategies effective to build the resilience of farmer to drought related shocks?

1.5 Significance of the Study

Rain fed agriculture is the livelihood strategy for the majority of rural households in Ethiopia. It is the source of food and employment. Despite of its significance, the sector is highly threatened by the recurrent drought associated with food shortage and famine. The government, non- government and farm households used different strategies to cope with drought effects. However, the strategies are tackled by lack of well understanding about the local context, lack of knowledge on drought management and other similar issues. Thus, this study is important to scrutinize in detail the local context pertaining to the households' food shortage coping strategies and its effectiveness. Thus, the finding of this study can serve as road map or corner stone to design appropriate drought coping options and interventions specific for the study populations. Besides, understanding and monitoring coping strategies provides a good indicator of the impact of drought on local population. The study findings also serve as an input for those who will engage in similar work to the study area and other districts.

1.6 Delimitation of the study

It is apparent that the topic under study is a common phenomenon for the whole districts in East Harerghe zone. However, the study carried out at a single district within the zone due to lack of adequate resources to cover the whole.

The study focuses on investigating farm households' *ex post* coping strategies for drought induced food shortage and their effectiveness in building farmers livelihoods at the study area at household level. Besides, the developed environmental, economic, socio-cultural and institutional indicators to assess effectiveness were not comprehensive since the concepts of those indictors are beyond the concepts used in this study. Thus, some variables relevant to the study were considered.

1.7 Limitations of the study

The study has been constrained by different factors. Data collection was difficult to freely engage in due to the fact that the Zonal as well as the district level office holders together with farm households were busy in performing water shade management practices operating at the whole districts within the zone including the study area throughout the month of January. Thus, they were not interested to provide data, to be interviewed and filling questionnaires. This situation made the data collection period longer than planned. Lack of well understating of the farm households about the aim of the research work also another problem constrained the data collection process. They have been thinking as if the research work is for other purposes like targeting for emergency relief, for productive safety net program and tax etc. Because of these misconceptions, they were limiting themselves in freely discussing ideas among themselves during focus group discussions. Apart from these, lacks of finance, inadequate knowledge of the enumerators in filling questionnaires are some of the problems that inhabit the research work.

1.8 Organization of the paper

The paper is organized in the following way:

Chapter one encompasses the introductory part viz., introduction, statement of the problem, objectives, research questions, significance, delimitation, and limitation part of the study. Chapter two is all about review of related literatures where as chapter three is organized for methodology part. Following these, chapter four discusses about results and discussions. Lastly, summary, conclusions and recommendations assumed the last chapter of the study.

CHAPTER TWO: REVIEW OF RELATED LITERATURES

2.1 Definition and concepts of food shortages

Dagnew 2001 cited in (Getahun, 2006) defined food shortage as a serious or acute food shortage results from unprecedented disaster. 'Exceptional' food shortage has been the result of several different factors usually associated with periodic failure of rains.

According to Climatic theory, drought or/and flood are the causes of crop failure and food insecurity in areas of rain-fed agriculture. Both scarcity and excessive water have adverse effects up on crop and livestock production that are the main stay of livelihood of farm households. In sub-Saharan Africa and South Asian countries, drought and flood causes many disasters that had causes the deaths of millions of people (Degefa, 2005). Climate elements especially temperature and rainfall are critical elements determining crop production presently. Lack of adequate rainfall (drought) is the most wide spread climatic threat to production and thus food shortage. Prolonged or multiple year of drought as experienced especially by sub Saharan Africa and south Asia, give rise to potential famine conditions(wide spread and extreme food shortage leading to elevated mortality and mass movements of population in search of food)that now a days are addressed relatively (DeRose *et al.*, 1998) .

Drought is the most common causes of temporary food shortage in many parts of the world. Such events commonly interfere with the food production, processing and transportation. Thus, the prices of staple food crops became inflated and inaccessible for the poor section of the society (Mc Donald *et al.*, 1994). Brown (2009) similarly argues that environmental trends especially of shortage of water are making it increasingly hard to expand the world's grain supply fast enough to keep with the demand. Shortage of water reduces grain production at major grain producing areas of the world notably China, India and USA. This creates food shortages at different parts of the world especially those engaged in importing grains from outside.

Among the climate induced disasters; drought is the major causes of chronic food shortage, especially in developing countries. It affects the four dimension of food security directly or indirectly (FAO, 2011). Different studies show that food shortage has been prevalent throughout the world due to different factors. Those most at risk of food shortage tend to be located in conflict zones where food cannot be reach them. Weather and hazardous climatic

or environmental conditions are less important than politics influencing food production and distributions. Active and post conflict zones always suffering from shortage of food. These situations predominate in sub Saharan Africa and western Asia. Seasonal or periodic food hunger constitutes the second general case of food shortage. This common phenomenon under the situations when the food production combined with other economic activities insufficient to support adequate dietary year round or from year to year where single year productivity is variable or low. Increasingly, these pockets of food shortfall are reached by intervention programs that provide relief food, often through 'food for work' employment programs, where markets or food relief penetrate relatively isolated local food systems as in many parts of Africa and South Asia, food shortage is removed but is replaced by chronic food poverty (Messer,1989).

As per the study conducted by Boccanfuso and Savarad (2008) at Senegal and Mali revealed that poor harvests and consequent food shortage is extremely linked with weather events in major cereal crop production parts of the world like Australia. This situation severely affects the low income and net importing countries like Sub Saharan Africa. Similarly, the study made at different parts of the world also show that climate change could cut food production in parts of the world by 50 percent in the next 12 years. This will be threats to global food security situations. For instance, Australia is normally the world's second largest grain exporter but savage multi year drought has reduced wheat crop by 60% and rice production has completely wiped out. In Bangladesh in November, one of the strongest cyclones in decades wiped out a million tons of rice and severely damaged the wheat crop making the huge country ever more dependent on imported food (Angus, 2008).

The history of Food shortage is associated with drought in Ethiopia. ''The history of drought goes back to 250 BC and there had been many national and localized drought events before that of 1970s for which international support was sought for the first time which were managed mainly by communities 'own coping mechanisms'' (DPPC, 2004). Drought induced famine dated back to the second half of 9th century. Subsequently, as of the 13th century, Ethiopia struck by the worst drought which were responsible for the displacement and deaths of several peoples (Relief and Rehabilitation Commission 1984 cited in Mulgeta, 2010). The 1973/74 and 1983/84 famine were also attributed to drought. The former result in the deaths of more than 200 thousand due to starvation in addition to

30% livestock whereas the later were responsible for 1 million deaths and 8 million affected people in the entire country (Haakansson, 2009).

2.2 Definitions and concepts of Drought

Drought has different characteristics and impacts across the globe. It is different from other natural hazards in many aspects. The first characteristics that make drought unique from the other disasters are that it is an event started slowly and difficult to quantify exactly its impacts. Secondly, there is no a single definition that can best represent what drought mean since the concepts of drought varies from one region to other region ,from one climatic region to other climatic region, from one sector to the other, from one discipline to the other. Therefore, different books recommend the definition of drought to be region and application (Impact) specific. Thirdly, the coverage of drought effects is wider than other natural disaster. This creates challenges to prepare relief response and quantify the drought impacts (Wilhite and Smith, 2005). Drought is different from aridity. It is a temporary deviation from what is set as normal or average where as aridity is the permanent feature of climate (Indian Ministry of Agriculture, 2009; Wilhite and Smith, 2005). The drought is also different from water scarcity. Water scarcity can occur even under normal climatic conditions when the supply and demand for water become imbalances (European Commission, 2007). Due to the aforementioned characteristics, it is difficult to draw single definition of drought (FAO, 2009). The most common definition of drought however attributed to deficiency of rainfall. It is commonly defined as temporary receiving of rainfall below what is considered as normal or average established for long period of time. It is natural climatic phenomenon (European Union, 2007). According to FAO (2009) drought is a ''temporary reduction in moisture availability significantly below the normal for specified period''. This definition encompasses the following concepts:

- *The reduction is temporary*
- *The reduction is significant*
- *The reduction is defined in relation to normal expectation*
- *The period of normal expectation is specified*

Similarly, Nishadi *et.,al* (2009) defined drought by comparing the expected amount of rainfall with the actual rainfall the specific area experienced. It is as normal climatic variability occurred as a result of long-term rainfall deficiency compared to long term average rainfall received at particular area. Based on its length and severity it can affect the

normal conditioning of the environment and its associated systems. Vulnerability to drought effects vary from one nation to the other based on level of development, population density and structure, demands on water and other natural resources, government policies and institutional capacities ,technology and political system.

In this study the concept of drought is contextualized as temporary receiving of rainfall below expected during the two rainy seasons in the study area. The small scale farmers are in need of adequate rainfall during the 'Belg' and 'Meher' seasons for crop production. The failure to receive the expected amount of rainfall during these seasons will lead to partial or complete harvest failure so that the farmers will experience food shortages.

2.3 Classification of Drought

Different literatures classified drought into Meteorological, Hydrological, Agricultural and Socio economic drought (Borton and Nicholas, 1994). According to Wilhite and Glantz, 1985 cited in Wilhite and Smith (2005) all the drought types are the result of inadequate rainfall. Meteorological drought is the first type of drought occurred due to temporary deviation of rainfall from long term average or normal for specified period of time (day, month, season or year). It is natural climatic conditions and its impacts differ from one area to other depending on the capacity to cope and the length of rainfall deficiency. The study mainly concerned with this drought types. The deviation of the normal climatic condition from what considered as normal affected the livelihood of small scale farmers in the study area. Crop production and livestock rearing which are the main livelihood strategies constrained by this climatic variability especially of inadequate rainfall. The other drought types include Agricultural, Hydrological and Socio-economic drought which emphasis on social and human aspects of drought. Agricultural drought is the second type of drought occurred subsequently to the meteorological drought. It is the situations when the soil moisture cannot meet the demand to support plant growth in particular time. This is different from one area to other based on soil types, moisture conditions, slope and intensity of precipitation. From this it is possible to infer that the agricultural sector responds immediately to changes in precipitation. This shows the fact that agricultural sector is highly sensitive to weather and climate. Therefore, the country whose population livelihood depends on agriculture is highly vulnerable to drought impacts. Hydrological drought is the third type of drought occurred after the Agricultural drought. It is the condition under which the surface and subsurface water: lakes, reservoirs, rivers are reduced in volume. Finally,

when the people starts to affect by the effects of those drought types the socio economic drought would happen (FAO, 2007; National Disaster management of India, 2010).

2.4 Drought vulnerability and food shortage coping

2.4.1 Drought vulnerability

In the context of climate, the term vulnerability refers to ''the degree to which the system is susceptible to or unable to cope with adverse effects of climate change including climatic variability and extremes'' (FAO, 2007). The extent to which climatic variability/change affects the natural or human system depends on various factors. Some of the factors are the severity of the changes, coping capacity in terms economy, technology and institutional aspects (FAO, 2007). Vulnerability from the context of drought can be defined by considering the society's '' ability to anticipate, cope with, resist or adapt to, and recover from the impacts of drought''. From this one can understand that different society's have different vulnerability to drought episodes. There are highly vulnerable population and least vulnerable population. The livelihood strategies of majority of the population in the study area are small-scale farmers which is mainly reliant on crop production and livestock rearing. The recurrent drought occurrences have been putting tremendous impacts the livelihood strategies due to low ability to cope with it. Poor drought anticipation and lack of skill and knowledge to manage the environmental hazard is among the major causes of exacerbating vulnerability to drought. Drought vulnerability can vary based on age, sex, state, nation and other factors (FAO, 2009). According to Alwang, Siegel and Jorge, 2001 cited in IFAD (2009) vulnerability is the function of a combination of different factors like income, occupation, family structure, gender, social class, caste, cultural factors and health. In addition to these, knowledge, resources and technology also determines the vulnerability context ((IFAD, 2009). Therefore, vulnerability to drought as it is explained is a function of different interrelated factors. Those factors which differs vulnerability to drought from one community to the other, household to other household and geography to geography are income, trade development, the extent to which the individuals or household can access to different options to cope with food crisis, the extent to which food production subject to climatic or pest related factors and the extent to which the government allow the free media for public service (Borton and Nicholas, 1994).

2.4.2 Food shortage coping strategies

Coping strategy is ''the strategy that has been evolved overtime through peoples long experience in dealing with the known and understood natural variation that they expect in seasons combined with their specific responses to seasons as it unfolds'' (CGIAR, 2009). Coping strategies or mechanisms also defined as the strategies peoples are employed in order to protect themselves and their livelihoods using their own experiences or indigenous knowledge (Twings, 2004 cited in Mugogovhali, 2011). As it defined by the Devereux (2006), coping strategies are the responses of farmers to the hardships which can affect them. This shows that farmers are not the passive receiver of the effects of natural and manmade hazards. For instance, during drought events they employ strategies like use of drought resistant crop varieties, more efficient use of water resources and improved pest management practices, changes in cultivation patterns which include reduction in fertilizer use, the better management of crop production, improvement of livestock diets and better management of their manure. Besides, the government and non government organizations also supplement the households' efforts in designing better land use policies, extensive livestock rearing and diversifying rural livelihoods (FAO, 2009). The rural farmers employed different strategies at different stages of drought intensity. At early stage they usually employ non destructive type of strategies like migration of household member to look for work, searching wild foods, and selling non productive assets. Under the situation when those strategies cannot reverse the drought effects they employed more destructive strategies like selling large number of livestock, go to hungry in order to not to sell productive assets. Mass migration or displacement from their resident is the final crisis strategies used after all option exhausted (Carbett, 1988; Young et al., 2001; cited in Wilhite and Buchana, 2005).

Coping mechanism can be grouped into different categories based on its impacts. It can be categorized as erosive and non erosive coping mechanisms. Non erosive coping mechanisms are those strategies that are not bringing permanent changes to livelihoods whereas erosive coping mechanisms are that brings permanent harm to the livelihood situations (WHO, 1998). According to Yergalem (2009), the erosive coping strategies are detrimental to the future food security where as non erosive are not. According to the study conducted at Dasse administrative areas, he identified consumption of seed stock and sell of farm implements are identified as erosive coping mechanisms and modifications made to households consumption, gather wild food, purchase food on credit, send household

members to other families members borrow or rely on help from others friend or relatives are identified as non erosive coping mechanisms

2.5 Empirical literatures

The household survey conducted by Olaleye in Tanzania to explore how the small-scale farmers cope with drought revealed that there are diversified responses to drought risks which are employed by only small scale farmers. Protecting water resources for livestock, providing supplementary feed for livestock, changing cropping pattern, using alternative water resources for crops, selling assets are some of the strategies employed by small scale farmers. The majority of the farmers out of 200 households are not aware of the onset of drought and using cope mechanisms so that they are vulnerable to drought risks. The same study revealed that few households migrated from their home lands. Most of the farmers interviewed concluded that they are unable to cope with drought effects while few percent evidenced that measures taken during the drought helped them to reduce their vulnerability to drought (Olaleye, 2010).From these, it is possible to conclude that there are challenges in using appropriate coping strategies by majority of the farmers to adapt with the climatic variability and extremes. In addition to these, the external coping mechanisms are inadequate to cope with the drought risks.

The household survey conducted by Chetri in the rural Nepal on food insecurity and coping strategies shows that there are differences in food security issues among the households surveyed. The food security varies based on socio economic background. To cope with food shortages induced due to different factors, the households usually employed the *ex ante* and *ex post* coping strategies. Casual labouring, occupational work, selling of agricultural and livestock products, collection of wild foods, borrowing food or money ,use of saving, seasonal migration to the places outside the district, small business ,use of pension are among the strategies used at aforementioned areas(Chetri,2006).The study entitled with household livelihood and coping mechanisms in the case of Oraon tribe India by Mishra reveals how the households cope with excessive crop failure and subsequent food shortages in the case of in adequate monsoon rainfall. The data collected through structured questionnaires, observation, case study and key informant revealed that to cope with drought induced food shortages, the households used both the external and internal coping mechanisms. They used social support together with reduction of food consumption, change in pattern of food consumption, changing occupation, selling or mortgaging land, selling household assets are the strategies used by households to reduce vulnerability. Some

young population including young children migrated temporarily to other place in search of jobs for livelihood. In addition to these, Oraon tribe appeal to god of rains as a drought coping mechanism (Mishra, 2007).

The research work conducted at two different communities in Zimbabwe on the topic Zimbabwe's drought conundrum; Vulnerability and coping by Mutassa provided evidences on the survival strategies of the household in the face of food insecurity and water stress resulted from drought. The structured questionnaires, interviews with key informants, observation and media monitoring revealed that some humanitarian organizations worsened household's vulnerability to drought effects through wrong informed screening methods and corrupted relief targeting. The study also shows that the community employed different indigenous weather prediction methods and strategies to alleviate drought effects. This implies that the community are not the passive receiver of drought related hazards they uses different strategies in order to mitigate it (Mutassa, 2010).

The study entitled coping with drought in Zimbabwe survey evidence on responses of rural households to risks by Kinsey identified drought as a major disaster threatens the rural livelihood. It investigates the households responses based on panel data from four drought events between 1983-96.The study found that under the circumstances when the state government and non government organizations provided relief during drought, the households rarely use the liquid assets and only use limited financial system. The same research work indentified those households owns livestock using livestock sell income as major coping mechanisms and those households do not have livestock are the most vulnerable to drought impacts (Kinsey,1998).

The study conducted by Firehiwot on the title drought and small holder farmers in Ethiopia, Boricha woreda case study in SNNPRS assessed the causes and consequences and coping with drought using discussion with communities, experts and officials, open and semi structured questionnaires, interviews for smallholder farmers, DA's, experts and secondary data. The study found that lack of alternative income generating mechanisms other traditional farming practices, lack of access to credit and capacity for improved technology, repeated climate changes, fragmented and eroded farm lands, under developed infrastructures, disintegrated relief and rehabilitation programmes are among the major factors exacerbating vulnerability to drought effects. To this end, the community also employed different strategies to cope with drought like reducing the quality and quantity of meal, sale of wood and charcoal, free aid distribution and participating in public work (cash

for work and food for work) are different coping mechanisms that are used by the community(Firehiwot,2009). The household survey conducted by Devereux at the Somali region revealed that the household in Somali region employed similar coping strategies with the study conducted elsewhere in other parts of the world. They protect consumption and modify consumption in the face of drought or other livelihood shocks. The former strategies met through purchase of food and receive food where as the latter through reduce consumption, diversify consumption and reduce consumers (Devereux, 2006).

As it is indicated in the empirical literatures, different studies have been conducted on drought induced food shortage coping strategies of the farm households at household level at different parts of the world including our country. Thus, the studies identified different strategies specific to the study area. The findings shows that the coping strategies employed by the farm households are different based on the asset ownership and the overall wealth status of the farm households. The studies also indicated that most strategies were inadequate to reduce the households' vulnerability to food shortage since it was at the expense of high cost, localized and were limited in scope. Despite numerous studies conducted at different parts of the world on drought coping strategies, its effectiveness were not fully investigated for recommending better intervention as well as coping options. Thus, the study under investigation is designed to fill this gap.

CHAPTER THREE: RESEACH METHODLOGY

3.1 Description of the study area

The study was conducted at Fedis District, East Harearghe Zone of Oromia Regional State. Astronomically, it is located between 8^0 22' and $9^0$14' latitude North and 42^0 02' and $42^0$19' longitude east (EHZFO, 2013).

According to the projection made from CSA, 2007, the total populations of the district are about 130,344 of which 65,976 are male and 64,368 are females (CSA, 2007).

Based on altitude, moisture and physiographic nature, the district is divided into *Woinadega* and *Kolla*) with proportion of 39 and 61 percent respectively. The climate of the area is dry and warm with small precipitation. The district like other parts of eastern Ethiopia experiences bimodal rainfall type. It receives small amount of rainfall during the *Belg* season (March to May) and the largest rain fall during the *Meher* season (July to October) with a dry-spell period during the months of June and July which, depending on its duration, may affect crop growth. Sorghum and maize constitutes the largest portion of crop production of the area. The farming type is mainly intercropping and mono cropping with lack of modern agricultural practices which result in low productivity. Even though the livestock keeping and crop production constitutes an important activity, many households lost their crops and livestock asset due to recurrent drought (EHZFO, 2013)

Fedis district is predominantly characterized by plains consisting of few isolated hills, few plateaus, mountains and valleys as well as gorges. The elevation descends from North to South direction, mountain peaks such as Rendo (1687 m.a.s.l) and part of Hakim mountain chain that rises upto 2118 masl are found in the district. It is drained by Perennial River Such as Erer and intermittent rivers like Bisidimo, Ije, Gohe etc. In general, a total length of about 89 kilometers of perennial and seasonal rivers gives drainage density of about 0.08km per km^2 of an area. Gena,Weyu and Umarkulle are some of the major springs in the districts used for domestic and irrigation purposes (EHZFO, 2013).

With respect to vegetation cover and wildlife resources, the district has small forest areas consisting of Junipers procera, Acacia wood land, Savanna grass land, Shrub and Bush land, Reverine and manmade forests. Currently about 2,223 ha (1.6%) of the total district is under both natural and manmade forest cover. There are no natural and manmade forests that that are protected by any sector in the district. Similarly, there are no parks, game reserves, and

wildlife conservation. But there is wildlife sanctuary known as Erer-fafem. There are some wild animals such as spotted Hyena, Baboon, Duiker, Elephant, Fox, Lion, Lesser Kudu and greater Kudu in the mentioned few forest area, rift valley mountain peaks, Sanctuary and gorges (EHZFO, 2013).

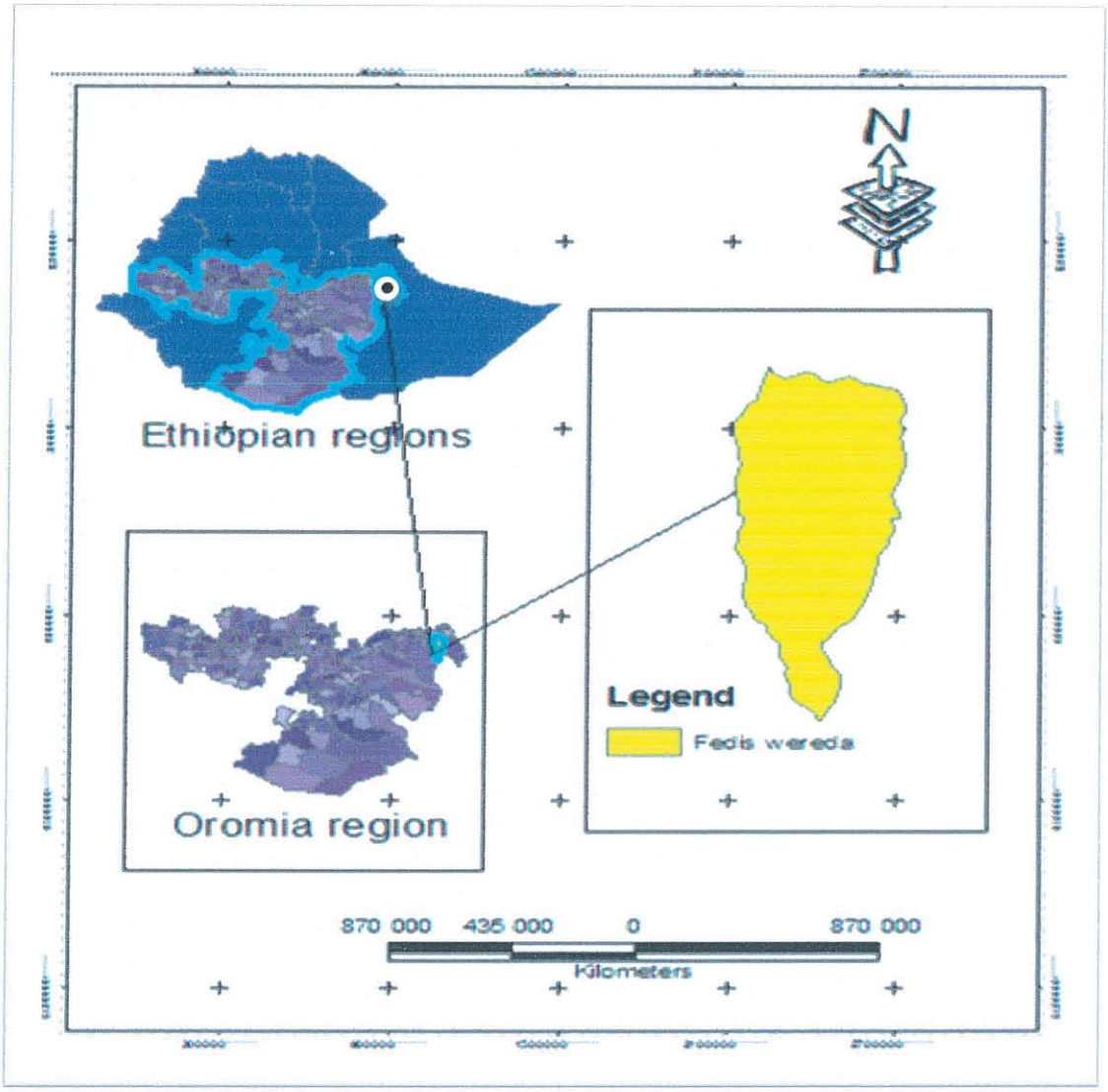

Figure 1: Map of the study area

3.2 Analytical Framework of the study

The idea behind the framework is that farm households employing different coping strategies against production shortfall during drought in order to increase availability of food at household level. Thus, effective and sustainable strategies that can successfully build resilience of farmers' livelihoods are those environmentally sound, economically viable, institutionally supported and socio-culturally acceptable. On the other hand, if the strategies are at expense of those elements, it would exacerbate the problems of food shortage and increasing vulnerability of household to shocks.

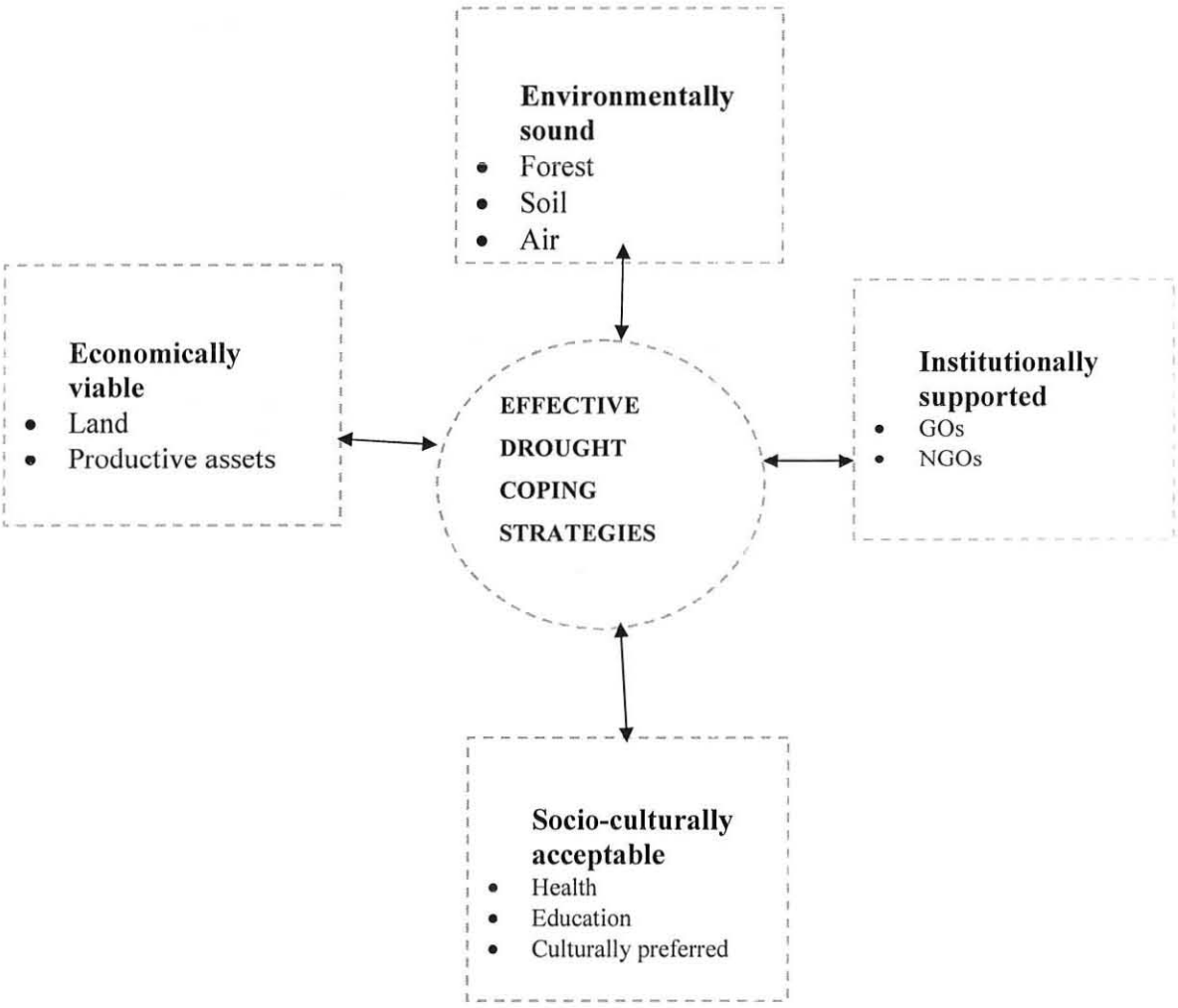

Figure 2: Analytical Framework

3.3 Indicators to measure effectiveness

According to the survey made at country level in 2007 by MoFED, the farm households employed different coping strategies to food shortage. The major identified coping strategies to shocks were include sale of animals (40 %), loan from relatives (18%), sale of crop outputs (14%) and own cash (9%). Though, these strategies were important to reduce vulnerability to food shortage to some extent they have not been fully effective mainly because they were at the expense of very high cost and localized (MoFED, 2007 cited in Temesgen, 2010). This means as peoples employing different coping strategies, they might induce different negative effects on health, ethics, moral or other factors. Similar to other parts of the country, peoples at Hererghe employ different coping strategies to drought however it effectiveness in building the resilience of farmers were not known or yet studied. In order to investigate this, coping strategies were identified and indicators were developed to know whether the strategies exacerbate or reduced vulnerability of the households at the study area.

Table 1: Identified coping strategies at the study area and its indicators.

No.	Drought coping strategies	Criteria for evaluating effectiveness
1.	Changing food consumption patterns	• Number of meals per day • Quantity of meals • Quality of meals
2.	Borrowing	• Sources of loan (From local merchants or relatives, friends, neighbors) • Forms of repay (in the form of labor or forth coming agricultural produce)
3.	Food aid	• Adequacy of delivered food per household • time of provision • targeting the HHDs • the implication of food aid on households' social capital
4.	Sale of livestock	• Type of livestock sold • Prices of livestock Vs. grain market
5.	Gathering wild foods	• Preferences of the food (health wise) • Adequacy
6.	Temporary migration	• Type of work the migrants engaged in • Household members who migrated • Skills of migrants and availability of job opportunities at the place of destination
7.	Sale of firewood	• Institutional restriction on the activities • Sources of the products (community, government or private land)

		• Market price during drought period
8.	Pulling children from school	
9.	Petty trade	• Adequacy of income obtained from this activities • Diversity of the activities

Source: Compiled from literatures, 2013

As it is indicated in the table, indicators for each strategies were developed by thoroughly assessing different literatures related to the study. For the sake of convenience, to frame effectiveness, the indictors were break down into environmental, economic, socio-cultural and institutional indicators.

3.3.1. Environmental indicators

Employing different coping strategies are beneficial for farm households to address the effects of drought. However, some common practices may have strong negative consequences for the natural environment in the long run. Particularly for poorer farmers with limited resource endowments, the process of maintaining households' viability can be at expense of natural surroundings. Coping strategies that may promote environmental degradation include cutting trees to make charcoal, overharvesting of wild foods, over grazing of grasslands all of which degrade soil conditions and augment problems of soil erosion (University of Arizona, 1990). Similar to this, the study made at India shows that the farmers change their occupation from agriculture to selling of forest products and casual labouring in compulsive manner during drought. Such practices were not to reducing vulnerability to drought effects because of different factors. Firstly, the farm households lack adequate skill to engage in high wage labouring. Secondly, selling forest products induced the ongoing deforestation which further exacerbates the problems of food shortages in sustainably (Mishra, 2007).

Gathering and selling natural products like firewood, charcoal, wild fruits and incense are an important source of secondary income for many households in Ethiopia. Selling charcoal and firewood are the most common livelihood activities next to livestock and crop farming. However, it not preferred strategies by many households. It is considered as last options and mainly for poor and desperate people. The activities are mainly adopted after the regular income sources become have failed. Furthermore, it is the most tiresome activities with low return (Devereux, 2006). Besides, collections of forest products are banned in many countries for environmental reasons. The study made at India shows that the households

mainly depend up on some common property like mangrove forests, catching fishes from rivers and village ponds these became a strong agents for environmental degradation (Roy *et al.*, 2002).

The study conducted at Somali region by Devereux (2006) found that charcoal burning and selling are restricted by regulation by concerned institutions. However, it is weakly enforced. Thus, peoples are highly engaging in this business activity during drought. Besides, commercializing and exporting charcoal become intensified at the study area.

3.3.2. Economic indicators

Borton and Nicholas (1994) listed the economic costs of drought as reduction of the overall demand in the economy, increased defaults of loans in rural sector, reduced government revenues and foreign exchange as result of decline in agricultural exports, increased inflation rate in the economy, costs to the government in organizing relief measures are among some of the economic impacts of drought. Nahusenaye (2011) similarly argues that drought has a multitude of effects on social as well as economic situations of the farm households. It not only affects the food security situations of the vulnerable but it compels the farm households to consume and sell productive assets like plough cattle and seed and erodes the production bases of the farm households. This makes to threaten the food security situations of the farm households for the years to come.

Livestock is an important component farming system in subsistence agriculture. It an important parts of household asset that significantly contributing to income of rural households. It is also one of the important sources of income to purchase food grains during adversity. However, the falling prices of livestock during drought decreases it effectiveness in order to cope with adversity. Livestock markets become oversupplied, forcing the prices down to levels of only one–tenth to the pre-drought levels (Nahusenaye, 2011). The worst affected and vulnerable populations are the poor and marginalized. They are the sections of the society that not only affected but also cannot recover after shocks. Thus, climatic risks push this society into vicious circles of poverty (Roy *et al.*, 2002).

According to the study made at India, many food insecure households borrow cash or grain from different sources based on the intensity of drought. The study found that the poor are the first to knock the door of neighbors, friends and other money lenders. Under the severe drought situations, most of the households do not have surplus production. Thus, the poor

households depending on local money lenders, local food traders, local land lords for borrowing grain or cash with unfair interest rate which further aggravating the food in security situations of the vulnerable (Chetri, 2006).

3.3.3. Socio- cultural indicators

As it is indicated, during drought, the prices of stable foods are steadily increasing and thus not affordable for certain sections (groups) in the society especially of poor and marginalized. As a result, they switch to cheaper and sometimes less preferred foods, reduction of overall intake, borrowing to maintain food intake, selling assets to raise funds and migrating to far distance in search for employment. This induced for instance deterioration of nutritional status and reduction in ability to resist infection. Scarce availability of water results in general increase in diarrhea and other water /hygiene induced illness like typhoid, dysentery, eye infections etc. Mobility during this also increases an opportunity for the transmission of epidemic diseases such as Cholera (Borton and Nicholas, 1994). Borton and Nicholas (1994) further argue that drought events are highly associated with social and cultural costs. For instance, School drop outs is common due to lack of energy and money for fees plus the need for children to assist other family members in water collection and income generating activities. Besides, migration also induced the community and family breakdown.

Changing or reducing consumption during drought in order to smooth or protecting food consumptions is also a common strategy for the farm households during food shortages. Most of the times, the adult members of the households do not consume as it would during the normal years. During severe drought, the situations turned to skipping meals throughout the day and then malnutrition. This makes the households not to perform the physicals task which further enhances food shortages conditions of the households due to lack of health. Besides, the households also could resort to consuming wild foods that have detrimental effects on health of individuals (Zvikomborero and Chigora, 2010).

Devereux (2006) argues that under the situations the households' income failed its inevitable for the farm households to engage in different illegal activities. The study conducted at Somali found that the households adopt strategies like sending children to work for income, begging and contraband trading to raise cash income for food purchase. The study made at Zimbabwe by Zvikomborero and Chigora (2010) also found that under the severe food shortages the households employ different strategies faced serous restrictions from

the government. Among these, prostitutions, illegal vending, and gold panning were some of the strategies commonly employed.

3.3.4. Institutional indicators

Effective institutions are paramount important for effective drought interventions. Effective social and political system is important to provide quick, adequate and timely response to hazards. For instance, the existence of free press, accessible administrative systems, opens public debate and representative political systems are among the determinants factors for the effectiveness of the response to drought by national governments (Borton and Nichoas, 1994). Effective institutions are important to reduce vulnerability to drought related shocks by preparing emergency drought budget, appeal for food aid, allocating water during drought, food distributions to vulnerable groups like children, lactating and pregnant women, elderly and physically challenged peoples. However, successful implementations of this practice are constrained at different governmental structures. For instance, the study made at Namibia indicated that government drought interventions were constrained by lack of clear guidelines in classifying the households and communities to different vulnerable groups, problems of targeting and lack of coordination during drought (Olalye, 2010). Devereux (2006) also argues that good governance is the major factors for well being of the society and the community by maintaining peace and security, providing effective social protection or safety nets. Despite of this fact, the study made at Somali Regional State found weak and ineffective institutions at Somali Regional State. The government body engaging in actions that exacerbating vulnerability of the pastoralists to drought effects by undermining the local participations and withholding food aids in the camps etc.

Institutional drought interventions are common in Ethiopia in the form of emergency food aid. For instance, more than quarter of Somali depends on food aid yearly. The amount emergency food aid delivered is aggregately enough to stabilizes the local food prices. However, most of the aid is misappropriated or mis-targeted. Besides, food aid deliveries are irregular and unpredictable, inappropriate and ineffective (Devereux, 2006). The study made at India by Roy *et al* (2002) found that government relief was common and felt important to get short lived relief from drought related stress. However, the government provided relief is full of corruption in targeting, inadequate coverage and favoring the rich and influential.

3.4 Research design

An exploratory research mainly relies on discovery of ideas, experiences and insights were conducted. It was carried out at Fedis district, East Harearghe Zone of Oromiya Regional State from half of December 2012 to May, 2013. The main objectives of the study were assessing how farm households' cope with drought induced food shortage and evaluating effectiveness of coping strategies so as to recommend better coping options for sustainable livelihoods. In order to meet research objectives, coping strategies specific to the study area were first identified during preliminary survey by document review, interview the farm households, key informants and by conducting two focus group discussions. Subsequently, indicators were developed to measure effectiveness by thoroughly assessing literatures related to study under investigation (see Table 1).

Pertaining to data collection, primary and secondary data collection techniques were employed. The former conducted through Household Survey, Focus Group Discussions, Observation and Interview whereas the latter collected by investigating documented materials such as books, research works and repots of GOs and NGOs organizations operating at the study area.

Both probability and non probability sampling techniques were employed in this research. Selection of study Kebeles were carried out randomly from two agro ecological zones namely *Woina dega* and *Kolla* whereas the sample households were selected by stratified random sampling method.

Finally, the quantitative data were coded and entered into computer software; Statistical Packages for Social Sciences (SPSS) for analysis whereas the qualitative data were narrated, described in such a way that it can complement the quantitative data.

3.5 Types of data required

3.5.1 Primary data

The data required for the study are primary and secondary data type. The primary data serves to have firsthand information pertaining to the objectives under investigation. The major coping mechanisms employed during drought episodes, its effectiveness in reducing household's vulnerability, preferred future coping strategies, trends of drought, asset ownership, issues related to food availability and factors affecting the households not

produce enough food for their household members were obtained from sources like household survey, focus group discussions, interviewing and observations.

3.5.2 Secondary data

Secondary data type is important to complement primary data. Thus, the district's and Kebeles' administration document were explored to have insights to the households' wealth status, emergency food aid distributed to the households, the number of male and female headed households in each Kebeles and factors constraining the crop and livestock productions. Besides, the earlier studies and different concepts and issues related to the topic were assessed and analyzed from different published and unpublished documents to compare and contrast with the study findings.

3.6. Primary data collection methods

The qualitative and quantitative data are required for the study. The researcher find out that both are important to meet the stated objectives in comprehensive way since one data collection methods can be crosschecked and complemented by other methods. Hence, the quantitative data were collected using semi-structured questionnaire from households whereas the qualitative data were collected using the observation, focus group discussions and interview.

3.6.1 Household survey

Semi-structured questionnaire was employed to generate quantitative data on the issues like background information, asset ownership, drought induced food shortage coping mechanisms and its effectiveness during drought events. The survey questionnaire was developed and tested on smaller sample households before used for the larger sample. Data were collected by trained Development Agents working at the study area with the close supervision of the researcher and recruited personnel. The survey questionnaires were administered face to face (door to door) after training was given to data collectors on overall aspects of the questionnaires. The Development Agents are assumed to be appropriate for data collection because of their educational status, familiarity with local language, familiarity to study area and their experiences in similar work.

3.6.2 Focus group discussions

Focus group discussions are important to obtain deep information concerning the study under investigation. It is helpful to complement and triangulate the information obtained

from other methods of data collection. Therefore, for this purpose, two focus group discussions composed of six to eight male headed households and other similar groups composed of only six to eight female headed households were held separately in each selected Kebeless. The discussions were made separately because of difference in coping strategies employed by sex; females may be dominated by males and ashamed of expressing their views in the presence of males freely. The discussions were recorded by Audio recorder.

3.6.3 Interview

Interviewing key persons working at different organizations are important sources of information for this research. Thus, interview was held with different government and non government office holders. Notably, head and key experts of the district's Agricultural office, head and key experts Disaster Prevention and Preparedness office, respective Kebele's administrators and Development Agents were among the government organizations served as important sources of data. Besides, the office holders of non-government organizations operating at the district were also interviewed. This was helpful for providing deep insights into the intensity of the problem and verifying information collected from household survey, focus group discussions and even secondary data obtained from Kebeles and District.

3.6.4 Observation

In trying to have firsthand impression on the existing natural as well social environment in the study area, the researcher with different groups of individual who can provide information in detail pertaining to physical, economic, and social aspects carried out in Kebeles under consideration. This exercise enabled to have close information on the socio-economic and environmental conditions of the study area. During observation, recording of activities on notebook was carried out so that it can easily retrieve and used during data analysis.

3.7 Instruments for Data Collection

3.7.1 Semi-Structured Questionnaires

As stated previously, semi-structured questionnaire was used to collect quantitative and qualitative information from sampled households. It incorporates closed ended (predefined) questions for which respondents can only choice from the given alternatives and open ended

questions for which respondents asked their opinions, reasons and other qualitative information.

3.7.2 Unstructured questionnaires

Checklists used for qualitative interview and focus group discussions. Both methods were used questions where the respondents are free to say whatever they feel on the questions posed to them. This was more flexible tool than its semi structured counterpart so that it was more of probing to find out reasons for certain actions. This type of tool was used for data collection in this study.

3.8 Sampling procedures

The study was conducted at rural Kebeless situated in two Agro ecological zones *(Woinadega and Kolla)* of Fedis district. To select the representative sample households, three Stage stratified sampling procedures were followed.

Stage one: Kebeles within the district were stratified into agro ecological zones namely *Woinadega* and *Kolla.* Consecutively, Nega Umarkulle Kebele from *Woinadega* and Belinarba, Agudora Kebeles from Kolla were selected on random basis. Two kebeles were from *Kolla* due to severity of drought and large area accommodates (69%).

Stage two: households in each randomly selected Kebeles were stratified into male and female headed households.

Stage three: male headed households were further stratified into different wealth categories based on their assets ownership; mainly land, livestock and family size which are the main factors used to classify households into different wealth categories at the study area (East Harerghe Zone, 2008). Accordingly, they were stratified into better off, middle and poor households. The wealth classification was carried out with respective Kebele's Development Agents and chair persons. The document initially used for PSNP targeting, model farmers selection documents, District's wealth ranking document and socio-economic data for other purposes were obtained from Kebele's administration office which provided a good hint in stratifying households into different wealth categories. For more reliability of wealth ranking, elders from respective Kebele's were invited to assure that the classification is true and cross checking with CISP and District's wealth categorization was carried out at each kebeles.

Finally, 5% of each wealth category and female headed households were selected randomly on proportionate basis. The researcher believed that 5% is enough in relation to the cost and time allocated for performing this research activity.

Table 2: Shows number of household heads selected from each PAs

Selected Kebeles	Household categories				Total household heads	Sample size
	Poor	Medium	Better off	Female headed HHds		
N/Umarkulle	15	18	11	4	965	48
Belinarba	19	17	9	7	1056	52
Agudora	24	10	8	5	957	47
Total	58	45	28	16	2978	147

Source: Field survey, 2013

3.9 Method of data analysis

Data analysis was carried out in line with the study objectives. Information generated from key informant interview, focus group discussions, personal observation and document analysis were analyzed by using qualitative description. The quantitative data generated from household survey was coded and entered into computer software, Statistical Package for Social Sciences (SPSS) for analysis. Thus, it was analyzed using descriptive and inferential statistics. Frequencies and percentages were among the descriptive statistics used to summarize data whereas one way ANOVA, Pearson's correlation and an independent sample t-test were among the inferential statistics used to see relationship between variables, to test mean difference between categories in assets ownership and the like. The data also displayed in tables to depict the actual trends and levels of different data.

CHAPTER FOUR: RESULTS AND DISCUSSIONS

This chapter presents the results and discussions of the thesis. It is divided into three main sub- sections so as to meet the study objectives. The first sub- section discloses the major livelihoods viz., crop and livestock productions and its constraints, asset ownership and sources of food of the target population which is important to serve as a background to understand the coping capacity and factors aggravating food shortages of the farm households. The second sub-section deals with the drought induced food shortage coping strategies whereas the third part deals with assessing the effectiveness of coping strategies in building the resilience of farmers' livelihoods in the study area.

In order to meet the study objectives, primary data were gathered through household survey, focus group discussions, key informant interview and observation whereas secondary data were collected from different government and non-government organizations official reports, books and research works.

4.1 Livelihood strategies and food shortage issues

4.1.1 Crop production

Subsistence crop production is the major economic activity of the households at both agro ecological zones of the study area. The sample households produced perennial as well as annual crops. Annual crops include cereals dominantly constitute sorghum and maize, oilseeds include groundnut. Sometimes food crops like haricot bean and sweet potatoes were also grown. Perennials are cash crops which commonly includes chat and rarely fruits like Mango. Among the cash crops, the most common sources of income are Chat and groundnuts whereas maize and sorghum are the staple food crops. As the survey result indicated that almost all of the sorghum and maize produced by both agro ecology and sex were for home consumptions. Only few percent of total harvest of sorghum and maize were sold by farmers inhabiting *Woinadega* parts and some better off households to cover various household expenditures. None of sorghum and maize was sold by *Kolla,* poor and female headed households for cash income. It seems such subsistence agriculture would not bring them significant livelihood improvement unless the households are encouraged and assisted to use improved technologies and diversify their income sources through the promotion of off farm and non-farm activities.

Unlike the sorghum and maize, most of groundnut and chat produced were sold by farmers at both agro ecology, sex and all wealth categories to cover various expenses. As the survey result indicated, more than half of groundnut and nearly above 90% of chat produced were sold for cash income to purchase grains and cover various costs incurred for socio-cultural and other related expenditures like clothing, schooling, health and sanitation, tax, social services and contributions.

With respect to farm implements, the households use traditional tools for cultivation and other activities. The well known tools are mainly composed of traditional farm implements such as plough, axe, hoe, spade, sickle, *mencha* and others. Plough and hoe are used for preparing land. Plough is used for cultivating land with pair of oxen while hoes are used for cultivation in the absence of oxen and uprooting weeds in cereal fields. Sickles are important for harvesting cereals and cutting grass for livestock feed.

Traditional cropping practices which are mainly practiced in the survey areas include mono cropping, intercropping, crop rotation, fallowing, traction using animal and manual power and traditional storage systems. Although intercropping is the dominant cropping practice, mono cropping is also dominantly practiced in the district. The most important annual crop combinations found are sorghum and maize with haricot bean and with each other. Chat is often intercropped with sorghum, maize, pulses and vegetables along the contour ridges within the farm.

Figure 3: Shows practice of intercropping chat with other crops and land preparation using hand tools

with the district's Agricultural Development Office report which indicates that the average land holding size of the farm households rated from 0.89 to 1.0 hectares. With reference to agro ecology and wealth categories, *Kolla* agro ecological part and better off households have greater land as compared to their counterpart.

One way ANOVA was conducted to test if there is significant mean difference between wealth categories in the land holding size. The output shows that there is significant mean difference between categories with respect to mean land holding size ($F = 35$, $p < 5\%$).

An independent- sample t-test also conducted to test if there is significant mean difference between agro ecology and sex of the households in land holding size. It shows no significant difference in mean land holding size between *Woinadega* and *Kolla* ($t = -1.9$, $P > 5\%$). On contrary to this, an independent sample t-test shows significant mean difference between male and female in land ownership ($t = 3.7$, $p < 5\%$).

The relationship between land size owned and availability of food from own harvests were investigated using Pearson correlation. Thus, the correlation coefficient shows that there is positive relationship between the two variables ($r = 0.362$, $p < 1\%$). This shows that households with large land holding size produced more food crops.

Table 3: Shows the average land holding size

Agro ecology		Sex of the HHDs		Wealth categories		
Woinadega	*Kolla*	Male	Female	Better off	Medium	Poor
0.58	0.67	0.67	0.41	0.93	0.69	0.50

Source: Field survey, 2013

The farm households asked ways of access to farm land at the study area. Accordingly, about 67.3 %(99) of the sample households indicated that they inherited from their parents. Thus, the size of land owned per households getting decreasing through time due to increasing pressures of population on land. This is consistent with the survey result which shows that about 70% (102) of the sample households perceived the size of their farm land is inadequate to produce enough crops for their family. In addition to these, lack of appropriate conservation techniques together with frequent drought result in deteriorations soil fertility. These situations decreases crop yield per hectare, which in turn leads to frequent food shortages.

4.1.1.3 Perceived problems to crop production

During the fieldwork, information on major crop production problems was gathered from sample households through household survey, from key informants and the district's official

reports. The sample households identified and prioritized the problems as illustrated in table below. The severity of a particular problem is measured by taking into account the number of sample households responding to particular problem identified in their area.

Table 4: Shows major farm problems encountered

Problems	Frequency	Percentages
Lack of rain(for major crop seasons)	118	80
Weed and pests	94	64
Erratic rainfall condition	82	56
Inadequate extension services	54	37
shortage of farm oxen	39	27
Poor soil fertility	34	23
Insufficient farm holding	25	17
Lack of appropriate technology	15	10
Shortage of cash	14	10

Source: Field survey, 2013

As it is indicated in Table 4, shortage of rainfall for major cropping seasons (Belg and Meher), weed and pests together with erratic nature of rainfall were the most frequently mentioned problems in crop production by many sample households. In most cases because of shortage of rainfall, weeds and pests, irregularity of rainfall crop failure occurs for prolonged period of time in the survey areas. Other problems and constraints of crop production include inadequate extension services like introduction of early maturing varieties and limited irrigation schemes. In addition to these, shortage of farm oxen, poor soil fertility, insufficient farm holding, lack of appropriate technology and shortage of cash (limited credit) services are factors constraining crop production.

According to the information obtained from key informants and the district's agricultural office official reports, 1999 afterwards, insufficient rainfall conditions resulting in at least 40% crop losses yearly. In addition to this, crop pests and weed diseases like staking bores, armyworms and birds exert similar problems on crop production at the study area. Among others, Striga was more prevalent and its damage on crop yield was estimated to 20% for sorghum and 15% for maize. Other pests such as stalk borer, smut and parthenium weed caused more than 10% of crop losses. The effect of such incidences aggravated food deficit in the study area. As a result, the majority of sample households indicated that they did not want to continue and depend on crop farming because of deteriorated livelihood status, low/unreliable income from crop production and unreliable weather condition.

of the test shows that there is statistically significant mean difference between *Wionadega* and *Kolla* in livestock ownership (t=3.574, P<5%). Similarly, an independent sample t-test shows statistically significant mean difference between male and female in livestock ownership (t= 2.3, p<5%).

The relationship between livestock owned and availability of food from own harvests were investigated using Pearson correlation. Thus, the correlation coefficient shows that there is positive relationship between the two variables (r=0.506, P<1%). This shows that households with more livestock have more opportunity to produce more food crops.

4.1.2.1 Oxen ownership and ways of getting access

Ox is an important draught power for rural households at the study area. However, of the total sample households, only 50.3 % (74) have farm oxen. About 79 % (38) *Woinadega* and 36 % (36) *Kolla* respectively have ox for farm operations whereas 53.4 % (70) of male and 25% (4) of female headed households have ox to cultivate their lands. With respect to wealth of the households, the entire better off, 77% (37) of medium and 8.6% (5) of poor headed households respectively have ox. This shows that the majority of *Kolla*, poor and female headed households depending up on hand tools for cultivating land which is difficult and traditional way of land cultivation methods. Besides, the poor and female headed households serve the better off and medium headed households as a result they lack time and energy to cultivate their small land and they become more vulnerable.

Despite the shortage of oxen, coupling, borrowing, hiring and contributing labor to a person who have oxen were some of the mechanisms for accessing farm at Fedis.

Table 6: Adequacy of farm oxen owned for farm operations and ways of access

Actions	Responses	Frequency	Percent
Adequacy of farm oxen	Yes	46	62
	No	28	38
Total		74	100
	Borrowing	52	51
	By contributing labor	8	8
	Hire	20	20
	Coupling	21	21
Total		101	100

Source: Field survey, 2013

As it is revealed in the table, of the total sample households who owns farm oxen, small proportion, 38 %(28) responded their farm oxen were inadequate to cultivate their land. In line with this, the farm households were asked how they have been accessed for ox.

Accordingly, the majority of sample households 51 % (52) accessed through borrowing from friends and relatives where as the rest of the sample households which accounts about 20 % (20), 21 % (21) accessed through hire and coupling respectively. Besides, small proportion of the sample households accessed through contributing labor for households who have oxen.

4.1.2.2. Major perceived problems encountered in livestock production

Information on major livestock production constraints was gathered from sample households through household survey, focus group discussions and review of district's official reports. The sample households identified the problems as illustrated in table below. The severity of a particular problem is measured by taking into account the number of sample households responding to particular problem identified in their localities

Table 7: Major livestock production problems encountered

Problems	Frequency	Percentages
Shortage of grazing land	123	84
Shortages of water	105	71
Lack of additional fodder	99	67
Disease prevalence	59	40
Absence of rural credit	45	31
Poor veterinary services	37	25

Source: Field survey, 2003

The survey has indicated that many sample households in the study area faced a multitude of problems in rearing livestock. In general, shortage of grazing land, water and fodder due to recurrent drought were the most severe problems reported by 84%(123),71%(105) and 67% (99) of the sample households respectively. Diseases prevalence, absence of adequate rural credit and poor veterinary services were also among the pressing problems affecting livestock production.

According to key informants and focus group discussions, livestock rearing became a difficult livelihood strategy in the district. Absence of grazing land forced farm households to graze in crop fields which affect crop production since livestock graze crops like sorghum, maize, leaf of groundnut and leaf of sweet potatoes at its flowering stage. This uncontrolled livestock grazing practices has been the emerging problem threats crop production now a day at the study area. The other important problem was lack of drinking water for livestock. As it was indicated in the district's agricultural office official reports, among 19 kebeles, seven have no water sources, three kebeles have hard water used only for

production now a day at the study area. The other important problem was lack of drinking water for livestock. As it was indicated in the district's agricultural office official reports, among 19 kebeles, seven have no water sources, three kebeles have hard water used only for livestock, two have unmaintained motorized scheme where as four kebeles have deep and shallow well (they were relatively better as compared to others). Therefore, the farm households were suffering from shortage of water for their livestock. Thus, some kebeles trek animals throughout the night to Gobelle and Erere River which are located at the two extremes (East and West) of the district. They travel more than eight hours to access water sources. On the other hand, some farm households went to Boko town early at the morning to buy water for both livestock and human consumptions. During discussions, the farm households noted that it costs around 20-30 birr to fetch single container (Jerry can) of water from the urban area using car which is totally impossible for poor households. Such circumstances made livestock production difficult livelihood strategy in the study area.

Figure 4: (A&B) shows non functional water scheme at Belinarba due to lack of underground water (C)the surrounding farm households moving to Boko town to fetch water (D)the only underground water sources observed at Negaumarkulle kebeles

4.1.3. Sources of food

The survey finding indicated that the major sources of food at the study area includes own production, purchase, PSNP, emergency food aid, social safety nets (borrow and gifts) and others. The sources of food for all were more or less similar. All households categories obtained more food from own production and purchase. As it is indicated in table 8, better off households obtained foods from own production and purchase only. On the other hand, medium and poor headed households reported that they obtained foods from borrowing and

borrowing was an important source of food following to own production and purchase whereas safety nets for female headed households.

Table 8: Sources of food in 2011/12 crop production

Wealth categories	Sources of food and rank		No.
Poor	Rank	Sources of food	58
	1	Own production	
	2	Purchase	
	3	Safety nets	
	4	Borrow	
	5	Aid	
	6	Others	
Medium	1	Own production	45
	2	Purchase	
	3	borrow	
	4	Aid	
	5	Safety nets	
Better off	1	Own production	28
	2	Purchase	
Sex of households	Rank	Sources of food	No.
Male	1	Own production	131
	2	Purchase	
	3	borrow	
	4	Safety nets	
	5	Aid	
Female headed households	1	Own production	16
	2	Purchase	
	3	Safety nets	
	4	Borrow	
	5	Aid	
	6	Others	

Source: Field survey, 2013.

Despite all household categories obtained the largest part of their food from own production, the level of sufficiency to meet the family's end meet was different. As it indicated in Table 9, it was higher for *Woinadega* agro ecology as compared to *Kolla.* With reference to sex of the households, male headed could cover more months of the year from own harvests. Apart from this, better off and medium households can cover on average 10 and 7 months respectively. On the other hand, the poor and the female headed households only cover 5 and 4.6 months respectively. From this, it is possible to deduce that the poor and female headed households and *Kolla* area more depends up on off- farm activities like wage labor,

selling fuel wood, charcoal, migration in search for employment and others to bridge family's annual food requirement.

Table 9: Average number of months HHDs could cover from owns harvest by agro ecology, sex and wealth

Agro ecology		Sex of the HHDs		Wealth categories		
Woinadega	*Kolla*	Male	Female	Better off	Medium	Poor
7.8	6.6	7.32	4.6	10	7	5

Source: Field survey, 2013

One way ANOVA was conducted to test if there is significant mean difference between wealth categories in the average number of months could cover from own harvest. It shows that there is significant difference with respect to average number of months that the households could cover food requirement from own harvest ($F=44$, $p < 5\%$). An independent sample t-test was also conducted to test if there is significant mean difference between agro ecology and sex of the households in terms of average number of months that the households could cover from own harvest. The result of the test shows that there was a statistically significant mean difference between *Woinadega* and *Kolla* in this aspect ($t=3.574$, $P<5\%$). Similarly, an independent sample t-test shows statistically significant mean difference between male and female in the average number of months could cover from own harvest ($t=3$, $P<5\%$).

According to the interview made with the districts head of Agricultural Development Office, vulnerability to food shortage were largely increasing over the last couple of years as a result of recurrent drought, erratic rainfall distributions and the weed and pest infestation attacking the crop production in the study areas. Apart from these, loss of livestock due to diseases, decrease in agricultural productivity due to decrease in per capita land holding, and depletion of household assets were also some the factors contributing to the farm households vulnerability to food shortages. Many informants indicated that the farm households exhibited shock situations when they feel the rain is erratic, sudden fluctuation in price and delayed in expected resources from donors as well as when the local peoples affected with illness due to food shortages and moving away from relatives/family. As a result, migration and joining the saturated urban unemployment environment, pulling children from school and illegal cutting of trees for sale were some of the bad story.

The key informants also noted that poor communication facilities, untimely assessment and reporting, inadequate early warning services, poor access roads, poor storage facilities and

delay in delivering food aid resources were also some of the gaps which contributed to vulnerability to food shortages in the study area.

4.1.4 Drought history in the last twenty years

During field work, focus group discussants and key informants were discussed past trends, frequency and intensity of drought in the last twenty years. Besides, secondary data was explored on issues related to drought occurrences to get deep insights into the situation of drought at the study area. Thus, the information obtained from these sources compiled as follows.

Table 10: shows Drought history in the last 20 years

Crop Years	Nil	Moderate	Severe
1991/92	X		
1992/93	X		
1993/94	X		
1994/95			XXX
1995/96	X		
1996/97	X		
1997/98	X		
1999/00			XXX
2000/01		XX	
2002/03		XX	
2003/04		XX	
2004/05		XX	
2005/06		XX	
2006/07*	X		
2007/08		XX	
2008/09			XXX
2009/10		XX	
2010/11		XX	
2011/12		XX	
2012/13		XX	

Source: compiled from key Interview, focus group discussions and document review, 2013

Note: x, nil xx, moderate drought year xxx, severe drought year

2006/07* the reference year (productivity of other crop years measured against 2006/07)

As it can be seen from the Table 10, the frequency of drought has been increasing. The gap between two consecutive droughts was decreasing from five years to one year. The 1994/95, 1999/00 and 2008/09 were the severe drought years which were highly remembered by the farm households during discussions. They locally named it '*bara azelo*' which means years nothing grown.

According to key informants, 1970 was the turning point for the district's agricultural production. Before 1970, the district was known by surplus production especially onion and cereal crops (sorghum and maize). Above all, the district is known by locally named onion called *'Fediso'* which was an important source of cash for the farm households. However, 1970 afterward, inadequate rainfall situations has been the major problem to agricultural systems of the area. The rain dependent livelihoods activities were getting deteriorated and peoples were started to highly depend on external food sources.

4.2 Food shortage coping strategies of the farm households

In response to food shortage, the households applied different tactics as coping mechanisms. The major coping mechanisms which were used by the farm households as identified from their own include changing consumption patterns, borrowing, appealing for food aid, selling livestock, eating wild foods, migration to urban center, selling firewood, pulling children out of school and petty trading. The effectiveness of these strategies is measured through self developed indicators which were developed by thoroughly assessing different literatures related to the study and perceptions of the households. Within the developed framework, the effectiveness of each strategy in building the resilience of farmers' livelihoods in the study area was assessed.

4.2.1 Changing consumption patterns

Changing food consumption patterns during drought was commonly reported strategy to cope food shortage by the sample households. The market prices for staple crops were steadily increasing while the labour price declined during drought so that it is difficult to access adequate food. Thus, the households resort to this strategy in order to smooth food consumptions. The survey result revealed that of the total sample households, about 79 % (116) reported that they changed normal food consumption patterns during drought. Agro ecologically, about 95.8 %(46) of *Woinadega* and 70.7 % (70) of *kolla* reported that they changed their consumption patterns during drought. From this, it is possible to deduce that *Woinadega* area was more rely on this strategy as compared to its *Kolla* counterpart. This might be due to the fact that the majority of the households at *Kolla* agro ecology were poor and the intensity of drought was more severe thus the households resorted to other strategies like migration and selling firewood. With respect to sex of the households, large proportions of both male 79.3(104) and female 75 %(12) reported that they engaged in this strategy.

Table 11_a: Distribution of sample households changes consumption patterns by agro ecology and sex

Agro ecology								Sex of the households							
Woinadega				*Kolla*				Male				Female			
Yes		No.		Yes		No		Yes		No		Yes		No	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
46	95.8	2	4.2	70	70.7	29	29.3	104	79.3	27	20.6	12	75	4	25

Source: Field survey, 2013

Table 11_b: Distribution of sample households change consumption patterns by wealth

Wealth categories											
Better off				Medium				Poor			
Yes		No		Yes		No		Yes		No	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
24	85.7	4	14.3	42	93.3	3	6.7	38	65.5	20	34.5

Source: Field survey, 2013

Of the total poor, medium and better off households surveyed, about 66 %(38), 93 % (42) and 86 %(24) respectively used this strategy during drought to smooth food consumption. The large proportion was attributed to the fact that farm households restored to changing food consumption in the first place to manage food shortage with the food stocks available at the household level. As it is indicated in the same table, relatively large proportions of the poor which accounts about 35 %(20) reported that they did not use this strategy. This might be due to the fact that the poor resorted to more destructive strategies like spontaneous migration, selling firewood. Besides, changing consumption for the poor might be skipping the meals for the whole day since they normally consume little portions of meals and small number of meals even during the normal conditions.

Generally, from the above tables, it is possible to understand that *Kolla* and poor households less engaged in changing consumption during drought. This might be due to the fact that effects of drought were more severe for these sections of the society thus they depend up on other strategies like firewood selling and migration to urban centers.

4.2.2 Borrowing

Borrowing was one of the strategies that the farm households engaged in during drought years. Households found in one peasant association borrow from friends and/or relatives in other kebeles, within peasant association or even from friends and/or relatives found in other districts with the understanding that the loan will be paid back when the borrower will get

good harvest. Household survey result shows that of the total sample households, 68% (100) borrowed grain and/or cash to cope with drought induced food shortages. Of the total sample households of respective categories, about 97.7 %(47) of *Woinadega* and 53.5% (53) of *Kolla* reported that they borrowed cash and/or grains during drought where as 66.6 %(87) of male and 81.2 %(13) of female headed households reported that they engaged in similar strategy. From this, one can understand that the *Woinadega* part and female headed households relied more on borrowing than their counterparts. Small proportions at *Kolla* might be due to the fact that there is no such gap among the farm households in terms of wealth to inter depend on each other during adversity.

Table 12a: Distribution of sample households borrow grains by agro ecology and sex by agro ecology and sex

Agro ecology								Sex of the households							
Woinadega				*Kolla*				Male				Female			
Yes		No.		Yes		No		Yes		No		Yes		No	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
47	97.9	1	2.1	53	53.5	46	46.5	87	66.6	44	33.4	13	81.2	3	18.8

Source: Field survey, 2013

Table 12_b: Distributions of sample households borrow cash/grains by wealth

Wealth categories											
Better off				Medium				Poor			
Yes		No		Yes		No		Yes		No	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
13	46.4	15	53.6	26	57.8	19	42.2	48	82.8	10	17.2

Source: Field survey, 2013

As it is indicated in table 12_a, the majority 82.8% (48) of poor headed households reported that engaged in borrowing cash and /or grains during drought to cope with drought induced food shortages. On the other hand, relatively small proportions of better off and medium also reported engaging in similar strategy. From this, it is possible to deduce that borrowing was a strategy that highly pursued by poor headed households since the problem of food shortage was more serious for this sections of the society. Thus, they depend on others for their problems.

4.2.3 Targeted relief aid

Appealing for food aid was one of the strategies in which sample households employed during food shortage. It serves as an important source of food for the study population since the last several years during food shortage. According to the data obtained from district's food security section, in average, about 41,732 peoples were assisted by external food sources (food aid) in the last ten years (See appendix III). This indicates that the majority of population at the study area could not produce enough food from their own harvests because of different ecological and socio-economic constraints to their livelihoods.

Table 13_a: Distributions of sample households assisted by food aid by agro ecology and sex

Agro ecology								Sex of the households							
Woinadega				*Kolla*				Male				Female			
Yes		No.		Yes		No		Yes		No		Yes		No	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
24	52	22	47.8	65	65.5	34	34.4	77	58.8	52	39.7	12	75	4	25

Source: Field survey, 2013

As it is indicated in table 13a, about 52% (24) of *Woinadega and* 65.5% (65) of *kolla* reported that they benefited from food aid during drought. This shows that *Kolla* was more benefited from food aid as compared to its *Woinadega* counter parts. As per the information obtained from key informants *Kolla* agro ecological zone was more benefited from food aid because of frequency and intensity of drought as well as less entitlement to productive resources. Due to this fact, they had more opportunities to be targeted as compared to *Woinadega*. With reference to sex of the households, the female headed households more benefited from emergency food aid as compared to male headed households. Similarly, female headed households have low entitlement to productive resources and thus had more opportunity to be targeted.

Table 13_b: Distributions of sample households assisted by food aid by wealth

Wealth categories											
Better off				Medium				Poor			
Yes		No		Yes		No		Yes		No	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
8	28.5	18	64.3	23	51.1	22	48.9	46	79.3	12	20.7

Source: Field survey, 2013

As it is revealed in the table 13_b, among the wealth categories, large proportions of the poor which accounts about 79 %(46) benefited from food aid to cope with drought induced food shortages. On the other hand, relatively small proportion of medium and better off households also reported that they used food aid as drought coping strategy. This is true due to the fact that the better off and medium headed households have relatively better asset ownership so that they had less opportunity to be targeted for emergency food aid.

4.2.4 Selling livestock

According to the farm households, it is difficult to rear livestock even under normal weather conditions due to problems associated with lack of grazing land and water. Hence, they only keep small number of livestock in order to sell them during adversity. According to the focus group discussions held, the farm households are not resort to other coping options like migration, eating wild foods as far as they own livestock. Selling livestock resources were the major coping strategies to them. Shoats and small other ruminants were the most preferred to sell during drought years to access cash and/or grain. The survey result revealed that of the total sample households, about 45 % (66) reported that they sold livestock during drought.

Of the total sample households surveyed, about 89 %(43) of *Woinadega* and 23 %(23) of *Kolla* reported that they sold livestock to purchase food grains during drought. This is due to the fact that the former agro ecology more entitled to livestock resources as compared to its counter parts. On contrary to this, *kolla* part repeatedly stricken by drought and prone to acute water and pasture problems so that it experiences low entitlement to livestock resources. As compared to female headed households, more male headed households relied on this strategy to cope with food shortage. This was due to differences in livestock ownership between male and female headed households.

Table 14_a: Distributions of sample households sold livestock by agro ecology and sex

Agro ecology								Sex of the households							
Woinadega				*Kolla*				Male				Female			
Yes		No.		Yes		No		Yes		No		Yes		No	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
43	89.6	5	10.4	23	23.2	76	76.8	62	47.3	69	52.7	4	26.7	12	73.3

Source: Field survey, 2013

Table 14_b: Distributions of sample households sold livestock by wealth

Wealth categories											
Better off				Medium				Poor			
Yes		No		Yes		No		Yes		No	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
21	75	7	25	25	55.6	20	44.4	16	27.6	42	72.4

Source: Field survey, 2013

As it is displayed in 14_b, relatively the largest proportion, about 75% (21) and 56% (25) of better off and medium headed households respectively reported that they sold their livestock during drought to purchase food grains. On the other hand, small proportion of poor which constitutes about 28% (16) used similar strategy to purchase food grains for their family. This is due to the fact that the better off and medium households have more livestock for marketing purposes. Thus, they preferred to sell their livestock than resorting to other coping options.

4.2.5 Eating wild foods

Eating wild foods was one of the means to cope with food shortages during severe drought years. During the survey, Manihot esculeata *(Cassava plant/Muka dekika),* Portulaca quadrifida *(Marare),* Opuntia ficus-indica *(Tini/cactus),* Agave sisalana *(Sisal /Kacha)* and Aloe *(Argisa)* were identified wild foods consumed during drought years to smooth food consumption patterns. With the exception of Portulaca quadrifida *(Marare),* all are moisture stress plants.

Table 15_a: Sample households used wild foods by agro ecology and sex

Agro ecology								Sex of the households							
Woinadega				*Kolla*				Male				Female			
Yes		No.		Yes		No		Yes		No		Yes		No	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
40	83.3	8	16.6	10	10.1	89	89.9	44	33.6	87	67.5	6	37.5	10	62.5

Source: Field survey, 2013

Of the total sample households, 34% (50) responded that they engaged in gathering wild foods during severe drought years. As it is indicated in table 15_a, about 83.3 %(40) of *Woinadega* and 10 % (10) of *Kolla* reported that they used wild foods to smooth food consumption patterns during drought. This was due to the fact that the *Woinadega* agro ecological zone experienced more opportunities to access these plants due to its physical abundance and accessibility to the farm households. For instance, Manihot esculeata

(*Cassava tree /Muka dekika)* which was commonly reported coping plants by the farm households and Portulaca quadrifida *(Marare)* the second commonly reported drought coping plants are abundantly available at this agro ecological zone. With reference to sex of the households, eating wild foods was equally pursued by male and female during drought.

Table 15_b: Distributions of sample households used wild foods during drought by wealth

Wealth categories											
Better off				Medium				Poor			
Yes		No		Yes		No		Yes		No	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
6	21.4	22	78.6	16	35.6	29	64.4	22	37.9	36	62.1

Source: Field survey, 2013

From the total sample households of the respective categories, about 36 %(16) and 38 %(22) of medium and poor headed households reported that they used wild foods to smooth food consumption where as 21%(6) of better off households also reported that they engaged in similar strategy. The poor and medium headed households seem more engaged in this strategy as compared to better off households. Thus, it's possible to deduce that gathering wild foods was a strategy pursued by household categories with less coping capacity to adversity. The resource poor household resorted to this due to the fact that they can easily obtain those foods from their village regardless of cost.

4.2.6 Migration

Fedis district is known by its migration to the nearby towns and cities during drought. Due to regular occurrences of drought, the people lost their purchasing power, economic and ecological base at their native place of residence. Thus, some people migrated to distant places outside the district to pursue livelihood strategies other than agriculture.

Table 16_a: Distribution of sample household migrated by agro ecology and sex

Agro ecology								Sex of the households							
Woinadega				*Kolla*				Male				Female			
Yes		No.		Yes		No		Yes		No		Yes		No	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
10	21	38	79.2	38	38.4	61	61.6	43	32.8	88	67.2	5	31	11	69

Source: Field survey, 2013

Of the total sample households, about 33 %(48) of households reported that they migrated to the surrounding urban environment in search for better livelihoods during harvest failure.

In relation to agro ecology, nearly 21 %(10) of *Woinadega* and 38.4 %(38) of *kolla* areas reported that they engaged in migration to cope with drought induced food shortage. From this, it is possible to deduce that *Kolla* areas were more engaged in migration because of low coping options and low capacity to cope with adversity. This is consistent with the information obtained from key informants that farm households at *kolla* agro ecological zone were more engaged in this strategy than its counterpart. With respect to sex of the households, the survey result indicated that equal proportions of male and female headed households migrated in search for better livelihoods.

Table 16_b: Distributions of sample households migrated during drought by wealth

Wealth categories											
Better off				Medium				Poor			
Yes		No		Yes		No		Yes		No	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
6	21	22	79	9	20	36	80	28	48	30	52

Source: Field survey, 2013

As it is indicated in table 16_b, from the total poor headed households surveyed, 48 %(28) reported that they migrated to urban areas for employment opportunities where as 20 %(9) of the medium and 21 %(6) of better off households also reported engaged in similar strategy for better livelihoods during drought. From this, one can conclude that poor household heads migrated to the surrounding urban areas as compared to medium and better off which were mainly attributed to limited asset bases to withstand the problems arising out of rainfall shortage.

The survey result also shows that the type of household members migrated depends on the intensity of drought and asset ownership. During the severe drought, the households' food stocks become empty and no enough work available locally thus the total household members especially of poor household migrated to the surrounding urban centers to engage in different works. On the other hand, during moderate drought and normal years, male household head migrated to engage in different works at urban areas by leaving the rest of the family members at their home village with small amount of food stocks, land and cattle. According to the interview made with the districts food security section head, this type of migration became fashion now a days. The farm households migrated to urban centers and came back to their home with some stocks of money to bridge the family's annual food

requirements. On top of this, there were few farm households who even started their own businesses like small shops, mills etc.

Table 17: Shows type of household members migrated during drought

Types	Frequency	Percent
Male household head	13	27
Female household head	5	10
Boys and girls	9	19
All family members	34	71

Source: Field survey, 2013

As per table 17, 71 %(34) of the farm households reported that the whole family members were migrated in search for food. Next to this, 27% (13) and 19 %(9) of farm households reported that male household head and boys and/or girls were among the migrated household members in order to help other members who stay with their livestock and land at home. Small proportions of the households also reported that migrants were female household head.

According to the information obtained from key informants, there are two distinct types of migration observed at their locality. The first one is the type of migration in which the male household head migrated to the surrounding urban areas like Harar, Aweday, Hargeisa, Jijjiga, Diredewa, Bablie, Haremaya,Kobmolcha and to other districts where crop production is relatively better. This type of migration is highly recognized by the communities as well as by administration bodies at zonal as well as district level. It is the common type of migration carried out mainly during normal and moderate drought years to bridge the annual food deficit encountered their family. It is known by the name 'productive migration' by administrative peoples and *'Kuli'* by farm households which means daily labor. The migrants are mainly engaged in different activities like fetching water, washing cloth, construction works, chat processing and back to their home with some amount of money obtained from these activities in order to support their family. This kind of migration is planned or deliberate with the intention of supporting their family without undermining their businesses at place of origin.

The second type of migration is under the situation when the whole families leave their places of residence and migrate to nearby urban areas. It is spontaneous migration arising as a result of recurrent production failures. According to the interview made with the key informants, this was the most commonly practiced type of migration by farm households

during drought years despite of numerous efforts made by government as well as non government organizations to maintain at their native place.

4.2.7 Selling firewood

Selling firewood is a common practice at the study area during normal as well as bad agricultural years especially for poor and female headed households. Unlike the normal agricultural years, it has been intensified during bad years by all household categories. According to the information obtained from the district's food security section head, increasing number of fire wood sellers has been served as an indicator for food shortages in the last several agricultural years.

During the field survey, it has been observed that farm households selling fuel wood in an open market at Boko town (district's capital) and some of them transport to the surrounding urban markets. Thus, remnants of natural forests found at Gobelle and Erer mountains as well as trees on private farm were under pressure due to uncontrolled deforestation.

Table 18_a: Distributions of sample household sold firewood during drought by agro ecology and sex

Agro ecology								Sex of the households							
Woinadega				*Kolla*				Male				Female			
Yes		No.		Yes		No		Yes		No		Yes		No	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
7	14.6	41	85.4	29	29.3	70	70.7	29	22.1	102	78	7	43.8	9	56.2

Source: Field survey, 2013

As it is revealed in the table above, about 29 %(29.3) of *Kolla* and 14.6 %(7) of *Woinadega* respectively reported that they engaged in selling firewood to cope with drought induced food shortage. The proportion was higher for *kolla* due to its accessibility to common sources of firewood, Gobelle and Erere Mountains where the natural forests are relatively abundantly available. With respect to sex of the households, about 43.8 % (7) of female headed households engaged in this activity during drought which is higher proportions as compared to male counterpart. Generally, firewood selling seems common strategy for *Kolla* and female headed households due to low coping capacity.

Table 18_b: Distribution of sample households sold firewood during drought by wealth

Wealth categories											
Better off				Medium				Poor			
Yes		No		Yes		No		Yes		No	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
4	14.3	24	85.7	7	15.6	38	84.4	18	31	40	69

Source: Field survey, 2013

Of the total poor headed households, about 31 %(18) reported that they sold firewood to cope with drought induced food shortage. On the other hand, relatively small proportions 16 %(7) and 14 %(4) of the total medium and better off households respectively similarly engaged in this practices to cope in adversity. This shows that poor headed households have limited asset bases and easily resort to selling firewood as compared to other wealth categories.

4.2.8 Pulling out children from school

Pulling out children from school was one of the common drought coping strategies at the study area. The survey result shows that equal proportions of farm households pulling out children from school regardless of agro ecology and sex during drought years. During focus group discussions, the farm households noted that they do not care about their children's education during food shortage. Rather, they prefer to engage them in casual labor in order to raise cash income or they send to other districts to live with relatives or friends where deemed crop production are relatively better.

Table 19_a: Distributions of sample household withdrew children from school during drought by agro ecology and sex

Agro ecology								Sex of the households							
Woinadega				*Kolla*				Male				Female			
Yes		No.		Yes		No		Yes		No		Yes		No	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
12	25	36	75	23	23.2	76	76.8	31	23.7	100	76.3	4	25	12	75

Source: Field survey, 2013

Table 19_b: Distributions of sample households withdrew children from school during drought by wealth

Wealth categories											
Better off				Medium				Poor			
Yes		No		Yes		No		Yes		No	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
5	17.9	23	82.1	9	20	36	80	17	29.3	41	70.7

Source: Field survey, 2013

As it is indicated in table 19_b, of the total poor, medium and better off households, about 29 %(17), 20 %(9) and 18 %(5) respectively responded that they withdrew children from school during drought. From this, it's possible to understand that all wealth categories do not want to teach their children during food shortage.

During survey, farm households were asked to state reasons for school drop outs in their order of importance. Accordingly, as it is indicated in table below, about 49 %(17) and 37 %(13) responded that to engage in casual labour and lack food, to engage in casual labour alone were among the frequently mentioned reasons for pulling children from school. From this, it is possible to deduce that casual labour and lack food took the lion share for reasons to withdraw children from school at the study area during drought.

Table 20: Shows reasons for withdrew children from school

Reasons	Frequency	Parentages
To engage in casual labour	13	37
Lack of food	5	14.3
To engage in casual labour and lack of food	17	48.6
Total	35	100

Source; Field survey, 2013

4.2.9 Petty trading

According to the livelihoods study report by East Harerghe Zone (2008), the road access and market conditions of the study area are rated as good. The district is accessible to major towns of Harar, Dire Dewa, Haremaya,Aweday, Kombolcha and Jijjiga. Groundnut and chat are the main cash crops traded from local markets to Harar, Dire Dewa, Aweday, Haremaya, Kombolcha and Jijjiga. It also traded among different kebeles within the district and among different districts. Apart from these, biscuits, tea, bread, sugarcane, banana, onion, tomatoes, buying and selling of small ruminants are small trading activities carried out during normal period along the major transportation routes and market places around the villages. These activities were intensified during drought years. Specifically, food related items were said to be highly traded. Despite of its variations among kebeles, the numbers of peoples engaged in these activities were increasing during harvest failure. During field survey, there was hot marketing of chat and other products at Nega Umarkulle peasant association throughout the week before mid- day. It is the most accessible market area for towns of Haramaya, Babile, Harar, Diredewa and located along the road from Harar town to Midega tola (other district). These created an enabling environment to widely engage in trading activities for farm households in the district especially for NegaUmarkulle kebeles. Farm households at Belina

arba and Agudora were similarly engaging in these activities at market places found at their villages.

Table 21_a: Distributions of sample household engaged in petty trading during drought by agro ecology and sex

Agro ecology								Sex of the households							
Woinadega				*Kolla*				Male				Female			
Yes		No.		Yes		No		Yes		No		Yes		No	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
7	14.6	41	85.4	24	24.2	75	75.8	24	18.3	107	81.7	7	43.8	9	56

Source: Field survey, 2013

As it is displayed in table 21a, about 14.6 % (7) of *Woinadega* and 24.2 % (24) of *Kolla* reported that they engaged in petty trading during drought whereas about 18.3 % (24) of male and 43.8 % (7) female headed households engaged in similar strategy. From this, it is possible to deduce that the *Kolla* and female headed households more engaged in this activity as compared to *Woiandega* and male headed households. The *kolla* households resort to petty trading due to recurrent production failures at this specific agro ecology where as female mainly due to traditions.

Table 21_b: Distributions of sample households engaged in petty trading during drought by wealth

Wealth categories											
Better off				Medium				Poor			
Yes		No		Yes		No		Yes		No	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
10	35.7	18	64.3	7	15.6	38	84.4	7	12.1	51	87.9

Source: Field survey, 2013

As it is revealed in table 21_a, of the total better off households, about 35.7 % (10) engaged in petty trading where as relatively small proportions of poor 12 % (7) and medium households 16% (7) also reported that they engaged in these activities during drought. From this, one can understand that better off households were more engaging in the activity during drought years.

According to the information obtained from key informants and own observation, female headed households are highly engaging in petty trading during normal as well as drought years which is mainly associated with traditions. The traditional chat dealers are mostly female headed households at the study area. Thus, it is the matter of maintaining their businesses during adversity. But, for most better off and medium headed households, petty

trading is not common activity during normal period since they are mainly obtained income from crop and livestock production sales at different scales. The poor less engaged in petty trading activities during normal as well as drought years. This might be attributed to lack of start up money or financial constraints. This is contradictory with the findings arrived at most of the petty traders were poor during drought at Humbo woreda, SNNP (Getahun, 2006).

During focus group discussions, the farm households noted that the large numbers of petty traders were females during drought. Females were less active in searching for local labour outside the district (land preparation, weeding, harvesting) and migrating to far distant in search for employment rather they preferred to engaging in small businesses at their locality. This is consistent with the finding that most females were petty traders during drought at the pastoralist areas of Shinile districts (Mulu, 2010). On the contrary to this, the farm households noted that female headed households immediately stops after getting married since they become busy in routine activities and caring for their children.

One focus group discussants shared his experiences as follows:

''……Before I got married to my wife, she was chat traders. I thought that she will continue after marriage so that our family could lead successful and happy life. But everything has been changed after marriage. She immediately stopped to engage in such activities and started to wait for income from crop and livestock sale……''

Figure 5: Shows petty traders along the road from Harar to Midegatola at Negaumarkulle kebeles

4.3 Assessing effectiveness of coping strategies

The effectiveness of each strategy measured in line with developed framework regardless of agro ecology, sex and wealth categories. Though, the proportions of households using

specific coping strategies are different in terms of agro ecology, sex, and wealth categories, the common strategies employed by the households were basically the same.

4.3.1. Environmental indicators

As it's indicated, of the total sample households, about 24 %(36) households reported that they engaged in selling firewood to purchase food grains during drought. However, cutting trees were subjected to restrictions from the concerned GOVs and NGOs, the farm households were cutting and sold trees in an open market. According to focus group discussions and interview made with the farm households during the survey, they obtained firewood for selling and domestic energy needs from the surrounding mountains found in their locality. They locally name it '*Gara*' which means mountains. The mountains belongs to nobody according to them which actually owned by the government. The prominent '*Gara*' or mountains where the farm households highly depend on were Erer and Gobelle mountains where pockets of natural forests, shrubs and bush land are relatively abundantly available. It is the home for wildlife like Lion, Elephant, Lesser kudu and Greater kudu. Besides, it is the origin for two main rivers (Erer and Gobelle) which are important sources of water for human as well as livestock consumption.

Despite its significance in maintaining the ecological and economic bases of the district, it is being threatened by the surrounding rural communities. The remnants of natural vegetation, fertile top soil as well as the wild animals might be eliminated in the near future if the current trends of deforestation will continued.

Figure 6: Fuelwood sell in open market during the survey at Boko town

Unlike the fuel wood, charcoal selling is strictly forbidden. A person who engaged in producing or selling charcoal was confiscated and a person fined by the police, Kebele level administrators and development agents. However, according to the information obtained

during focus group discussions, there are some illegal commercial traders and producers of charcoal in the study area. They are transporting from one area to the other by using vehicle during the night. This practice furthers aggravating deforestation and the ecological imbalances at the study area. Eriksen *et al.*, cited in Mulu (2010) similarly argues that under the situations drought occurred frequently, selling firewood to cope with food shortages might lead to deforestation.

The farm households were complaining the measure taken against the charcoal sellers. According to them, it is mainly subjected to corruption. It is a matter of only changing the users than controlling deforestation from the source. The concerned body confiscated the charcoal sellers and used for their own purposes. Therefore, in order to protect the existing forest, the district's concerned body should eliminate deforestation for its source by creating awareness about the significance of forest among the farm households. Besides, the measure taken to reduce deforestation should be revisited and focus to reduce illegal cutting of forest from the source.

During focus group discussions, the farm households strongly argued that selling forest products are preferred strategies to cope with drought. According to them, tree is the gift of *Allah* so that it should serve them all the time. From this, it is possible to understand that the households have no awareness about the environmental significance of trees and the consequences of deforestation than mere satisfying their immediate needs. This was one of the contributing factors for the damage of the surrounding wood lands and forests. If the current trends continued, it will be difficult to exercise the major livelihood strategies viz., crop production and rearing livestock in the study area. This calls for urgent policy actions to design alternative drought coping options.

Though, the farm households were engaging in selling fuel wood and charcoal as one of the strategies during drought, it is not helpful to build the resilience of farmers' livelihoods on sustainable basis. Rather, it is exacerbating the problem of food shortage by disturbing the surrounding environments. On top of this, the limited availability of forest resources, the prices of the product during drought together with the restrictions imposed from the concerned body limiting the effectiveness of this activity as drought coping strategy. Degefa (2005) similarly argues that the forest product sellers faced a number of difficulties in attempting to make livelihoods from firewood selling. He mentioned the reduction in price

of firewood, in accessibility of this product during food crisis and restrictions on tree cutting make firewood collection difficult livelihoods strategy to the farm households.

4.3.2 Economic indicators

Selling firewood and livestock were reported by the households as drought induced food shortage coping strategies. However, its effectiveness in successfully addressing the problem of food shortage depends on the demand (how the market functioned), the prices and the types of livestock sold.

With respect to price of fire wood, the household survey result revealed that it was reducing almost by half during drought years. As it can been seen in table 22, the average price of a bundle of fuel wood during the normal production was 65 birr where as 34 during drought. Similarly, the price of one *quintal* of charcoal during normal production year was 77 birr where as 41 birr during drought. This was mainly owing to increasing forest product supplier while the demand for this product declining. Thus, the cash income obtained from sell of this product could not purchase adequate food grains due to its skyrocketed price.

Table 22: The average price of fuel wood in bundle and charcoal in *quintal* during normal and drought years

Type of forest products	Frequency	Percent	Normal years in birr	drought years in birr
Fuel wood	36	100	65	34
Charcoal	27	75	77	41
Total	36	100		

Source: Field survey, 2013

Like the prices of firewood, the animals are said to be sold at a very low price during drought period as compared to the normal years.

Table 23: The average price of livestock and type of livestock sold

livestock sold	Frequency	percent	Price	
			During normal period	During drought
Farm ox	48	73	5452	3062
Cow	18	27	2905	1772
Bull	17	26	2500	1394
Heifer	20	30	2355	1060
Goat	23	34	900	695
Donkey	5	7.5	1660	1060
Chicken	4	6	68	44

Sources: Field survey, 2013

As it is indicated in table 23, the price of all livestock types were significantly decreasing during drought while the prices of grain obviously increasing owing to increasing number of livestock supplier to the market and deteriorated body conditions of livestock due to lack of feed and water. Thus, the money obtained from livestock sell could not buy enough grain to cope with drought induced food shortages. Furthermore, of the total sample households sold livestock during drought, about 73 % (48) of the households indicated that they sold farm ox. This might be due to lack of shoats and small ruminants for sell so that they resort to sold farm oxen which further contributes to food shortages by eroding households production base.

During focus group discussions, the farm households also noted that selling livestock were subjected to uncertainties. The price of livestock reduced almost by half since the supply to market has been increasing and demand becomes reduced. This situation created good business environment for some medium and better off households at the expense of poor households. They engaged in buying livestock from the poor with small prices in order to sell during normal years on profit basis.

On contrary to selling livestock and firewood, the farm households perceived petty trading as preferred drought coping option during discussions. Though, not fully confident to say it built their resilience to food shortage, they strongly argued that with regular awareness and financial assistance, it will be better livelihood strategies to future drought. Thus, it can be possible to partly reduce dependency on rainfall and effects of food shortages.

One focus group discussants shared his ideas as follows:

''……...our life is at risk now a day. Our land couldn't give production and pasture for our livestock due to inadequate rain fall and loss of soil productivity. Besides, weeds and pests are attacking our crop land yearly. Thus, it is difficult to pursue these livelihood strategies. We have to switch to alternative livelihood options like trading, fattening ……..''

Therefore, despite of variations in capacity among the farm households, trading was perceived as a better livelihood options against the effects of regular drought.

4.3.3 Socio-cultural indicators

Health

There were reported cases of changes in diets, reduced number of meals per day and the quality of food consumed in order to smoothening consumptions during food shortages at the study area. The food consumed during the normal period includes *Lafiso*, Porridge and

Shumo (boiled grain), Potatoes and limited fruits and vegetables. Besides, milk and milk products are also consumed. Yearly meat consumptions days for most of the people were limited due to poor purchasing power by majority of the households. Meat is mainly consumed during annual religious festivals especially during the month of Ramadan (Muslim fasting period). On the other hand, during food stress, households switch to low quality sorghum and maize (harvested but left unprocessed for long period of time due to its lack of maturity). During normal period, it only used for fattening livestock (livestock feed). Besides, the farm households also depend up on low quality purchased staple foods. Obviously, this type of foods has low nutritional content and less preferred foods for consumption. Thus, the frequency of drought events made the farm households to repeatedly consume this type of food which could result in malnutrition and other related diseases.

The farm households were changing diets to wild foods during severe drought to smooth food consumption patterns. The identified wild foods were Manihot esculeata (*Cassava tree /Muka dekika*), Portulaca quadrifida *(Marare),* Opuntia ficus indica *(Tini/cactus*), Agave sisalana *(Sisal /Kacha*) and Aloe *(Argisa).* During field work, information was gathered from key informants and focus group discussants (especially female focus group discussants) to get deep insights to the health effects of these coping plants and their preferences for consumption. Furthermore, attempts were made to observe the physical abundance and distributions among the kebeles.

To start with, Manihot esculeata (*Cassava tree /Muka dekika*) was one of the commonly reported wild foods consumed during drought. It is the root tree found in some kebles. According to the key informants, Iddo baso, Nega Umarkulle (the sample Kebele), Melka, and Muleta were the notable kebeles widely depend up on this plant during food shortages. The farm households were extracted the matured big roots for food by leaving small ones for future use. The roots were chopped down, dried on sunlight and grinded to make flour. Finally, large proportions of Cassava tree floor mixed with little amounts of sorghum or maize floor in order to prepare foods like *Injera*, Biscuits, Bread and porridge for consumption. After eating this, people sleep on a stomach full of food, albeit of insufficient nutritional content.

Portulaca quadrifida *(Marare)* was used in all surveyed villages. It is mostly available during rainy seasons. The leaf of this plant was gathered and boiled for a long period of time with or without cabbage based on availability. Consequently, large proportion of cooked

Portulaca quadrifida *(Marare)* with small amount of *Injera* provided to the whole family members for consumption.

Opuntia ficus indica *(Tini/Cactus)* was plant commonly consumed at Agudora peasant association during food shortage. Under normal circumstances, the fruit of Cactus consumed when it is getting ripen. On contrary to this, during food shortages, the farm households consumed it regardless of maturity. This became the causes for stomach and skin illnesses at the study area.

Agave sisalana *(Sisal /Kacha)* used to make ropes to buy food during normal years and is chopped and given to animal in drought period to get some milk or to maintain animal during feed shortages where as Aloe *(Argisa)* used for nothing during normal period and for animal feed during bad years. Thus, both Sisal and Aloe were used as coping plants in bad periods as feed security for animal and food security for human. This caused human-livestock conflict during food shortages at the study area.

Figure 7: shows Agave sisalana and Manihot esculeata taken during the survey at Belinarba and Negaumarkkulle Kebeles

The effectiveness of these plants as coping strategy discussed with the farm households during focus group discussions. They reached on the consensus that these plants are unrecognized as food sources during normal period. Thus, plants like Aloe *(Argisa),* Agave sisalana *(Sisal /Kacha)* and Opuntia ficus indica *(Tini/cactus)* were felt useless (Non-Preferred) plants and removed to have enough space for crop production. Similarly, Portulaca quadrifida *(Marare)* was regarded as weed plants. From this, it is possible to understand that these plants are not preferred foods culturally as well as health wise. Apart

from these, Agave sisalana *(Sisal /Kacha)* and Opuntia ficus indica *(Tini/cactus)* are plants which have health effects on human beings notably the skin diseases. The survey result also shows that of all sample households used wild foods, 92 % (46) responded that those plants are not useful for consumption during the normal period. With reference to their abundance, they are not fairly distributed among kebeles. Some kebeles could access to some of these plants while some are not at all. Therefore, in terms of their adequacy as well as their preferences those plants were not promising coping options to build the resilience farmers to drought induced food shortages.

The second important thing with respect to changing consumption patterns was reducing number of meals consumed per day. The discussions result revealed that both sexes and all wealth categories reduced the number of meals provided to the household members per day during lean period.

As per the discussions, parents have responsibility to feed children among household members. Thus, priority is given to them where as father; mother and adults in the households usually eat based on availability of food. As it is indicated during discussions, the average frequency of meals for adults per day is three times for better off, medium and female headed households where as two times for poor during the normal period. For children under the age of five, number of meals per day during normal period is five times for better off and four times for medium households whilst three times for poor and female headed households. These trends were changed during food shortages. The numbers of meals were reduced by at least one for all wealth categories and sexes. In line with this, the quantity of meals was also reduced as it was reported by 87 % (97) sample households. Therefore, the reduction in number of meals per day, quality and portions food might leads to undernourishment and other related diseases which further threaten the future livelihoods of the farm households. According to the interview made with the district's head of health office, malnutrition is one of the ten top diseases observed yearly due to frequent harvest failures. Thus, in order to alleviate this problem, vulnerability screening and targeted feeding for most vulnerable sections of the society viz., lactating and pregnant women, and children in between 6-59 months has been conducted. During the survey, the food was provided for 17^{th} round for 22,605 children out of the total 22,563 and 4,990 pregnant and lactating women out of the total 5,587. From this, it is possible to understand the intensity of the problem at the study area which is partly due to drought induced harvest failure.

Though changing consumption patterns during drought was considered as non- erosive coping strategy in different literatures, the frequency and intensity of drought, the households' coping capacity are some of the determinant factors for effectiveness of the strategy. The farm households at the study area have been persistently hit by the drought. These situations led the farm households to experience food shortages on continues basis. Therefore, consumption of less preferred foods, reducing number and quantity of meals per day in line with growing frequency of drought events might threaten the health of farm households which further erodes their production. In line with this reality, Eriksen *et al.*, cited in Mulu (2010) found that consumption reduction as coping mechanism is not sustainable. He argues that continuous consumption reduction results into malnutrition, lose of capacity for diseases resistance and finally to death.

Culture

Migrating for better livelihoods was one of drought coping strategies of farm households at the study area. The common type of migration the farm households engaged in during drought was moving the whole family members to surrounding urban environments. It was considered as destructive type of migration for migrants, place of origin as well as destination. The migrants could not lead successful life at place of destination thus forced to engage in different illegal and immoral activities like theft, prostitution, begging which is locally known as '*Sedeka kedechu.*

Table 24: Shows the number of migrants at different crop production years to urban areas.

Production year	Without family	With family	
	Male household head	Number of households	Number of family members
2003/04	NA	942	2878
2006/07	132	22	81
2007/08	455	528	640
2010/11	38	NA	NA
Total	625	1492	3599

Source: compiled from district's annual report, 2013.
NA=data is not available

From the table, one can understand that to what extent the farm households employed migration as a strategy to tackle problem of food shortage and which type of migration commonly exercised at the study area. As it is indicated, the common type of migration was moving the whole family members to the urban areas. This is consistent with the survey result which shows that most of the households migrated with their whole family members.

As per the discussions made with farm households, most of the migrants have no adequate awareness about the place of destination and the activities they engage in than mere attempt to make money. Such circumstances made them to face more livelihoods problems. Thus, they forced to engage in illegal activities like theft, contraband and immoral activities like prostitution, begging which were against their culture (religion). After all, migration was one of the ineffective types of drought coping strategy for the study population because of the aforementioned problems that the farm households experienced at previous years. The survey result also shows that of the total households migrated during drought, 68 %(25) responded that it was not useful strategy to cope with food shortages which further strengthens the idea raised during interview and focus group discussions. However, based on experiences, awareness and skills few households reached to the extent that they could establish their businesses and became successful.

Borrowing money and/or grains during adversity was perceived as effective strategy to cope with drought induced food shortage. According to the focus group discussions, there is strong culture of interdependence among farm households during normal as well as adversity. It is the culture inherited from their ancestors which cannot be changed by the present generations. According to their tradition, no interest for money and/or grain borrowed from relatives and/or friends. There is a strong belief that a person who lend cash and/or grain at present might borrow from others in the future. Therefore, lending cash and/or grain on the basis of interest is against their tradition. It is *'harama'* according to Muslim religion which means sin. This is the strong cultural obligation that the society should obey.

At the same time, the farm households also noted that no time bound for money borrowed from relatives and/or friends. In most cases, the borrower is expected to repay during the subsequent crop year. However, this will be practical if and only if a person could obtain adequate harvest otherwise the lender should wait as long as the borrower could repay the money. On the other hand, according to the information obtained from key informants, there were few local merchants that brought grain (sorghum and maize) from Adama town during adversity and lent it to the farm households on interest basis. According to the response of farm households borrowed grain from local merchants, the interest for grain was not fair and peoples were compelled to repay it at subsequent agricultural season with interest otherwise the merchants were accused them to the court. Thus, the farm households were forced to

repay the loan by selling asset. This situation puts the borrower more in stressful situations than solving their problems.

Therefore, as per the information obtained from household survey, key informants and focus group discussions, the tradition of interdependence among farm households during adversity should be encouraged and strengthen in the future since the essence of borrowing and lending was helping each other. It was considered as one of effective strategy in which money households engaged in during drought. On the other hand, borrowing cash and/ or grain from the local merchants during drought was no longer important to build the resilience of farmers' livelihood to shocks rather it erodes the farm households' production bases by compelling farm households to repay the loan by selling their assets like livestock, land and others.

With respect to the formal credit institutions (Government and non government), key informants and focus group discussants noted that too small amount of money for only limited households based on household asset ownership was provided. Though, it was designed to capacitate the poor, better off and medium households were more benefited from loan arrangement. Mis-understanding of office holder about aim of loan, only focusing on households can repay the loan soon, nepotism and corruption and lack of monitoring by the concerned body were some of the factors mentioned for ineffectiveness of loan provided by institutions.

Education

Pulling out children from school was also one of the reported strategies that the farm households cope with drought induced food shortage. Children scarified their education in search for food. For instance, in 2010, a total of 594 school drop outs were seen due to different factors.

Table 25: Reasons for school dropout in 2010

Reasons for school drop out	Number	Percent
Marriage	50	8
Migration	23	4
To attend religious education	12	2
Diseases	10	2
To engage in casual labour	499	84
Total	594	100

Source: district's educational office, 2013

Similar to the survey result, engaging children in causal labour to assist the parents in the case of food shortages was the major cause of school dropout in 2010. Following this, marriage and migration were assumed the largest causes. In addition to this, lack of drinking water also noted as the main problems contributing to school dropout.

Thus, in order to reduce this problem, different interventions related to food provisions and awareness creation by government and non-government organizations were exercised. Seven elementary schools consisting of 7,724 students were accommodated by Food for Education Program provided by World Food Program. Despite of this, the district's educational office still claiming similar interventions for 17 elementary schools faced serious food shortage. Therefore, unless serious attention is given to the issue of food shortage, the children's education will be more affected and further aggravating the problems of food shortage in the future.

4.3.4 Institutional indicators

Selling firewood during drought is intensified at the study area. Despite the farm households depend on this activity in order to purchase food grains, it faced serious restrictions from concerned GOVs and NGOs. According to the interview made with the district's Agricultural and Rural Development head and Development Agents working at respective kebeles, cutting trees for any reasons without permission from the concerned authorities are illegal. The farm households are allowed only collecting dead trees for the purpose of selling and using for their domestic energy needs. On contrary to this, a person engaged in cutting trees without permission is confiscated and fined. This situation made difficult to freely in engage in this activity as drought coping options.

Emergency food aid intervention by GOVs and NGOs was common during drought at the study area. However, different factors affecting the effectiveness of this intervention to successfully address the issue of food shortage. Though most of farm households during focus group discussions reached on the consensus that humanitarian aid was important to get relief from food shortage, they argued that targeting process was full of nepotism and flawed. As it was indicated by farm households, the poor participation of the community members and corruption during registration of beneficiaries' by administrative people in terms of prioritizing their relative and friends who were better in living condition than needy people were frequently seen. The kebele level and community task force selected from the community did not prioritize the need of the poor and marginalized community members

but instead divert benefit to their families and their relatives who were better off than the remaining needy people. Muttasa (2010) similarly argues that humanitarian aid worsened households' vulnerability to food shortage through wrong informed screening methods and corrupted relief targeting process. In such cases, at the community level, it is important to involve the whole community member during beneficiary selection

During interviews, key informants noted that emergency food aid beneficiary selection was the top challenge and they felt unease. It was underlined that a better targeting requires reliable socio-economic data and related indicators which indicate a serious gap between households. Despite of its significance to increase effectiveness of targeting, base line data for rural communities were lacking in the study areas. Thus, targeting beneficiaries became full of illusions and confusions.

The key informants also noted that the challenges were identified with respect to administering beneficiary selection in the study area. Community targeting method was the process which has taken place at village level where as quota of households to be targeted was assigned at federal level. Thus, the number of targeted households at community level and quota assigned at federal level were conflicting yearly. Due to this gap, only few households were selected by the community task force to benefit from emergency relief at random basis to provide equal opportunities which disadvantages the poor families and benefited better off. Apart from these, late informing and approving number of total beneficiaries of the district from the region result in late selection of targeted households during food shortages which result in inclusion and exclusion error at the time of targeting. One of the ineffective targeting in the area was inclusion error. It was indicated that the number of needy people was always higher than the resources allotted to the district. Thus, despite of the large people need emergency food assistance, small proportions of these households targeted for emergency food assistance. As a result there was a problem in making targeting socially acceptable and it was complained by the majority of the populations. At the same time there was also exclusion error.

Table 26: Shows adequacy of aid and sharing of aid with non beneficiaries

Actions	Responses	Frequency	Percent
Adequacy of food aid	Yes	41	45
	No	50	55
Total		91	100
Sharing the aid	Responses	Frequency	Percent
	Yes	32	35
	No	59	65
Total		91	100

Source: Field survey, 2013

The survey result revealed that the amount of emergency food aid provided during drought was not enough to support their family. From the total households benefited from food aid, 55% (50) of the farm households reported that it was not adequate to support their family. The focus group discussants also reached on the consensus that emergency food aid was not adequate to support their family which further strengthens the survey result. They argued food aid is important only as supplementary to their available food stocks. But, since their food stocks were empty during drought years it was difficult to get relief from food shortage only by aid came from institutions.

With respect to sharing aids with non beneficiaries, of the total sample households received food aid, only 35% (32) reported that they shared it with non beneficiaries where as the majority of sample households 63 %(55) did not because of the amount of transferred was limited which even couldn't support their family. These puts strain on strong social networks and cultures of the farm households.

4.4 Preferred future coping mechanisms: discussions

As per the discussions held with men and women during field survey, many households argued that the majority of current drought coping strategies were not effective to meet their family's food requirement adequately on sustainable basis. With the exception of borrowing and petty trading, the others were at expense of health, education, environment and their productive assets. For instance, reducing quality of meals, size of meals and number of meals per day will lead to malnutrition related diseases. Vulnerability assessments and targeted feeding of lactating and pregnant women and supplementary feeding at school were some the indications how the problem of malnutrition was serious at the study area. Similarly, Selling charcoal and fuel wood was one of the factors for rapid deforestation of existing pockets of forest and migration of wild animals. Besides, it will lead to degradation

of the surrounding environment which further aggravates the problem at hand. The other important thing raised was the problems related to migration during drought. Migrants were spontaneously moved to the urban centres with their family members and suffered from different socio-economic problems. Because of nature of the activities they engaged in exposed for different diseases like AIDs and other Sexually Transmitted diseases.

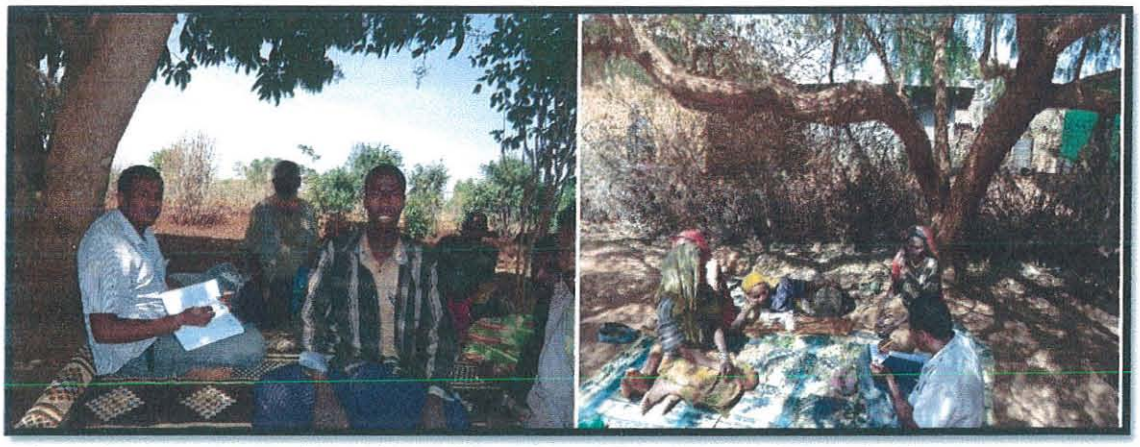

Figure 8; Focus group discussions with male and female headed households

Therefore, in order to minimize the effects of frequent drought, households identified the preferred future coping strategies specific to their district. These are petty trading (like chat, livestock, food items, and cereals trading), temporary migration of male headed households to urban centres (for works like construction, chat processing, and for employment opportunities like guards), migration to other districts (for works like land preparation, weeding and harvesting), fattening livestock, strengthening the culture of interdependence during adversity (borrowing from friends, gifts), small scale irrigation agriculture (which is very difficult to really exercise it), cultivating short cycle and drought tolerant sorghum and maize, diversification of livestock and crop types, saving and educating children were raised preferred coping options suggested by the farm households during discussions.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The study revealed that frequency and intensity of drought has been increasing while the farm households' drought coping options has been decreasing in the last few years. The livelihoods of the study population getting deteriorated 1970s afterwards and thus the farm households persistently exposed for food shortage. In line with this, dependency on external food sources has been increasing. In addition to frequent drought, vulnerability to food shortage has been increasing owing to low entitlement to productive resources like farm land, livestock resources and farm oxen which are the determinant factors for food availability at household level. Despite of positive relationship between availability of food from own harvest and productive resources, the study findings revealed that the farm households have low entitlement to these resources because of frequent drought that decreasing livestock ownership, decreasing of farm land due to increasing population pressure which further undermines crop production and productivity and coping capacity of the households. The problems are found to be severe for poor and female headed households and lowland within agro ecology.

The study result also revealed that subsistence livelihoods strategies faced multitude of bottlenecks. Traditional farm operations and rudimentary farm implements were among the major causes for low crop production and productivity at the study area. Furthermore, bio physical and socio-economic associated problems like lack of rainfall, sudden weeds and pests outbreak, uneven distributions of rainfall affecting crop production and thus food shortages. Similarly, livestock production was constrained by lack of grazing land, lack of water and other drought related problems. Thus, the intertwined problems to livelihoods undermine the shock absorption capacity of the farm households.

In response to frequent drought and subsequent food shortage, farm households adopt different coping strategies to smooth food consumption pattern. Changing food consumption, borrowing, appealing for food aid, selling livestock, eating wild foods, migration to urban centers, selling fuel wood, pulling children out of school to engage in casual labor and small business activities were identified strategies adopted to increase food availability at household. Though, coping strategies adopted during drought were basically

the same, the study finding shows that majority of these strategies differs in terms of proportions of the households adopt them in agro ecology, sex and wealth status. Thus, changing consumptions, borrowing, selling livestock and eating wild foods were among the strategies pursued by *Woinadega* part whereas receiving food aid, migration, selling firewood and petty trading were mainly employed by *Kolla* part. With respect to sex of households, female headed households mainly adopted borrowing, receiving food aid, selling firewood and petty trading. On the other hand, selling livestock was mainly employed by male headed households. Besides, no difference between male and female headed households in terms of adopting changing consumptions, using wild foods and migration. On the basis of wealth status, changing consumptions, selling livestock and petty trading were among the strategies pursued by households relatively experiences better resource ownership whereas the rest pursued by resource poor households.

The study shows that the majority of the strategies are not effective and sustainable to build the resilience of farmers' livelihoods to increasing frequency of drought situations at the study area. Changing food consumptions, appealing for food aid, selling livestock, eating wild foods, migration and selling fuel wood were at the expense of environment, social capital, traditions/culture and production bases. Hence, could not enhance the resilience of farmers' livelihoods to drought effects.

Therefore, preferred future drought induced food shortage coping options were suggested by the farm households. These are small business activities like chat, livestock, food items, and cereals trading, temporary migration of male headed households to urban centres for works like construction, chat processing, and for employment opportunities like guards, migration to other districts for works like land preparation, weeding and harvesting, fattening livestock, strengthening the culture of interdependence during adversity (borrowing from friends ,gifts), small scale irrigation agriculture which is very difficult to really exercise it due to absence of water sources, cultivating short cycle staple crops, striga and drought tolerant sorghum and maize, diversification of livestock and crop types, saving and educating children were preferred coping options suggested by the farm households for resilient livelihoods to drought effects.

5.2 Recommendations

The findings of the study revealed that the majority of the adopted coping strategies were not effective to build the resilience of farmers' livelihoods to drought induced food shortage.

Besides, the household's shock absorption capacity was weak to withstand the problem due to aforementioned factors. Thus, it needs interventions to address the root causes of food shortage which were attributed to inadequate rainfall situations constraining crop and livestock production at the study area. Therefore, the following areas need to be prioritized while developmental activities carried out by GOs and NGOs at the district.

- The current land cultivation practices of the farm households need to be modernizing in order to enhance crop production and productivity. Means of land cultivation by some better off farm households using tractors is a good start needs to scale up to all farm households so that the land can be adequately cultivated with less energy and at an appropriate time. This is mainly the responsibility of Fedis Agricultural Research Center to provide modern agricultural farm implements with an affordable price or rent.

- Agricultural extension services provided by GOVs and NGOs need to be introducing early maturing and Striga resistant variety of staple crops (maize and sorghum). Besides, adequate veterinary services needs to be provided to protect livestock resources from sudden out breaks of diseases. Thus, Fedis Agricultural Research center and the district's agricultural office should be more concerned about the implementation of these to the grass root level.

- Despite of their abundance, some moisture stress plants *(cactus/Tini and cassava/Muka dekika)* could be useful to cope with food shortage during drought. Thus, training and awareness creation needs to be provided by nutritional specialists on how to use those plants for consumption purposes. With respect to its abundance, it should be scale up to all peasants associations.

- All lowland parts have an acute water problem and persistently hit by the drought thus couldn't practiced crop and livestock production which are the major sources of livelihoods at the study area. Thus, in order to improve food security and coping capacity on sustainable basis, rather than providing relief food for short term assistance, voluntary resettlement programs to other potential area is the most prominent option.

- The current traditions of interdependence among the farm households regardless of wealth status need to be upgraded to civil society so that its usefulness will be more strengthened. This can be overlooked and implemented by respective elected community members.

- There should be strong link and communication among federal, regional, zonal, district and community level food security task force for check and balance which in turn helpful to facilitate timely food aid transfers during harvest failure, to harmonize the difference between the number of targeted households and quota assigned by federal government. Besides, the whole community should participate during targeting process and the committee should be elected from the community to handle grievance so that trust should be there among the farm households. Finally, all level food security task force should be accountable for their deed.

- Complete socio-economic data base system that can reflect the difference among the farm households should be established. This needs to easily understand the food security status of the households and thus facilitate effective targeting for different purposes like credit services, PSNP, emergency food aid and other purposes.

- Government need to overlook market situations during drought. A government market intervention is important to stabilize the prices of livestock, wood fuel and staple crops at the study area during drought. Market information and communication means needs to be designed in order to create the systems under which the farm households can sell their products to other nearby districts and urban centers. Besides, the government should provide food crops at low market price to increase food access at the study area.

- The education of children needs to be strengthened by designing alternative ways how they can assist their parents at farm. Half day education and half day work might helpful to sustain their education during bad years.

- Training, awareness creation and identification of business environment in which the farm households should engage needs to be designed, prioritized and implemented especially for poor households so that they can diversify their income sources and decrease the adoption of riskiest coping strategies like spontaneous migration, selling firewood and resorting to less preferred foods.

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ANNEX-I

Household Survey Questionnaire

Introduction

My name is **Anteneh Derribew**, a graduate student in the Department of Environment and Development at Addis Ababa University. As part of the study programme, students are expected to engage in a field research and produce a thesis covering their areas of interest. I am, therefore, conducting an assessment of ''the effectiveness of coping strategies for drought induced food shortage'' at Fedis Woreda.

I guarantee that the information which will be gathered in this exercise will be strictly used for academic purposes and the respondents' confidentiality will be respected. Having said this, I like to request for your participation in this exercise.

Thank you in advance.

Household Identification

Questionnaire No---------- Name of the respondent ----------

Wealth category----------Name of enumerator----------

Name of the PAs----------Checked by----------

A. Household characteristics

1.Age	2.Sex	3.Marital status	4.Educational status	5.Occupation other than agriculture

B. Land ownership

6. Do you have your own land? A. Yes B. No

If 'yes', please answer up to 17, If 'No', skip to 18.

7. How many 'timad' of land do you have? ----------

8. How do you get access to it?

A. Through land distribution B. shared with relatives

C. Inherited from parents D. Purchased

Other (please specify) ----------

9. Do you think that your piece of land is enough to support your family? A. Yes B. No

10. If No, what are your reasons?

A. Infertility of land B. Small size of land C. Lack of agricultural inputs to increase productivity D. large family size E. Other (specify) ----------

11. What proportion of your cultivated land is allotted to the following in 'timad'?

Annual crops----------Perennials----------

12. What were the types of crop you grew on your land and the amount of harvest you got from it in 2003/04 E.C. How much did you sell from each of these yields?

Types of crops	Amount produced in quintal/ kilograms	Amount sold in quintal/kilograms
Annual crops 1. 2. 3. Perennial crops 1. 2.		

13. What do you use to plough your land?

A. Hand tools /Hoes B. Oxen C. Rented tractor

14. How do you evaluate the condition of rainfall in your area for crop production and livestock rearing? A. Sufficient B. Insufficient

15. Did you experience crop failure due to shortage of rainfall in the last ten years?

A. Yes B. No

16. What were/was the consequences? (Multiple responses is possible)

A. Shortage of food B. Lack of pasture C. Shortage of drinking water

Other (please specify) ----------

17. What are the major constraints to crop production in your woreda? (Mention at least 3)

C. Livestock ownership

18. Do your households own livestock? A. Yes B. No

If 'yes', please answer up to 21, If 'No', skip to 23

19. Please indicate the type and number of livestock you owned? ----------
---

20. Do you have oxen for you farm operation? A. Yes B. No

21. If yes, are your oxen enough for your farm operations? A. Yes B. No

22. If No, how do you access to additional oxen you need?

A. Hire from someone B. Coupling with other farmer C. Borrow from friends

D. By contributing labor to person who has oxen E. Other (specify) ----------

23. What are the major constraints to livestock production in your woreda? (Mention at least 3)

D. Food security

24. Do you meet all year round food requirements of your household members from own production? A. Yes B. No

If 'No', please answer 25 up to 28. If 'Yes', please skip to 29

25. For how many months of the year your household production is sufficient to make the family's end meet? ----------

26. Would tell us the specific months your household encountered food shortage? ----------
---

27. What do you think are the main causes of food deficit in your district?

---

28. Does the income you earn from nonfarm activities enable you to buy food for bridging deficiency? A. Yes B. No

29. How many quintals/kilograms of food grains did you obtain from the following sources in 2003/04 E.C crop year?

Major sources	Estimated amount in *quintals* or kilograms
Own production	
Purchase	
Borrow from relatives	
Relief food aid	
Safety nets	
Other (specify)	

E. Coping strategies and its effectiveness

30. Have you received food aid to cope with drought in recent past? A. Yes B. No

If 'Yes', please answer up to 37, If 'No', please skip to 38.

31. From which organization did you receive the aid?

A. Government B. Non Government organizations

32. How much was monthly distribution rate?

Cereals (kgs) ---------- pulses (kgs) ----------

Oil (liters) ---------- Salt (kgs) ----------

33. Do you think that the aid was enough to meet your household need? A. Yes B. No

34. Did you share the food aid with other neighbors and relatives? A. Yes B. No

If your answer is No, why----------

35. Did the entire households affected by drought get food aid? A. Yes B. No

If No, why ----------

36. Do you think the beneficiary selection criteria were fair? A. Yes B. No

If No, why ----------

37. Was the aid provided on time? A. Yes B. No

38. Did you engage in gathering wild foods to cope with drought in the recent past?

A. Yes B. No

If 'Yes', please answer up to54, If 'No', skip to 55.

39. Would you mention the name of wild foods you gathered? ----------

---

40. Do you believe that it was helpful to cope with droughts? A. Yes B. No

If No, why----------

41. Is it useful for consumption during normal production year? A. Yes B. No

If No, why----------

42. Did you sell livestock to cope with drought in recent past? A. yes B. No

If 'Yes', please answer 56 and 57, If 'No', skip to 58.

43. Please specify the number of livestock you sold during drought in recent past and estimate their price during normal and drought years.

Types of livestock	Number	Price in *birr* during drought	Price in *birr* during normal year.
Farm ox			
Cow			
Bull			
Heifer			
Calve			
Goat			
Donkey			
Chicken			
Others(specify)			

44. Do you believe selling livestock is long term solution to cope with drought?

A. Yes B. No

If No, why----------

45. Did your household members migrate to nearby cities to cope with drought?

A. Yes B. No

If 'Yes', please answer up to 62, If 'No', please skip to 63.

46. Which of the following household members has migrated?

A. Male headed household B. Female headed household (wife) C. Adult boys and girls

47. Mention the type of work the migrated household members engaged in? ----------

---

48. Do you think that it was useful means to cope with drought? A. Yes B. No

If No, why----------

49. Did you get remittances from the migrated household members?

A. Yes B. No

50. Were you engage in selling firewood and charcoal to cope with drought in recent past? A. Yes B. No

If' Yes', please answer up to 67, If 'No', please skip to 68.

51. Did you freely engage in this activity? A. Yes B. No

If No, why----------

52. From where did you collect those forest products (charcoal and fuel wood)?

A. Own land B. Community forest C. Government forest

53. Please specify the price of charcoal and fuel wood during normal as well as drought years?

Activities	Price during normal period	Price during drought years
Fuel wood(Bundle)		
Charcoal (quintal)		

54. Do you believe that it is an appropriate strategy to cope with drought?

A. Yes B. No

If No, why----------

55. Have you rented out land during drought in recent past? A. Yes B. No

If 'Yes', please answer up to 69, If 'No', please skip to 73

56. How did you rent out land?

A. For specific period of time to specific amount of money

B. For specific amount of money until the money was paid back with interest rate

Other (please specify) ----------

57. For how long did you rent out land? A. 1 year B. 2 years C. 3 and above years

58. How do you rate the amount of rent as compared to normal production year?

A. High B. Medium C. Low

59. Do you think it is the useful strategies to cope with drought? A. Yes B. No

If No, why----------

60. Did you borrow cash and/or grain during drought in the recent past?

A. Yes B. No

If yes, please answer up to 78, If No, please skip to 79.

61. From which of the following did you borrow? (Please tick (√) where appropriate.)

Sources of money/cash	
Local merchant/money lender	
Friends or relatives	
Bank	
Cooperatives	
Community based organizations	
Micro finance institution	
Nongovernmental organizations	

62. How did you repay the loan from local merchants and money lender?

A. By working as wage laborer B. In the forthcoming agricultural years

Other (specify) ----------

63. How did you repay the loan from friends and relatives?

A. By working as wage laborer B. In the forthcoming agricultural years

Other (specify) ----------

64. Do you think the interest was fair for money borrowed from local merchants?

A. Yes B. No

65. Were you engage in petty trade during drought in the recent past?

A. Yes B. No

If yes, please answer 79 and 80,, If No, please skip to 81.

66. Would you mention the types of activities you engaged in? ----------

---

67. How many activities were you engage in?

A.1-2 B. 3-4 C. 4-5 D. more than 5

81. Did you change your household consumption pattern during drought in the recent past? A. Yes B. No

If yes, please answer up to 85. If No, skip to 84.

82. How many times did your household members eat per day?

	During normal periods	During food shortages
Children below age five		
Children in-between 6-15		
Adults above 16		
Elderly		

83 How was the quality of meals as compared to normal years?

A. High B. Medium C. Low

84. How was the quantity of meals as compared to normal period?

A. Increased B. Reduced C. Unchanged

85. Did you withdraw children from school during drought in the recent past? (For those households who have children in school during drought

A. Yes B. No

If yes, answer 86 and 87. If No, skip to 88.

86. What were the major factors to withdraw children from school?

A. Lack of food B. To engage in casual labor C. Illness

Other (specify) ----------

87. Do you think it is helpful strategy to cope with drought? A. Yes B.No
If No,why----------

88.Please would you suggest the preffered future coping options----------
---

ANNEX-II

A. Interview guide for key informants

Name _____

Organization_____

Position in the organization_____

Date of the interview _____

1. How was the situation of drought in your district for the last 20 years?
2. How the situation of drought induced food shortages in your district?
3. What are the droughts induced food shortage coping mechanisms practiced by the households in your district?
4. Are these coping mechanisms are effective with the current drought? Why?
5. What are the roles of your office related to drought induced food shortage coping mechanisms?
6. Is there a policy related with the drought coping mechanisms? If yes, what is this?
7. Suggest the preferred future coping options for your district?

B. Checklist for focus group discussion with male and female household head

Name of PAs _____
Date _____
Group Members

	Name	**Age**	**Sex**
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____
6.	_____	_____	_____

1. How do you perceive the trends of drought in your district in the last fifteen years? (Particularly with reference to intensity and frequency)

2. Would you list the coping strategies and prioritize them in terms of their common use?

3. Do you think the coping strategies were effective to mitigate the effects of drought such as food shortages and water scarcity?

4. Do you believe that your indigenous drought coping mechanisms are enough to protect your livelihoods in the future? If No, in your opinion what activities are the best coping options for future?

5. Do you believe the food aid and safety net provided by organizations were the best strategies to cope with drought events? How?

6. How do you see the difference among household in terms of coping capacity?

7. Wealth categorization (Better off, medium, poor) and the criteria used to come up with this categorization

8. What are the activities of households' members in relation to coping mechanisms?

9. How do you see the trend of rainfall in the last fifteen years and its implication on agricultural productivity?

C. Check lists for field Observations

1. Environmental conditions of the area

A. Land use and land cover (Forest resources, cropping pattern, means of land cultivations etc)

B. Physiographic conditions of the area (mountains, steep slope, plateau etc)

C. Water resources (Streams, dried rivers)

2. Socio-economic conditions of the area.

A. culture, value and traditions

B. Social relations, Neighborhoods, Social network

C. Main sources of livelihoods (crop cultivation, livestock rearing, off farm activities, petty trading)

D. Crop diversity (Cropping pattern, the main crop cultivated, sources of staple food)

E. Wild foods found at the study area (cassava plant, cactus, sisal)

F. Selling of fuel wood and charcoal

G. livestock; type, size raising practices

ANNEX-III

Table: Number of peoples assisted by external food sources in the last ten years.

Years	Number of people assisted
1995*	127400
1996*	97000
1997*	88803
1998	15330
1999	6400
2000	6405
2001	23901
2002	8218
2003	15000
2004	11800
2005**	17066

Source: East Harerghe Disaster Prevention and preparedness office, 2005

*before Fedis and Midega tola are divided into two administrative districts

**number of needy population during survey, 2005 (2004/05 crop year)

Table: conversion factors used to calculate tropical livestock unit (TLU)

Animal	TLU -Equivalent
Calf	0.20
Heifer and Bull	0.75
Cow and Ox	1.00
Camel	1.25
Donkey	0.70
Sheep and Goat	0.13
Chicken and poultry	0.013

Source: Strock *et al,* 1991 cited in Tewedros, 2006

Table: Wealth breaks down criteria at the district

Household categories	HH size	Land owned in Ha	Livestock owned	Activities
Female HHs	5-7	<0.5	0-2 cattle,2-4gaots,0-1 donkey,2-4 hen	Firewood, charcoal, land preparation, weeding harvesting ,petty trading, Safety nets ,farming ,handcarts
Poor	5-7	<0.5	0-2 cattle,2-4gaots,0-1 donkey,2-4 hen	Firewood, charcoal, land preparation, weeding harvesting , Safety nets ,farming .handcraft
Medium	6-7	0.5-0.6	0-2 oxen,2-4 cattle,3-5 gaots,0-2 donkey,2-4 hen	Farming ,merchant
Better off	6-8	0.6-1	1-3 oxen,3-4 cattle,4-6 goats,0-2 donkey,3-5 hen	Farming, merchant

Source: Adapted from East Harerghe livelihoods report, 2008 and PAs administration office