



**INDRA GANDHI NATIONAL OPEN  
UNIVERSITY**

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**FOOD INSECURITY AND COPPING STRATEGIES OF AGRO  
PASTORAL HOUSEHOLDS IN AWBAR WOREDA, ETHIOPIAN  
SOMALI REGIONAL STATE**

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**M.A. Thesis**

**By**

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**Oct, 2016**

**Addis Ababa, Ethiopia**

**FOOD INSECURITY AND COPPING STRATEGIES OF AGRO  
PASTORAL HOUSEHOLDS IN AWBAR WOREDA, ETHIOPIAN  
SOMALI REGIONAL STATE**

**A THESIS SUBMITTED TO INDIRA GANDHI NATIONAL OPEN  
UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR  
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## DECLARATION

This is to declare that the dissertation entitled “**FOOD INSECURITY AND COPPING STRATEGIES OF AGRO PASTORAL HOUSEHOLDS IN AWBAR WOREDA, ETHIOPIAN SOMALI REGIONAL STATE**” submitted by me for the partial fulfillment of MARD to Indira Gandhi National Open University (IGNOU) is my original work and has not been submitted either to IGNOU or any other institution for the purpose of earning any degree.

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## CERTIFICATE

This is to certify that Mr. Mohammed Abdulahi Ibrahim student of MARD from Gandhi National Open University; Addis Ababa was working under my supervision and guidance for his project work. His project work entitled **“FOOD INSECURITY AND COPPING STRATEGIES OF AGRO PASTORAL HOUSEHOLDS IN AWBAR WOREDA, ETHIOPIAN SOMALI REGIONAL STATE STATE, ETHIOPIA**, which he is submitting is his genuine and original work.

Place: Addis Ababa, Ethiopia

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Addis Ababa, Ethiopia

## **DEDICATION**

*I dedicate this thesis manuscript to my mother **Shugri Bade Hassen** for nursing me with affection and love and for her far-reaching persuasion to the completion of this MSc work especially; and for her dedicated affiliation in the success of my whole life.*

## **ACKNOWLEDGEMENT**

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## **BIOGRAPHICAL SKETCH**

The author was born in September, 1987 in Kebribeyah district; Fafan (Jigjiga) zone of Ethiopian Somali Regional State. He attended his primary and junior school at Kebribeyah primary school and secondary school at Jijiga Senior Secondary School at Jijiga town. Upon his successful completion of his high school education, he joined Agarfa Agricultural Technical and Vocational Collage and graduated advanced Diploma in Agriculture. Then, He joined Jijiga University in Oct, 2007 and graduated with BA degree in Applied Geography and Environmental Studies on July 2010. Soon after his graduation, he was employed in an international non-governmental organization from Sep, 2010 till now.

After two years of service in an international organization, in July 2012 he joined Indra Gandhi National Open University.

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## **LIST OF ACRONYMS**

AAO	Awbare Administration Office
ADLI	Agricultural Development Led Industrialization
AE	Adult Equivalent
BoFED	Bureau of Finance and Economic Development
CAADP	Comprehensive African Agriculture Development Programme
CFSM	Core Food Security Module
CPEG	Center for poverty Employment and Growth
CSA	Central Statistics Authority
DPPB	Disaster Prevention Preparedness Bureau
DPPC	Disaster Prevention and Preparedness Commission
ECA	Economic Commission for Africa
EHNRI	Ethiopian Health and Nutrition Research Institution
EU	European Union
FAO	Food and Agricultural Organization
FDRE	Federal Democratic Republic of Ethiopia
FSCB	Food Security Coordination Bureau
FSP	Food Security Program
FSS	Food Security Strategies
GDP	Gross Domestic Product
GO	Governmental Organizations

Ha	Hectare
HH	Household
HHFSO	Households Seasonal Food Security of Oromia Region
HHFSS	Household Food security Status
HICE	Household Income Consumption and Expenditure
HSRC	Human Science Research Council
IFAD	International Fund for Agricultural Development
LCRDB	Livestock, Crop and Rural Development Bureau
MoFED	Ministry of Finance and Economic Development
MP	Millennium Project
NGO	Non-Governmental organization
PASDEP	Plan for Accelerated and Sustained Development to End Poverty
SD	Standard Deviation
SRS	Somali Regional State
SSA	Sub-Saharan Africa
TLU	Tropical Livestock Unit
UND	United Nations Development Program
UNHDI	United Nation Human Development Index
USAID	United States of American International Development
VIF	Variance Inflation Factor
WAO	Woreda Administration Office
WB	World Bank
WFP	World Food Programme

## ABSTRACT

*An understanding of the major causes of food insecurity is important for interventions aiming to reduce it. Therefore, this study was conducted to analyze food insecurity status of agro-pastoral households, to identify determinants of food insecurity status of agro-pastoral households, and to identify agro-pastoral households coping strategies against food insecurity in Awbare district. The analysis was based on household survey data gathered from 140 randomly selected households. Descriptive statistics, such as mean, standard deviation, maximum, minimum, percentage and frequency distribution. Univariate analysis such as t-test and Chi-square ( $\chi^2$ ) test and binary Logit regression were used to analyze the data. The results from descriptive statistics show that the majority (55.7 percent) total surveyed households were food insecure. The binary logit model outputs show that six variables were significant determinants of household food insecurity. These were dependency ratio, cultivated land, livestock ownership, oxen ownership, family size and age of the household head. Furthermore, results show that households also used different coping strategies against food insecurity and these include, borrowing food or cash from relatives or neighbor's, reduced number of meals, reduced meal size, sale of livestock than usual and sale of fire wood and charcoal. The results generally suggest the need to improve agricultural technologies enhancing land productivity and special attention should also be given to improving animal health services through provision of veterinary services and provision of training to livestock herders. Finally, limiting population size through integrated health and education services and giving priority to old aged headed households in interventions, introduction of water harvesting technologies to practice intensified agriculture are also suggested to improve food insecurity status of households.*

**Key words:** Food insecurity, logit, agro-pastoral households, Awbarre.



## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1. Background of the Study**

Millions of dollars have been dispersed by governments, donors, international aid agencies, and multi-lateral development bodies in the developing countries including Ethiopia to address the problem of food insecurity and hunger. Despite the many programs and projects on food security, there are still millions of food insecure people around the world with many of them living in developing countries particularly in Africa (FAO, 2013)

Even though the problem of food insecurity has been the concern of developing countries for long time, now a days it is a world-wide issue. Estimates indicate that about 925 million people worldwide were chronically malnourished of which 906 million are in developing countries, in which two-thirds of these live in just seven countries (Bangladesh, China, Democratic Republic of Congo, Ethiopia, India, Indonesia and Pakistan) and the rest 19 million in the developed countries. Moreover, the proportion of undernourished people remains highest in sub-Saharan Africa, at 30 percent (that is, 239 million) in 2010 (FAO, 2010).

According to FAO, 2010 in consistence with the above challenges of the country, it noted that agriculture being poor for several decades was the result of many surrounded constraints, this has been manifested in the prevailing food insecurity, both chronic and transitory, which have almost become a structural phenomenon, and toss the way of life for a significant proportion of the country's population of the in to misery.

According to human development index of the UN in 2009, Ethiopia was ranked 171st out of 177 countries in the human development index, with a GDP per capita adjusted with the Purchasing Power Parity of only USD 779 compared to almost USD 2000 average for Sub-Saharan countries. This explicitly portray that the country is still to go further and dramatically address the future consequences of food insecurity.

In Ethiopia, food insecurity is highly prevalent in moisture deficit highlands and in the lowland pastoral and agro-pastoral areas. Even in years of adequate rainfall and good harvest, the people, particularly in lowland agro-pastoral areas, remain food insecure and in need of food assistance. Droughts have become frequent and more severe in recent years and are one of the most important triggers of malnutrition and food insecurity in the country (Dominguez, 2010).

Food insecurity in pastoralist areas can be viewed in terms of chronic and transitory food insecurity. Those vulnerable to chronic hunger are households that are either subjected to frequent or severe and regular food insecurity or households that have low resilience or both. In Contrast, households that suffer transitory food insecurity or hunger do so over a shorter but intense period, such as the life-threatening periods of drought (CAADP, 2009).

In Ethiopia, the dimensions, determinants and consequences of food security problems differ widely within the country. The Somali region of Ethiopia is one of the regions of the country which is mostly affected by recurrent drought and food security problems. Food insecurity in rural Somali region is subject to numerous shocks and stresses, including recurrent drought. Pastoralist and agro-pastoralist face higher risk than the urban household (USAID, 2011).

## **1.2. Statement of the Problem**

Africa faces a number of critical challenges. According to UNDP (2002), the environment continues to deteriorate; social and economic inequality is increasing; and globalization is sweeping across the world, largely leaving Africa behind. Rapid changes in the global economy, in consumption patterns and in population and demographics are having a negative impact on the environment. In spite of the introduction of economic reforms in many Sub-Saharan African (SSA) countries, economic growth continues to be sluggish or negative, impacting heavily on the welfare of the people, especially the rural population. In addition, major environmental disasters in the continent such as recurrent drought and floods have serious devastating socio-economic and ecological impacts. Poor land policies and management practices, which lead to land degradation and

deforestation, contribute to increased flood disasters in some risk areas. A clear outcome of these processes is a significant decline in agricultural production, poverty and food insecurity (UNDP, 2002).

Ethiopia, being one of the SSA countries, is prone to food insecurity and chronic food crises. Given that the population is growing exponentially and about 45 percent living below the poverty line and most vulnerable to food insecurity, ensuring food security remains a key issue for the Government of Ethiopia. In order to combat threats of famine and pervasive poverty and thereby ensure food security for its population, the government strategy has rested on increasing the availability of food grains through significant investments in agricultural technologies (high yielding varieties of seeds, fertilizer), services (extension, credit, inputs), and rural infrastructure (roads, markets. The impacts of these policies, however, have been shadowed as there are still millions of people who experience extreme hunger in the country (Bogale and Shimellis, 2009).

In Ethiopia, the dimensions, determinants, and consequences of food security problems differ widely within the country. The Somali region of Ethiopia is one of the regions of the country most affected by recurrent drought and food security problems (United States Agency for International Development [USAID], 2011).

The main causes of food insecurity are high population growth rate, high reliance on small-size and rain-fed agricultural holdings, lack of access to input, lack of access to credit, high susceptibility to drought, limited access to basic service, lack of access to market, land degradation and decreased productivity, lack of income generation opportunity and alternatives, lack of access to technology and lack of access to information on market, agricultural technology (FSP, 2003; WFP, 2006; EU, 2012)

Agriculture is the main liable sector for triggering food insecurity in the rural households, and finally made the country underperformance, as the agricultural techniques practiced in the rural areas are out modeled and dependent on rainfall; it is not amazing that many households are highly susceptible to recurrent droughts, including fluctuations in annual rainfall, crop blights, pest infestation, and livestock epidemics. All of these shocks can render rural households destitute, as many liquidate already scarce assets to cope with

such adversities. Excessive vulnerability leaves households in a vicious cycle of poverty where their efforts are insufficient to lift themselves from their tenuous reality (Jennifer, 2008).

The failure of market mechanisms is also an important factor in food insecurity in the country. Rural market has been widely seen disoriented and non-monetized which engendered price of agricultural crops remains low throughout the harvest period. This, in turn impoverished producers, who were unable to meet their credit commitments, and made them extremely vulnerable to produce up to their choice in the next cropping season – turned out to be a disaster WFP, 2004).

Moreover, the dry land area of Ethiopia comprises about 70% of the total landmass and 45% of the arable land which includes arid, dry semi-arid and part of the sub-moist zone. However, these areas contribute only 10% of the total crop production (Abebaw, 2003)

In Somali regional state, which is one of the nine states that the country is composed of, many of its domain districts are recognized as prone-drought areas where food insecurity situation is suspected from every season. In most parts of the Region, particularly those agro-pastoral areas around the vicinity of Jijjiga zone, where rangeland was captured by invasive plant species which complemented by the ever growing climate effect which in turn caused to deepen many households under the food insecurity status (Guled, 2006).

The study area, Aw-Barre Woreda, is one of the seven woreda in Jijjiga Zone. Food insecurity is the real and major problem in Aw-Bare Woreda. In the Woreda, the problem of food insecurity among agro-pastoralists is believed to be caused mainly by low and erratic rainfall (AAO, 2013).

According to AAO (2013), the problem of food insecurity is mostly related to climate change which results in variation of rain-fall and then this reduces moisture situation and when the rainfall distribution varies or rainy season delays or not totally received; it is likely to face food insecurity. Thus identifying and analyzing those elements that responsible for variation in household food security in Aw-Barre district are needed to guide policy decisions, appropriate interventions and interested efforts to combat food insecurity in the woreda at household level.

Therefore, this study is related with food insecurity and coping strategies of agro-pastoral households in Aw-Bare district in order to measure the current status of food insecurity, identify specific factors that contribute to household food insecurity, identify the way households respond to food shortages and through to make recommendations to improve the effectiveness of intervention programs in the study area.

### **1.3. Research Questions**

This study attempted to address three research questions:

1. What is the food insecurity situation in the Awbarre district?
2. What are the factors that contribute to the food insecurity in the study area?
3. What are the coping strategies used by food insecure households in the study area?

### **1.4. Objectives of the Study**

The general objective of the study was to assess food insecurity situation and coping strategies of agro-pastoral households in Aw-Bare district of Somali Regional State.

The specific objectives of the study are:

- To assess the food insecurity status of the agro-pastoral households in Aw-Barre district of Somali regional state;
- To identify the determinants of food insecurity status of agro-pastoral households in the study area.
- To identify the local food agro-pastoral households coping strategies against food insecurity in the study area.

### **1.5. Significance of the Study**

A study about assessing the food insecurity status and coping strategies of agro-pastoral households is crucial as it provides information on the effective measures to be taken to implement appropriate strategies and enhance food security. Besides, the output of this research will greatly helpful to development practitioners and policy makers to acquire better knowledge to carry out development interventions at the right time and place to decrease vulnerability to food insecurity.

This study will also be helpful to identify the different coping strategies in order to make interventions appropriate to the area.

This study will also be important to all concerned sectors that are going to implement projects which are related to food security in the area which may include the government, nongovernmental organization and private investors. In general, the beneficiary of this study will be government, nongovernmental organizations, private sectors and the community at large. The results of the study can also be made ready and documented at district level so that it will serve as source material for further research development strategies.

Finally, the results of this study will contribute to other studies on food security in the agro-pastoral context and may be used as benchmark information by the students and researchers interested in this area for further study.

#### **1.6. Scope and Limitations of the Study**

This study focused on assessing the food insecurity status of agro-pastoral households in Aw-Bare district and the study also identifies determinants of food insecurity in the study area and also the coping strategies used by agro-pastoral households against food insecurity.

The study covers only Awbare district of Fafan (formerly Jigjiga) zone in Somali Regional State. The study focused on the agro-pastoral households in the study area and it does not include pastoral households in the study area. The study was conducted only in four selected *Kebeles* of Awbare district. A total of 140 households were selected randomly, since households were the unit of analysis in this study. The study was restricted in terms of its coverage; the scope of the study was limited due to limited resources in terms of time, secondary data availability in the study area, budget and other material limitations. Moreover, there were limitations in use of cross section data and lack of well-documented records.

The major limitation of the study comes from the fact that the study was based on data drawn from one cross sectional survey at a particular period of time, where households will

be asked a series of questions and lack of well-documented records. Besides this, the respondents may be scattered in different sites, some difficulties would be faced in giving orientations, following up respondents and collecting responses. Therefore, study is prone to some errors and biases, which may affect its quality, reliability and accuracy of the paper to some extent.

### **1.7 Organization of the Study**

This thesis paper is organized into five chapters. Chapter one deals with the background information, statement of the problem, objectives, significance and scope and limitations of the study. Chapter two presents review of literature which focuses on the basic concepts and definition of food insecurity, food security indicators and measurement, coping strategies against food insecurity, empirical studies on determinants of food insecurity and conceptual framework of the study. Description of the study area, data type, source and methods of data collection, sampling technique and sample size, method of data analysis and definition of variables and hypothesis are presented in the third chapter. Chapter four deals with the results and discussion of the research findings and finally chapter five presents summary, conclusion and recommendations of the study.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1. Theoretical Review**

##### **2.1.1 Concepts and Definitions of Food Security**

Early definitions of food security focused on aggregate food supplies at national and global levels and analysts advocated production self-sufficiency as a strategy for nations to achieve food security (Devereux, 2006). Through developmental trends of ups and downs, the concept of food security gained prominence at the World Food Conference of 1974, becoming associated with the food self-sufficiency of individual countries (USAID, 2009).

Across the review of thousands of literatures, it was realized that a clear understanding of the concept of food security is paramount step to further overhaul the underlying particles and to extent of food security. According to Anderson (1990), food security is a concept that can generally be addressed at global, regional, national, sub-national, community, household and individual levels.

According to the World Food Summit plan of action of 1996, food security is generally defined as “all people, at all times, have physical and economic access to sufficient, safe and nutritious food for a healthy and active life”. Food insecurity is therefore the inverse of food security: a condition in which a population does not have access to sufficient, safe and nutritious food over a given period to meet dietary needs and preferences for an active life. Possible causes are insufficient food availability, accessibility, and inadequate food utilization

Food security has three major components: availability, access and utilization (Kifle and Yoseph, 1999). Food availability refers to the need to produce sufficient food in a way that generates income for small-scale producers without depleting the natural resource base, and to the need to get this food into the market for sale at prices that consumers can afford (Haddad, 1997).



According to Kifle and Yoseph (1999), availability is basically the household's capacity to produce the food it needs. The second component relates to people's ability to get economic access to this food. Economic access is typically constrained by income. If households cannot generate sufficient income to purchase food, they lack an attainment to food. The third component concerns an individual's ability to in and use food for growth, nutrition and health. In an environment lacking clear water, sanitation, child care and health facilities, the ability to use food to promote health and nutrition will be impaired (Haddad, 1997).

On the other hand, when we come to household food security, literature by Anderson (1990) sees it fit to distinguish between food security at national and household level. This distinction is crucial since the approach to assess food security in those levels are not the same. Food security at national level refers to the condition whereby the nation is able to manufacture, import, retain and sustain food needed to support its population with minimum per capita nutritional standards.

At community level food security is defined as the condition whereby the residents in a community can obtain safe, culturally accepted, nutritionally adequate diets through a sustainable system that maximizes community self reliance. At household level food security refers to the availability of food in one's home which has accessibility. In this case, a household is regarded as food secure when the members of the family do not live in hunger or fear of starvation (Anderson, 1990).

According to literature review conducted by FAO (2006), as well as the Centre for Poverty, Employment and Growth (CPEG) of the Human Sciences Research Council (HSRC) in the united nation acknowledged that food security has three dimensions namely food availability, accessibility and utilization. Food availability in the definition implies that a country must have sufficient quantities of food available on a consistent basis at both national and household level. Food accessibility also implies the ability of a nation and its households to acquire sufficient food on a sustainable basis. Food utilization refers to the appropriate use based on knowledge of basic nutrition and care, as well as adequate water and sanitation (FAO, 2006).

It is evidenced by scholars that, not only food availability (adequate supply of food) but also food access through home production, purchase in the market or food transfer. Global food production does not sufficiently guarantee a given nation, household or individual to be food self-sufficiency because accessibility and purchasing power entitlements are other factors those could curtail households from getting the available food (HHFSO, 2007).

Food insecurity, on the other hand, is a situation that exists when people lack secure access to sufficient amounts of safe and nutritious food required for normal growth and development and an active and healthy life. It may be caused by the unavailability of food, insufficient purchasing power, inappropriate distribution, or inadequate use of food at the household level. Food insecurity, poor conditions of health and sanitation and inappropriate care and feeding practices are the major causes of poor nutritional status. Food insecurity may be chronic, seasonal or transitory (WFP, 2004).

Household food insecurity can be traced as inadequate and unsustainable access to income and resources to meet basic needs. These needs include adequate food, health, and shelter, minimal levels of income, basic education and community participation (Devereux *et al.*, 2004). Household livelihoods are insecure when they lack ownership security, or access to resources and income earning activities, including reserves and assets, to off-set risks, ease shocks, and meet contingencies. More narrowly, livelihood strategies are undertaken essentially to facilitate food security. People enjoy food security when they have access to sufficient, nutritious food for an active and healthy life. Food insecurity exists if one or more of these conditions are not fulfilled. Further, different levels of household asset building must be considered if the underlying causes are to be effectively understood (Drimie *et al.*, 2006).

### **2.1.2. Food Security Trends in Ethiopia**

A study conducted by Abebaw (2003), revealed that Ethiopia had turned from a food exporter into a food importer during the period 1955-1959. It was not something amazing in the 1960s and 1970s to talk Ethiopia as having the potential to be the bread basket of the Middle East. It took two devastating famines for the “bread basket” since the ‘hidden

famine' of 1973–74, which claimed many thousands of lives, Thereafter, the Ethiopian government had recently tried to emerge from emergency responses for food insecurity to more sustainable one, by the introduction of productive safety net program that would lead one of the exemplary mechanisms in sub-Saharan countries (Food Security Strategies [FSS], 2002).

Such condition in Ethiopia leads to a shift between chronic and acute food insecurity expressed by broad and deep crisis, which often is the characteristic of drought prone areas with low and variable rainfall, high population density and low natural resource endowments. Since the country is dependent on agriculture, crop failure usually leads to household food deficit. The absence of off-farm income opportunities, and delayed food aid assistance, leads to asset depletion and increasing levels of destitution at household level. Over the last fifteen years this situation has resulted in importing an average of 700-thousand metric tons of food aid per annum to meet food needs (Tafere, 2009).

Literature regarding Ethiopian catastrophic famines such as the 1973 and 1984/85 seems to be voluminous. Nevertheless, proper “transitory food insecurity” has received little attention, despite its prevalence even in what we call “normal years” as well as in the so-called “high potential” and “surplus areas” (HHFSO, 2007). It maintained that in Ethiopia there two susceptible areas concentrated along two broad belts, generally described as drought and famine prone areas. One of these is the mixed farming production system area of highland Ethiopia, involving central and northeastern highlands stretching from Northern Shewa through Wello into Tigray. The land resources mainly the soils and vegetation of this part of the country have been highly degraded because of the interplay between some environmental and human factors such as relief, climate, population pressure and the resultant over-cultivation of the land, deforestation of vegetation and overgrazing. The second belt is the range-based pastoral economy of lowland Ethiopia, ranging from Wello in the north through Hararghe and Bale to Sidamo and Gamo Gofa in the south. Apparently, this belt is generally considered as resource poor with limited potential and hence highly vulnerable to drought (HHFSO, 2007).

Countrywide food self-sufficiency has long been a primary political and economic objective for Ethiopia: cropping and herding account for around 50% of gross domestic product and 70% of exports; since the mid-1990s, the Ethiopian government has been trying to make agricultural development drive economic development. While Ethiopia has come closer to its overall aim of self-sufficiency, this has not led to an automatic reduction in food insecurity, (Food Insecurity and Aid policy, 2002-2003).

According to the 2009 Human Development Report of the United Nations Development Program, Ethiopia is ranked 171st out of 177 countries in the human development index, with a GDP per capita adjusted with the Purchasing Power Parity of only USD 779 compared to almost USD 2000 average for Sub-Saharan countries.

According to the Household Income, Consumption and Expenditure (HICE) Survey by the Central Statistical Authority (CSA), the incidence of national poverty declined from 44.2 percent in 1999/00 to 38.7 percent in 2004/05. In particular, reductions in poverty levels were observed in rural areas following the steady increase in government's pro-poor expenditures (averaging at about 13 percent of GDP in the last five years). On the other hand, urban poverty has shown only a marginal decline especially due to the limited capacity of the manufacturing sector to absorb the increasing number of economically active population in towns as well as the negative impact on household budget of increasing prices of food commodities (FAO, 2010).

Despite all these efforts that have been spelt by the government of Ethiopia, food security has to be the over-riding issue, and one, which impacts on passing political concern (Abi, 2001). The same source further express that, it is not unusual at present to hear estimates that over half of the Ethiopian population may in fact be chronically food insecure.

Since early 1990s, the government has adopted the Agricultural Development Led Industrialization(ADLI) policy that primarily focused on the intensification of production systems. Current agricultural policy is still based on the ADLI framework but, within the 2006/10 Plan for Accelerated and Sustained Development to End Poverty (PASDEP), it shows a shift in strategy toward a more market-oriented

agriculture, either at national than international level, and the promotion of private investments to reduce the vulnerability of food insecurity (WB, 2006).

In August 2009, MoARD launched the 2010-2014 food security program (FSP) whose aim is to improve food security for chronic and transitory food insecure Households in rural areas putting them on a trajectory of asset stabilization and accumulation to finally become food sufficient first and then food secure. The intensity and severity of food insecurity has been rising over the years. On average some 6.6 million people were affected each year between 1991/92 and 2002/2003, compared to 4.5 million between 1980/81 and 1990/91. Some 14.5 million, over two times the number in 1984/85, have succumbed to the current drought.

Such horrible condition in Ethiopia leads to a shift between chronic and acute food insecurity expressed by broad and deep crisis, which often is the characteristic of drought prone areas with low and variable rainfall, high population density and low natural resource endowments. Since the country is dependent on agriculture, crop failure usually leads to household food deficit. The absence of off-farm income opportunities, and delayed food aid assistance, leads to asset depletion and increasing levels of destitution at household level. Over the last fifteen years this situation has resulted in importing an average of 700-thousand metric tons of food aid per annum to meet food needs (Tafere, 2009).

The above endeavors are merely true because past policy environment has failed to address these issues and create off-farm income opportunities. This is particularly true according to ministry of foreign affairs' food security documents, agrarian policies of the 1970s and 1980s, which, when combined with civil conflict led to agricultural stagnation and increasing levels of poverty across the board. As a consequence, for the last two decades in particular, Ethiopia has become increasingly reliant on food aid to meet national food deficits. In 1984-85, external food aid made up just over 26% of the total food availability in country. Over the last decade, this has declined to an average of 10% of the volume of national cereal production (MoFA, 2011).

### 2.1.3. Measuring Food Security

Measuring the required food for an active and healthy life and the degree of food security attained is a question to be addressed in a food security study. According to Von Braun *et al.* (1992), given the multiple dimensions (chronic, transitory, short term and long term) of food insecurity, there can be no single indicator for measuring it. Different indicators are needed to capture the various dimension of food insecurity at the country, household and individual levels:

**Country level:** Food security at the country level can to some extent be measured in terms of demand (requirement) and supply i.e. the quantities of available food and needs.

According to Hoddinot (1999), the supply of food may be from current production and stocks and from previous production whereas the need has to be determined on the basis of biological or nutritional requirement of a given society for a certain period of time usually a year or a day. However, national-level measures inherently lend themselves only to addressing national-scale food availability shortfalls, not intra national access and utilization concerns.

**Household level:** Food security at the house hold level is best measured by direct survey of dietary intake (in comparison with appropriate adequacy norms). However, they measure the existing situation and not the downside risks that may occur. The level of, and changes in socio economic and demographic variables such as real wage, employment, price ratio and migration properly analyzed can serve as proxies to indicate the status of, and change in food security. Indicators and their risk pattern needs to be continually measured and interpreted to monitor food security at the household level.

**Individual level:** Anthropometrics information can be a useful complement because the measurements are taken at the individual level. Yet such information is the outcome of changes of health and sanitation environment and other factors. Most importantly, this information indicates food security after the fact.

In the work by Frankenberger (1992), a distinction is made between "process indicators"—those that describe food supply and food access—and "outcome indicators"

that describe food consumption. However, process indicators are insufficient to characterize food security outcomes. Chung *et al.* (1997) found that there is little correlation between a very large set of process indicators and measures of food security outcomes. Outcome indicators shows good estimate of house hold consumption than process indicators.

According to Weibe and Maxwell (1998), the most frequent used measures include consumption and expenditure, nutritional status and coping strategies and resource related correlates. Anthropometric measures of nutritional status are sometimes used as food security indicators. However, food security is not the only determinant of nutritional status. As a result, its usage needs data collection on other determinants of nutritional status like health, intra house hold distribution, maternal care and time allocation.

Income and consumption has been traditionally used as a measure of food security. But measurement method based on income has three further limitations: 1) they cannot be used for determining the location of food insecurity, 2) it has limited use for understanding the cause of food insecurity, 3) it focuses only on the diet quantity to the exclusion of other important aspect of food security such as diet quality and vulnerability (Smith *et al.*, 2006).

Thus, consumption is a better measure of longer-term household welfare as it is subject to less temporal variation than income. In addition, households are likely to under report their income level more than they do with their consumption (MoFED, 2008).

According to Hoddinot (2001a), was made comparison of different outcome measures of household food insecurity namely, individual intake, household calorie acquisition, dietary diversity and indices of household coping strategies in terms of time requirement, cost, skill and susceptibility to misreporting. Household calorie acquisition is found to be better measurement. Hoddinot (2001a) briefly discussed them as follows:

**Individual food intake data:** This is a measure of the amount of calories, or nutrients, consumed by an individual in a given time period, usually 24 hours. To generate these data, there are two basic approaches used. The first is observational. An enumerator resides in the household throughout the entire day, measuring the amount of food served

to each person, and the amount of food prepared but not consumed ("plate waste") is also measured. In addition, the enumerator notes the type and quantity of food eaten as snacks between meals as well as food consumed outside the household. The second method is recall. The enumerator interviews each household member regarding the food they consumed in the previous 24-hour period. This covers the type of food consumed, the amount consumed, food eaten as snacks and meals outside the household. Data collected on quantities of food are expressed in terms of their caloric content, using factors that convert quantities of edible portions into calories. These intake data are compared with minimum calorie requirement. Despite its advantages in terms of accuracy, it is unlikely to be an indicator that can be feasibly collected as part of many development projects.

**Household caloric acquisition:** This is the number of calories, or nutrients, available for consumption by household members over a defined period of time. The principal person responsible for preparing meals is asked how much food she prepared over a period of time. After accounting for processing, this is turned into a measure of the calories available for consumption by the household. To generate these data, a set of questions regarding food prepared for meals over a specified period of time, usually either 7 or 14 days, is asked to the person in the household most knowledgeable about this activity. This measure produces a crude estimate of the number of calories available for consumption in the household. Because the questions are retrospective, rather than prospective, the possibility that individuals will change their behavior as a consequence of being observed is lessened. The level of skill required by enumerators is less than that needed to obtain information on individual intakes. On average, it took around 30 minutes per household to obtain these data, an amount of time considerably less than that required to obtain information on individual intakes.

**Dietary diversity:** This is the sum of the number of different foods consumed by an individual over a specified time period. To generate these data, one or more persons within the household are asked about different items that they have consumed in a specified period. These questions can be asked to different household members where it is suspected that there may be differences in food consumption among household members. Even though it is simple to use, the simple form of this measure does not



record quantities. If it is not possible to ask about frequency of consumption of particular quantities, it is not possible to estimate the extent to which diets are inadequate in terms of caloric availability.

**Indices of household coping strategies:** This is an index based on how households adapt to the presence or threat of food shortages. The person within the household who has primary responsibility for preparing and serving meals is asked a series of questions regarding how households are responding to food shortages. After these data are collected, the number of different coping strategies used by the household will be counted and categorized as number of strategies that the household used often, from time to time, or rarely. The higher the sum, the more food-insecure the household will be. As it is subjective comparison among household would be difficult. In addition, it is highly susceptible to misreporting of the household's circumstances.

To sum up, among the four types of food security measurement discussed above, the last two indicators could not capture consumption of particular quantities and as a result it is not possible to calculate kilocalories consumption per household. In household caloric acquisition method, conversion of gross household food consumption into calories, and dividing the calorie figure by the number of adult equivalent in household and the number of days of the recall period results in a concise figure for average calories consumed per adult equivalent per day which is then compared with the minimum calorie requirement. In this study, since focus of analysis is household, household caloric acquisition was utilized.

#### **2.1.4. Mechanisms and Coping Strategies against Food Insecurity**

In elaborating the concept of coping strategy/mechanism, common terms or phrases like coping technique, and survival methods are often used interchangeably by writers and researchers. In this context, coping strategy means coping mechanism or coping technique, is implying mainly at a household and individual levels. The term response is also used for individual actions aiming at survival in the face of disaster-induced food Crisis or famine. Coping strategy could be defined as a mechanism by which households or community members meet their relief and recovery needs, and adjust to future

disaster-related risks by themselves without outside support (Dagneu, 1993; as cited in Tesfaye, 2005).

Dagneu (2000) defined coping strategies as “mechanisms by which households or community members meet their relief and recovery needs, and adjust to future disaster-related risks by themselves without outside support”.

In any stage of food insecurity (initial or severe), agro-pastoral households practice different coping strategies but with low frequency. The less frequently practiced coping strategies were: becoming temporary traders, by making mortar from trees and selling in main towns inside the country or outside as well, by working as daily labour in nearby towns or areas, by participating in the food for work programme and by eating wild foods were found (Gulled, 2006).

Coping mechanism used by agro-pastoral households in Ethiopia include; livestock sales, agriculture employment, certain type of off-farm employment and migration to other area, requesting grain loans, sales of wood or charcoal, small scale trading, selling dung and crop residues, rising of food consumption of wild plants, reliance on relief assistance, relying on remittances from relatives, selling of clothes, and dismantling of parts of their houses for sale (Yared, 2001). Inability to cope, or vulnerability, is conventionally related to assets, particularly physical assets such as land, labour and capital (Elizabeth, 2004).

Households use different means to cope when a food crisis hits them. Their coping mechanisms are adapted depending on how bad the crisis are and what is available to help them manage their situation. Some sale their assets, look for part time work, turn to their social network, venture into income generating activities, engage in food for work activities and others get food relief from NGOs and the government (Chlembo, 2004).

Another study by Eshetu (2000) further revealed that the most common coping practice that are sequentially used during food crisis consisted of reducing number and size of meals, sale of small ruminants and draft oxen, consuming wild food, and borrowing of cash and/or food from better-off neighbors' and/or relatives. Another less frequently used strategies were: postponing wedding and other ceremonies, sale of fire wood, with drawing children from school and eating toxic taboo foods.

## **2.2. Empirical Studies on the Determinants of Household Food Security**

Empirical studies conducted by various authors identified various factors influencing household food security. In a study done by Balayneh (2005), in the Metta district by using logit regression model estimation, the collective effect of the determinants of household food insecurity shows that among the 19 factors to influence food insecurity, 11 of them were found out to be statistically significant while the rest were not. This findings revealed that family size in adult equivalent; cultivated land holding in hectare; livestock holding in TLU, number of oxen; amount of improved seed used; total value of asset; gender of the household head; non-farm income; on-farm annual cash income; sufficiency of mothers' time for food preparation; and Women's control over the domestic resources were important determinants identified to influence household food insecurity in that studied area.

Tafere (2009), in his study at Farta district, logit regression model was fitted to analyze the potential variables affecting household food insecurity in the study area. Among 14 explanatory variables included in the logistic model, 6 of them were significant at less than 5% probability level. These are; cultivate land size, livestock holding, and improved seed, sex of household head, Soil fertility status, and non-farm income.

As conducted by Mulugeta (2002) at Boke district on determinants of food security. The researcher used logistic regression model to identify the continuous and discrete, potential variables capable of affecting the food security status in the district. The model results reveal that among 14 explanatory variables included in the logistic model, eight were found to be significant at less than 10 percent probability level in the district. These significant variables include family size, number of oxen owned, use of fertilizer, food expenditure pattern, size of cultivated land, number of livestock owned, off-farm income and income per adult equivalent.

Abebaw (2003) made an assessment of Dimension and Determinants of Food Insecurity among rural households in rural Dire Dawa Area, Eastern Ethiopia, The logistic regression model results make known that annual household income, amount of credit

received, irrigation use, age of the household head, educational status of the household head, cultivated land size and total livestock owned have negatively affect food insecurity status of the households. While family size and number of oxen owned affect food insecurity status of the household positively. The likely explanation is that in an area where households depend on less productive agricultural land, increasing household size results in increased demand for food. But this demand will not be matched with the existing food supply so ultimately end up with food insecurity and there may be households in the study area cultivate their farmland using hand tools. Moreover, some farm households even if they are using oxen for farm operation it could not be possible to see the effect because their farm size is small. However, oxen could serve as a store of wealth and disposed during time of severe food shortage. But this is not practiced in the area, because farmers think that regaining such asset is by far difficult.

Sissy (2012) indicated in his study entitled on Food insecurity and coping strategies: a perspective from Kersa district, East Hararghe Ethiopia using binary logit model found that out of eleven explanatory variables, six significant variables were thought to influence the food security status. Those variables that showed significance in the model were: age of the household head, sex of the household head, household size in Adult Equivalent, total cropping land in ha, oxen owned and remittances in Birr. From this household size in adult equivalent and age of the household head affect food security negatively.

Indris (2012) carried out study on assessment of food insecurity, its determinants and coping mechanism among pastoral household of afar national regional state the case of zone one, chifra district. Logistic regression model results make known that among explanatory variable large family size, dependency ratio, age of the household head affect food insecurity positively where non-farm income affect household food security negatively.

### **2.3 Conceptual Framework**

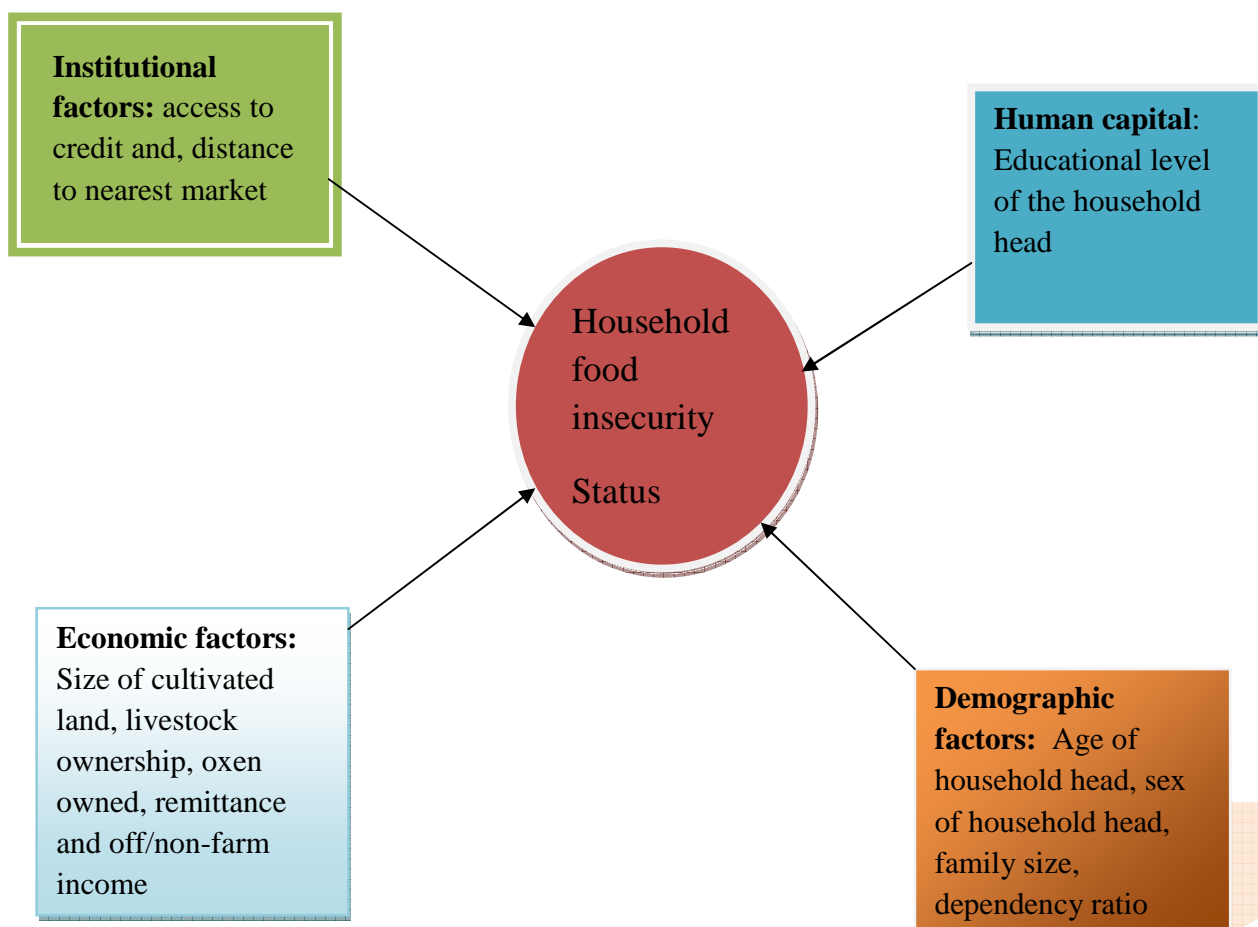
The demographic factors including age of the household head, sex of the household head, family size and dependency ratio whereas age, family size and dependency ratio affected

the household food insecurity status positively while sex of the household head affected the household food insecurity status negatively. That is, households with large family size are more prone to food insecurity than others. In addition, households with high dependency ratio have high risk of food insecurity. Furthermore, age of household head and food insecurity has positive relationship which means as the age of the household head increase that household is unable to work hard for survival for his family members.

Variables like size of cultivated land, livestock ownership, number of oxen owned, remittance and income earned from off/non-farm activities were the important economic factors affecting the food insecurity status of households. That is households with large cultivated land, large number of livestock, oxen, remittance from their relatives and large income from off/non-farm income have more probability to be food secure than others.

Variables like access to credit use were the important institutional factors affecting the food insecurity status of the households negatively. However, distance to nearest market affects food insecurity status of households positively.

Variable Educational level of the household head is important human capital affecting food insecurity negatively which means as the education level of the household head increase the food insecurity status of that household decrease



**Figure 1:** Conceptual framework of the study

Source: Own source based on literature review

## CHAPTER THREE

### RESEARCH METHODOLOGY

#### 3.1. Description of the Study Area

Somali Regional State is the second largest in the country after Oromia and covers a total area of 350,000 km<sup>2</sup>. It is located in the east and southeast of the country and lies between 4 and 11 degrees north latitude and 40 and 48 degrees east longitude. The Region has 9 administrative zones consisting of 68 districts and 4 town councils, which is further divided into 786 *kebeles*. The zones are Fafan (formerly Jigjiga), Siti (formerly Shinile), Liban, Afder, Shabelle (formerly gode), Korahe, Dolo (formerly Warder), Jarar (formerly Dagahbur) and Nogob (formerly fik). It shares borders with Somalia to the east and southeast, Kenya to the south and Djibouti to the north. To the northwest and west, it borders with Afar and Oromia Regions respectively. Climate is arid in most parts of the region and weather is therefore hot in most parts of the year, with mean temperatures ranging from 18 to 45C<sup>o</sup>. Temperatures are cooler in areas of high altitudes like Fafan zone and parts of Afder zone (e.g. Elkare) and hotter in areas around the main rivers of the region. Annual rainfall ranges from 150mm in the low-lying areas of the region to 660mm received in high altitude areas (SRS BoFED, 2013).

The region is divided into two ecological zones namely the "*Deyr*" receiving areas and the *karan* receiving areas. The first consists of 7 zones namely, Jarar, Korahe, Dolo, Shabelle, Afder, Liban and Nogob. This receives the *gu* rains, the main rainy season of the year, from April to June followed by the *deyr* rains from October to November. Similarly, the *hagaa*<sup>1</sup> which is the short dry season of the year falls between June and October, with the *jilaal*<sup>2</sup> stretching from December to March. For the *karan*<sup>3</sup> receiving zones, which are Fafan and Siti, follow climate pattern more like that of the highland areas of the country. In this part of the region, the *gu* is received from March to late May

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<sup>1</sup> Hagaa season is a dry season which is from June to October.

<sup>2</sup> Jilaal season is a dry season which is from December to March.

<sup>3</sup> Karan season is a rainy season which is from July to September.

<sup>4</sup> Deyr season is dry season which is from June to march

and is followed by the *hagaa* which continues to mid July. The *karan* rains fall from mid July to late September. The *jilaal* season which is normally the most difficult time of the year and hunger season for both pastoralists and agro-pastoralists, is from October to mid March (SRS BoFED, 2013).

The vast majority of the population of the region is pastoralists and agro-pastoralists who are dependent on livestock and farming for their survival. The region has 17 rural livelihood zones, generically classified as pastoral, agro-pastoral, riverine and sedentary farming. The major sources of income include livestock and livestock product sales, crop sales, firewood and charcoal sales, petty trade and remittance from western living Diaspora of the region (SRS BoFED, 2013).

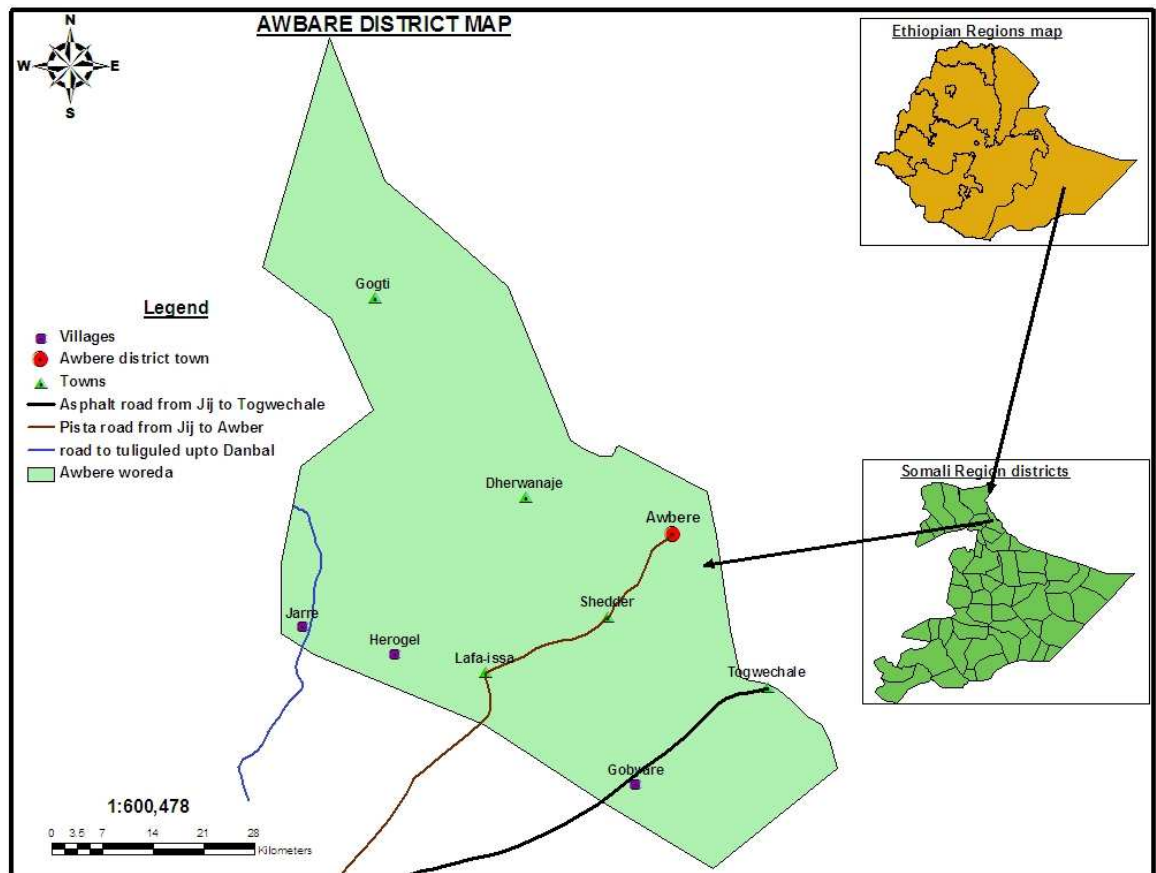
The study area (Awbare) is one of the eight districts of Fafan (formerly Jigjiga) Zone of SRS of Ethiopia. The district is located in the Northeastern corner of the region bordering Northern Somalia and lies from 9<sup>0</sup>, 18' and 10<sup>0</sup>, 12' N. Latitude and 42<sup>0</sup>, 37' and 43<sup>0</sup>, 26' E. Longitude. Awbare town, the administrative center of the district and the fourth largest in the region, is located 74km Northeast of Jigjiga just 5km of the international borderline. It is bounded by Siti (formerly Shinile) Zone in the Northwest, Jigjiga district in the South, Kebribeyah district of Fafan (formerly Jigjiga) Zone in the Southeast and Northern Somalia(Somaliland) in the Northeast, East and Southeast (WAO, 2013).

The total area of the district is 3,862km<sup>2</sup>. According to the CSA (2007), the total population of the district is about 339,056 people of which 45% of the total population is female, and 55% of the total population is male. While the rural and urban population is 88.29% and 11.71% respectively. The average household size is 6 and the percentage of population under 15, 15 - 64 and above 64 years old is 45%, 52% and 3% respectively. The district has 59 *kebeles* of which 51 *kebeles* are agro-pastoral and 8 *kebeles* are pure pastoral (WAO 2013).

The geographical distribution of the district is divided into three different land masses i.e. north-west part which is valleys, central part which is high altitude plains and south-east which is lowland areas. The altitude of district ranges from 1000 to 2117 m.a.s.l. the highest peak of the district is 2117 m.a.s.l that lays northern part of the district (Hero-



geel). The terrain of the district is a hilly and dry valley in North-western. The temperature of the district ranges from 16<sup>0</sup>c to 29<sup>0</sup>c (AAO, 2013).



**Figure 2:** Map of Awbare district

### 3.2. Data Types, sources and Methods of Collection

The data used in this study pertain from both primary and secondary sources. This study primarily relied on primary data which were collected by using a semi-structured interview questionnaire, key informant interview and focus group discussions. Before embarking on the collection of primary data, enumerators were trained on the content of the questionnaire. To check similar understanding by all enumerators a pilot test was conducted after which some minor adjustments were made before full data collection process was started.

Furthermore, relevant secondary data were collected from regional bureaus like Somali Regional Disaster Prevention and Preparedness Bureau, Regional Livestock Crop and Rural Development Bureau and other Regional Bureaus and also from the zone administration and district offices and nongovernmental organization that implement different projects. Also secondary data were collected from published documents, official websites and unpublished documents and also related literature were deeply reviewed.

### 3.3. Sampling Technique and Sample Size

An important decision that has to be taken while selecting a sampling technique is about the size of the sample. Appropriate sample size depends on various factors relating to the subject under investigation like the time aspect, the cost aspect, the degree of accuracy desired (Gupta, 2002). If sample size is too small, we may fail to achieve the objectives of our analysis. But if it is too large, we waste resources. So that appropriate sample size has to be selected in order to get good representative data.

In order to determine the sample size there are several formulas developed. But the simplified formula to calculate the sample size was provided by Yamane (1967) which is given by:

$$n = \frac{N}{1 + N (e)^2} \quad (1)$$

Where

n is the sample size

N is the number of households

e is the level of precision.

In the process of selecting the sample, two-stage random sampling procedure was employed. Awbare district contains 59 *kebeles* of which 51 *kebeles* are agro-pastoral and 8 *kebeles* are pure pastoral, from which four agro-pastoral *kebeles* were selected randomly. Following this, a total of 140 households were selected randomly by employing probability proportional to size.

$$n = \frac{1350}{1 + 1350 (0.08)^2} = 140$$

Then according to the Yamane (1967) formula the sample size of 140 agro-pastoral households were selected randomly from the selected four agro-pastoral kebeles. After having the total number of households in each of the four agro-pastoral households, probability proportional to size was sampling technique employed to select the sample households from the four agro-pastoral kebeles.

**Table3. 1:** Total number of sample households by Kebele

Kebele name	Households	Sample	Percentage
Gobabley	101	10	7
Bodley	344	36	26
Herogel	625	65	46
Mohamed Ali	280	29	21
Total	1350	140	100

Source: Own computation (2016)

### 3.4. Methods of Data Analysis

#### 3.4.1. Descriptive statistics

Descriptive statistics like percentages, mean and standard deviation, minimum, maximum and others were used to describe the determinants of food insecurity status in the study area based on the socio-economic, institutional, human capital and demographic situations. Statistical tests like t-test and chi-square test were also used to test the significance level of the explanatory variables or to compare food insecure and food secure households in the study area based on different demographic, socio-economic and institutional factors by using STATA-11 software.

### ***3.4.2. Measuring food security status of the household***

The household food insecurity status was measured by direct survey of household consumption. The person responsible for preparing meals was asked how much food was prepared for consumption from purchase, stock and/or gift/loan/wage over a period of seven days. In this study, a seven-day recall method was used since such a measure gives more reliable information than the household expenditure method (Bouis, 1993). According to Gulled (2006), these seven days recall period was selected due to the fact that it is appropriate for exact recall of the food items served for the household within that week. If the time exceeds a week, for instance 14 days, the respondent may not recall properly what she has been served before two weeks.

Therefore, the consumption data collected on the basis of seven days recall method was converted into kilocalorie using the food composition table adopted from (Ethiopian Health and Nutrition Research Institute [EHNRI], 1997). Then, in order to calculate the household's daily food consumption, the total household's caloric food consumption for seven days was divided by seven. The household's daily caloric food consumption per adult equivalent was calculated by dividing the household's daily food consumption by the family size after adjusting for adult equivalent using the consumption factor for age-sex categories.

Then the result was compared with the minimum subsistence requirement per AE per day of 2,200 Kcal which is set by the Ethiopian Government (MoFED, 2008). Accordingly, this value of minimum subsistence requirement was used as a cut-off point between food secure and insecure households in which case the household is said to be food secure if it meets this minimum and insecure otherwise.

### ***3.4.3. Coping strategies***

The local coping strategies practiced by the agro-pastoralists in the study area, differs since food insecurity conditions vary at different stages(Gulled, 2006).Therefore, in order to identify the different coping strategies at different stages, data specific to the stage was collected. Finally, simple descriptive statistics (percentages and frequencies) were

employed in addressing the local food insecurity coping strategies of rural agro-pastoral households.

#### ***3.4.4. Econometric model analysis***

In order to identify the determinants of the food insecurity situation of the households a Logit model was used.

In this study, the dependent variable Y (household food insecurity status) is dichotomous variable taking value 1 if the household is food insecure and 0 otherwise. In the case where the dependent variable is dichotomous, probability regression models are the most fitting to study the relationship between dependent and independent variables. In the case where the response variable is qualitative, it is the probability of the dependent variable given independent variable that is determined. One the most common qualitative regression model is logit model (Gujarati, 2004).

Models, which include a yes or no type dependent variable, are called dichotomous or dummy variable regression models. Such models approximate the mathematical relationships between explanatory variables (independent) and the dependent variable that is always assigned qualitative response variables (Gujarati, 1988; Feder et al., 1985; Pindyck and Rubinfeld, 1981).

The major point that distinguishes these functions from the linear regression model is that the outcome variable in these functions is binary or dichotomous (Hosmer and Lemeshow, 1989).

The Probit and Logit models are commonly used models. The Probit probability model is associated with the cumulative normal probability function. Whereas the Logit model assumes cumulative logistic probability distribution. The advantage of these models over the linear probability model is that the probabilities are bounded between 0 and 1. Moreover, they best fit to the non-linear relationship between the probabilities and the independent variables; that is one which approaches zero at slower and slower rates as an independent variable ( $X_i$ ) gets smaller and approaches one at slower and slower rates as  $X_i$  gets large (Train, 1986).

The choice between these two models revolves around practical concerns such as the availability and flexibility of computer program, personal preference, experience and other facilities. In fact, it represents a close approximation to the cumulative normal distribution. Hosmer and Lemshew (1989) pointed out that a logistic distribution has got advantage over others in the analysis of dichotomous outcome variable. There are two primary reasons for choosing the logistic distribution. These are: (1) from a mathematical point of view, it is an extremely flexible and easily used function, and (2) it lends itself to a biologically meaningful interpretation. Aldrich and Nelson (1984) also state that, the logit model is simpler in estimation than the probit model.

According to Gujarati (2004) the logistic distribution function for determining factors in food security status of the households can be specified as:

$$p_i = \frac{1}{1 + e^{-z_i}} \text{-----} (1)$$

Where:  $p_i$ ; is a probability of a household being food secure for  $i^{\text{th}}$  household  $\beta$

$e$ ; represents the base of natural logarithms (2.718) and

$Z_i$  ; is a function of  $m$  explanatory variables ( $X_i$ ) and is expressed as:-

$$Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_m X_m \text{-----} (2)$$

Where  $\beta_0$  is the intercept and  $\beta_i$  is the slopes parameter in the model which is estimated using maximum likelihood method. The slope tells how the log-odds in favor of food secure of the household change as independent variables change by a unit.

The odds to be defined as the ratio of the probability that a household being food secure  $p_i$ , to the probability that household is food insecure ( $1-P_i$ ). But

$$(1 - p_i) = \frac{1}{1 + e^{z_i}} \text{-----} (3)$$

Therefore,

$$\left( \frac{p_i}{1-p_i} \right) = \frac{1+e^{Z_i}}{1+e^{-Z_i}} = e^{Z_i} \quad \text{_____} \quad (4)$$

$$\left( \frac{p_i}{1-p_i} \right) = \frac{1+e^{Z_i}}{1+e^{-Z_i}} = e^{\beta_0 + \sum_{i=1}^m \beta_i X_i} \quad \text{_____} \quad (5)$$

Taking the natural logarithms of the odds ratio of equation (5) will result in what is known as the logit model as indicated below;

In

$$\left( \frac{p_i}{1-p_i} \right) = \ln \left[ e^{\beta_0 + \sum_{i=1}^m \beta_i X_i} \right] = Z_i \quad \text{_____} \quad (6)$$

If the disturbance term  $U_i$  is taken in to account the logit model becomes:

$$Z_i = \beta_0 + \sum \beta_i X_i + U_i \quad \text{-----} \quad (7)$$

### 3.7 Definition of Variables and Hypothesis

It is necessary to identify the potential explanatory variables. Different variables are expected to affect household food security status in the study area. The major variables expected to have influence in the household to be food insecure or not are explained below.

#### 3.7.1. Dependent variable

Household food security status (HHFSS), which is dependent variable for the logit analysis, it is a dichotomous dependent variable in the model taking a value 1 if the household is food secure and 0 otherwise. Households' food security status was determined by comparing total kilocalories consumed in household per adult equivalent per day with the daily minimum requirement of 2200 kcal/AE/day. Households getting

2200 kcal/AE/day and above were considered as food secure and otherwise food insecure.

### **3.7.2 The independent variables**

***Sex of the household head (SEXHH):*** female headed households are more vulnerable to labor shortage situation. They do not actively participate in the animal rearing and crop production activities which are seen as a back bone for survival of the rural agro-pastoral households in the study area. It is dummy variable taking a value of 1 if the household head is female and 0 otherwise.

According to Tefra (2009), sex of the household head positively influenced on the food security status. Therefore, it is expected that female headed households have more chance to be food insecure and positive relationship with food insecurity.

***Age of the household head (AGEHH):*** Age is a continuous explanatory variable peculiar to the household head. In most rural households, the food production and animal rearing is carried out by the head of the household. This is because of the fact that once his children reach marriage age, they leave the house by making their own house. So that age of the head of the household is important with regard to availability of the required food for survival of the family. As the age of the head of the household increases there is a more probability of that household to be food insecure, since the older aged agro-pastoralists are unable to work hard for the survival of his family members. In light of this, age of the head of the household and food insecurity is positively correlated. Indris (2012) indicated in his study that the age of the household head affect food insecurity positively. Therefore, it is hypothesized that age of the household head has positive relationship with food insecurity.

***Family Size (FMSZEAE):*** This variable refers to the size of household members who live together under the same roof converted to Adult Equivalent (AE). The expectation is that household with large number of children or economically non-active family members will face food insecurity because of high dependency burden. This is the ratio of children under age 15 and old age of above 64 to family (total dependency ratio) expressed in



terms of AE (Abebaw 2003; Tesfaye 2005 and Yilma, 2005). Therefore, family size will be expected to have negative relationship with food security of the households.

***Dependency ratio (DEPRATIO):*** This indicates the number of children under age 15 and old age of above 64 expressed in terms of adult equivalent expressed as a ratio of active family labor members (i.e. age15-64). As the number of dependents increases the active labor force (i.e. age15-64) beside themselves are obliged to support these dependents. Thus this leads to the share of resources and income obtained by the active labor force and hence a decline to the well-being of the household in average terms. Abebaw (2003) have come up that dependency ratio and food insecurity has positive relationship. Thus, the hypothesis is that a household with large economically non- active family members tend to be food insecure than those with less burden of dependents.

***Education level of the household head (EDUCLEVEL):*** it is dummy variable taking the value of 1 if the household head is illiterate and 0 if the household head can read and write, the better the educational level of the household head, the higher the chance to maintain the food security status of his family with for instance diverting to other income generating activities and Lower educational level and illiteracy of the household head are directly related to food insecurity. According to Abebaw (2003) and Yilma (2005), the level of education of the household head has significance effect on food security. Thus, this variable is expected to have positive relationship with food security status of the rural agro-pastoral households.

***Size of cultivated land (LANDCULT):*** This is measured in hectares and refers to size of the cultivated land. As the cultivated land size increases, provided other associated production factors remain normal, the likelihood that the holder gets more output is high. This variable represents the total cultivated land size of a household in hectare Therefore, It was hypothesized that farmers who have larger cultivated land are more likely to be food secure than those with smaller area. Thus, Lewin and Fisher (2010) indicated in their study that size of cultivated land and food insecurity has negative relationship. Therefore, it is hypothesized that size of cultivated land and food insecurity has negative relationship.

***Livestock owned in tropical livestock unit (TLU):*** The livestock holding of the household will be measured in terms of Tropical Livestock Unit (TLU). Livestock are the main source of livelihood of agro-pastoralist community in Somali region. Households who possess a large number of livestock are expected to be less vulnerable to food insecurity than those who have few livestock. Since households with a larger number of livestock produce more milk, milk products and meat for direct consumption and owners could be more food secured. Besides, the contribution of livestock to food security includes the manure and income from sales of livestock and livestock products, which are often used for purchase of food grains during times of food shortage. Livestock sale is also used as the major coping strategy during famine and seasonal food shortage. Hence, the higher the value of TLU, the higher will be the probability of being food secure. According to Adugna and Wogayehu (2011) in their study in Wolayita found that households with more number of livestock have more probability to be food secure than households with less number of livestock. Therefore it is hypothesized, the higher the value of TLU, the higher will be the probability of being food secure.

***Number of oxen owned by the household (NUMBOXEN):*** This refers to the number of oxen a household owns for the purpose of traction power. Oxen are the most important means of land cultivation and basic farm assets. Households who own more oxen have a better chance to be food secure than others. This is because oxen possession allows undertaking farm activities on time and when required. Mulugeta (2002), Abebaw (2003) and Ayalew (2003) have shown that this variable has a positive and significant effect on food security. The number of oxen available to the household is, therefore, expected to enhance the probability of being food secure.

***Income from off/non-farm activities (NONFRM):*** It is a continuous variable and was measured in birr. Off-farm income represents the amount of income the farmers earn in the year out of on-farm activity in the farm. Non-farm income is the amount of income generated from activities other than crop and livestock production like labor in non-agricultural activities. Basher (2010) indicated in his study that the availability of off/non-farm income and food security has a positive relationship. It is hypothesized that

households who managed to earn higher off/non-farm income are less likely to be food insecure.

***Remittances or relative economic support (REMITA):*** This is a variable where most households in the study area are benefiting from, due to the “supporting one after the other” of the Somali culture. Gullud (2006) in his study indicated that remittance and food insecurity were negative relationship. It is expected that having relative economic support from abroad and within the country is positively related to the food security status of the household.

***Distance to nearest market centre (DISTMRKT):*** It refers to the distance between the farmers’ home and the nearest market that the household usually made transaction which is measured in kilometers. Proximity to market centers creates access to additional income by providing off-farm/non-farm employment opportunities, easy access to inputs and transportation. It was expected that households nearer to market center have better chance to improve household food security status than those who do not have a proximity to market centers. It is therefore hypothesized, in this study that the nearer the household to the market centre, the less would be the probability of being food insecure. The same result was also obtained by Lewin and Fisher (2010). Therefore, in this study it is hypothesized that distance to nearest market centre has positively relationship with food insecurity.

***Total food aid (FOODAID):*** Food aid is given as a coping strategy to food insecurity in the study area. Hence households in the study area are vulnerable for food insecurity and mostly cover their food shortfalls through emergency food aid. So the amount food aid received by the household is good indicator of household food insecurity in the study area. Food aid can develop a dependency behavior among households which in turn will reduce farmers’ motivation towards food self-sufficiency. Therefore, food aid was expected to have a negative relation to food security. The amount of food aid given was measured in Birr. According to Mulugeta Tefera (2002); Abebaw Shimeles (2003) and Ayalew Yimer (2003) food aid has no significant effect on food security.

**Table3. 2:** Summary of variables measurement and hypothesis

<b>Variable</b>	<b>Variable type</b>	<b>Variable definition and measurement</b>	<b>Hypothesis</b>
<b>Food security status</b>	Dummy	1 if the household is food secure; 0 otherwise	
<b>Sex</b>	Dummy	1 if the household is female; 0 otherwise	-
<b>Family size in AE</b>	Continuous	Family size in adult equivalent	-
<b>Age</b>	Continuous	Age of the household head in years	-
<b>Size of cultivated land</b>	Continuous	Land cultivated in hectares	+
<b>Dependency ratio</b>	Continuous	Ratio of dependents to active members	-
<b>Education</b>	Dummy	1 if the household is illiterate, 0 otherwise	+
<b>Livestock</b>	Continuous	Livestock owned in TLU	+
<b>Distance to nearest market</b>	Continuous	Distance to market centers in KM	-
<b>Oxen</b>	Continuous	Number of oxen owned	+
<b>Off/non-farm income</b>	Continuous	Income from off/non-farm activities in Birr	+
<b>Remittance</b>	Continuous	Income from relatives in Birr	+
<b>Food aid</b>	Continuous	Total food aid received in Birr	-

Source: Own definition (2016)

## **CHAPTER FOUR**

### **RESULTS AND DISCUSSION**

This chapter presents the results of the study. Descriptive statistical tools such as mean, percentage, standard deviation, t-test, and chi-square test were used to compare and contrast different characteristics of the sample households are discussed in section 4.1. Section 4.2 presents and discusses the econometric model results. While the final section 4.3 deals with the households coping mechanisms.

#### **4.1. Descriptive Results**

##### **4.1.1. Food security status of the households**

The households' food security status can be measured by direct survey of income, expenditure and consumption. In this study, households' food or calorie acquisition/consumption per adult per day is used to identify the food secure and food insecure households. The calorie consumed by the household is compared with the minimum recommended calorie of 2200 kcal per adult per day. If the consumption/acquisition is less than the recommended amount then, the household is categorized as food insecure and if greater than, as food secure.

The households' food security status was measured by direct survey of consumption. Data on the available food for consumption, from home production, purchase and /or gift/loan/wage in kind for the previous seven days before the survey day by the household was collected. Then the data were converted in to kilocalorie and then divided to household size measured in AE. The calorie intake result is calculated by using the standard food composition table prepared by (Ethiopian Health and Nutrition Research Institution [EHNRI], 1997).

Following this, the amount of energy in kilocalorie available for the household is compared with the minimum subsistence requirement per adult per day (i.e. 2200 kcal). As a result, from all respondent households, over half households are food insecure 78(55.7%) and 62(44.3%) of them are food secure.

Results presented in Table 4.1 shows that the mean per capita calorie intake of the sample household was 2184.18 kcal, which is lower than the minimum calorie requirement of 2200 kcal. The average and maximum calorie intake of food insecure households were below the minimum energy required for an individual to live a healthy life. There is statistically significant mean difference between food secure and food insecure households at one percent probability level. Thus, the study area could be classified as food insecure given the fact that majority (55.7%) of the surveyed households were not getting the minimum daily energy requirement for an individual to live healthy life.

**Table4. 1:** Energy available per AE per day among sample households

Energy Available per AE in (Kcal)	Food secure (N=62)	Food insecure (N=78)	Total N=(140)	t-value
Maximum	3151.52	2164.26	3151.52	
Minimum	2210.50	1524.36	1524.36	
Mean	2655.78	1809.33	2184.18	54.298***
Mean difference	2184.18			
St. Deviation	278.80	161.06	475.95	

Note: \*\*\* Significant at 1 percent probability level of significance

Source: Own Survey (2016)

#### **4.1.2 Demographic characteristics of household.**

The following sub section discusses the demographic characteristics of the respondent households. The household characteristics are compared to see the difference among food insecure and food secure groups. The variables discussed here are those which do have influential relationship to the food insecurity status of a household in the study area. Different characteristics of a household like the age of household head's, sex of the household head, dependency ratio and family size in AE were given due consideration

#### 4.1.2.1. Sex of the household heads

According to the survey results presented on Table 4.2, from the total sampled households, male headed households accounted for 80 percent while female headed households accounted for 20 percent. The proportion of male headed households was 74.36 percent of total sampled food insecure households. In addition to this, male headed households accounted for 87.09 percent of the total food secure households. Whereas, the proportion of female headed households out of total sampled food secure households and food insecure female headed households were 12.91 percent and 25.64 percent respectively. There is no statistically significant proportion difference between food secure and food insecure households in terms of sex. Thus, the result shows that there is no great disparity of food insecurity status due to sex difference among the household heads.

**Table4. 2:** Food Security Status by Sex

Sex of household head	Food insecure N=(78)		Food secure N=(62)		Total N(140)		$\chi^2$ - value
	Frequency	Percent	Frequency	Percent	Frequency	Percent	
	<b>Male</b>	58	74.36	54	87.09	112	
<b>Female</b>	20	25.64	8	12.91	28	20	
<b>Total</b>	78	100	62	100	140	100	3.503*

Source: Own survey, 2016, N=140

\* is Significant at less than 10% probability level

#### 4.1.2.2. Age of the Household Heads

Age is an important demographic characteristics of the household assumed to bring food insecurity difference among the agro pastoral households. According to the results presented in Table 4.3, On comparison, (39.8%) of the food insecure households fell within age category of 51 to 64 years, while only (11.3%) of the food secure households fell within the same category. On the other hand, (69.4%) of food secure households are

under the age category of 18 to 35 years, while only (14.1%) of food insecure households had age which were under the same category.

The average age of the sampled household heads are 43.01 years (SD=16.57) with minimum and maximum of 18 and 80 years respectively. The average age of food insecure household heads are 50.65 years (SD=14.28) whereas it was 33.40 years (SD=14.15) for food secure household heads.

**Table 4. 3:** Food Security Status by Age groups of Household Heads

<b>Age interval in (Years)</b>	<b>Food insecure (N=78)</b>		<b>Food secure (N=62)</b>		<b>Total (N=140)</b>	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
<b>18-35</b>	11	14.1	43	69.4	54	38.6
<b>36-50</b>	26	33.3	10	16.1	36	25.7
<b>51-64</b>	31	39.8	7	11.3	38	27.1
<b>65-80</b>	10	12.8	2	3.2	12	8.6
<b>Mean</b>	50.65385		33.40323		43.01429	
<b>SD</b>	14.28179		14.15078		16.57769	
<b>t-value</b>			7.1279			

Source: Own survey (2016) N=140

#### **4.1.2.3. Family size**

The following Table 4.4 shows that the mean of total sampled households family size in AE is 5.41 (SD=2.32) with the minimum of 2.35 and maximum of 12.3. The mean of family size in AE is 6.32(SD=2.30) and 4.26 (SD=1.79) for food insecure and food secure households respectively. From food insecure households (55.1%) have got a family size which ranges from 5.91 to 12.2.



On contrary, only (8.1%) of food secured households, got family size which ranges from 5.91 to 12.2. On the other hand, only (8.9%) of food insecure and about (56.5%) of the food secure got a family size, measured in AE, which ranges from 2.35 to 3. This means that the higher the family size, measured in AE, the more it is related to food insecurity status of the households in the study area. Therefore, the distribution of sample households with regard to household family size, measured in AE, show a statistical difference between food secure and food insecure households.

**Table4. 4:** Food Security Status by family size in Adult equivalent of HHs

Family size	Food insecure (N=78)		Food secure (N=62)		Total (N=140)	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
<b>2.35-3.0</b>	7	8.9	35	56.5	42	30
<b>3.01-4.99</b>	12	15.4	13	20.9	25	17.9
<b>5.00-5.99</b>	16	20.6	9	14.5	25	17.9
<b>5.91-12.3</b>	43	55.1	5	8.1	48	34.2
<b>Mean</b>	6.326154		4.262968		5.412457	
<b>Std. Dev</b>	2.309754		1.792533		2.328793	
<b>t-value</b>			5.7828**			

Note: \*\* Significant at less than 5% probability level

Source: Own survey (2016) N=140

#### **4.1.2.4. Dependency ratio**

Dependency ratio is hypothesized as having positive relationship with the households food insecurity status in that households with the larger dependency ratio is more food insecure than households with less dependency ratio. Results presented in Table 4.5 shows that the average mean dependency ratio of the sampled households is 1.35

(SD=1.06) with the minimum of 0.00 and maximum of 4.32. The mean dependency ratio was 0.63(SD=1.03) for food insecure households and 1.92(SD=0.56) for food secure households. There is statistically significant mean difference of dependency ratio between food insecure and food secure households at less than one percent probability level. Thus, the result shows that food insecure households had high dependency burden than food secure which may increase vulnerability of households to food insecurity.

**Table 4. 5:** Food Security Status by Dependency ratio of HHs

Food Insecurity Status	Mean	SD	Minimum	Maximum	t-value
Food Insecure	1.92294	1.03015	0.24	4.32	
Food Secure	.63983	.566468	0	2.80	8.8024***
Total households	1.3547	1.06669	0	4.32	

Note: \*\*\* Significant at less than 1% probability level

Source: Own survey (2016) N=140

### 4.1.3. Economic factors/Resource ownership

#### 4.1.3.1. Cultivated land of HHS

It is hypothesized that the size of cultivated land by the household negatively affects the food insecurity status of the households. That is, households with large cultivated land in hectares have more probability of escaping the problem of food insecurity than household with small cultivated land in hectares.

According to the survey results presented in Table 4.6, cultivated land per household for the sampled households varies from a minimum of 0.24ha to a maximum of 7 ha. About 67.9% of food insecure, 37.1% of food secure respondents and 54.28% of all respondents possessed cultivated crop land, which ranges from 0.24 hectare to 2 hectares.

Average cultivated land of the sampled households are 2.14ha with a standard deviation of 1.32. The average cultivated land was 1.06ha (SD=1.06ha) and 2.82ha (SD=1.32ha) for food insecure and food secure households respectively. There is statistically significant difference between food insecure and food secure households in their mean cultivated

land at less than one percent probability level. The result shows that food insecure households were relying on very small pieces of land than the food secure households to meet their food requirement.

**Table 4. 6:** Food Security Status by Cultivated Land Size of HHs

Cultivated land size in Ha	Food insecure (N=78)		Food secure (N=62)		Total (N=140)	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
	<b>0.24-2</b>	53	67.9	23	37.1	76
<b>2.01-3.50</b>	20	25.7	25	40.3	45	32.14
<b>3.51-5</b>	5	6.4	10	16.1	15	10.71
<b>5.01-7</b>	0	0	4	6.5	4	2.85
<b>Mean</b>	1.605641		2.820323		2.143571	
<b>Std. Dev</b>	1.062294		1.323215		1.326713	
<b>t-value</b>	-6.0259***					

Note: \*\*\*significant at 1 percent probability level of significance

Source: Own survey (2016) N=140

#### **4.1.3.2. Livestock ownership of HHs**

The survey results presented in Table 4.7 shows that the mean livestock holding of the sampled households are 2.309 TLU (SD=0.957) with minimum of 0.12 TLU and maximum of 4.16 TLU. The mean livestock holding was 2.009 TLU (SD=0.931) and 2.687 TLU (SD=0.857) for food insecure and food secure households respectively. The t-test for the equality of the means in livestock holding between food insecure and food

secure households shows that there is statistically significant mean difference at less than one percent probability level

**Table4. 7:** Food Security Status by Livestock owned in TLU of HHs

Food Insecurity Status	Mean	SD	Minimum	Maximum	t-value
Food Insecure	2.009	.931	0.12	4.16	
Food Secure	2.687	.857	0.29	4.16	- 4.43
Total households	2.309	.957	0.12	4.16	

Note: \*\*\*significant at 1 percent probability level of significance

Source: Own survey (2016) N=140

#### **4.1.3.3. Number of oxen owned**

In the study area oxen is the most important traction power for the production of crops. As a result, it was hypothesized that the number of oxen owned is negatively related with the food insecurity status of households in the study area. That is, the more the number of oxen owned the less the probability of the household to become food insecure.

The survey results presented in Table 4.8 shows that the number of oxen owned by the sampled households varies from the minimum of zero to a maximum of three. About 19.67% of food secure households possessed two oxen, while only 2.56% of food insecure households possessed 2 oxen. On the other hand, 13.11% of food secure households got 3 oxen; while food insecure households had not got number of 3oxen. Also about 74.36% of food insecure, 31.14% of food secure households and 55.71% of all respondents got no ox at all.

The average number of oxen owned by the sampled households was 0.66 with a standard deviation of 0.87. The average number of oxen owned was 0.28 (SD=0.50) and 1.14 (SD=1.0) for food insecure and food secure households respectively. The average number of oxen owned is appeared to be greater for food secure compared to food insecure

households and this difference is statistically significant at less than one percent probability level.

**Table 4. 8:** Food security Status by number of oxen owned of HHs

Number of oxen owned	Food insecure (N=78)		Food secure (N=62)		Total (N=140)	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
<b>0</b>	58	74.36	19	31.14	77	55.71
<b>1</b>	18	23.08	23	36.06	41	27.85
<b>2</b>	2	2.56	12	19.67	14	10.71
<b>3</b>	0		8	13.11	8	5.71
<b>Mean</b>	0.28		1.14		0.66	
<b>SD</b>	0.50		1.0		0.87	
<b>t-value</b>			-6.601***			

Note: \*\*\*significant at 1 percent probability level of significance

Source: Own survey (2016) N=140

#### 4.1.3.4. Off/Non-farm income

Off/non-farm income is very important for the wellbeing of the households in that it help the households to access food when income from agriculture is inadequate to enable households to access food throughout the year. Consequently, it is hypothesized to affect the food insecurity status of the households negatively in which households who are managed to earn more income from such activities are more food secures than others.

The survey results in Table 4.9 revealed that about 71.42 percent of the sample households earn less than Birr 3500 from non-farm income in the study area. But when we further look the results within the sample groups above 84.62% of the food insecure and above 54.84 %of the food secure households earn less than 3500Birr from off farm activity. However, going further one step to the higher income level the food secured

sample groups are in a better off. Above 45.16 percent of the food secured sample groups earn more than Birr 3500 whereas only 15.38 percent of food insecure households earn the same amount.

The sampled households who have engaged in off/non-farm activities have generated an average income of Birr 3249.79 with its standard deviation of 2365.72. Food insecure households have generated very low average income of about Birr 2292.76 (SD=1445.27) while their counterparts generated an average of Birr 4453.77 (SD=2733.47) in the study period. The t-test for the equality of the mean off- farm income generated shows that there was statistically significant difference between food insecure and food secure households at less than one percent probability level.

**Table4. 9** Food Security Status by Off Farm Income [in Birr] of HHs

<b>Off-farm Income</b>	<b>Food insecure (N=78)</b>		<b>Food secure (N=62)</b>		<b>Total (N=140)</b>	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
<b>&lt;3000</b>	51	65.38	11	17.74	62	44.28
<b>3001-3500</b>	15	19.24	23	37.10	38	27.14
<b>3501-4000</b>	5	6.41	6	9.68	11	7.85
<b>&gt;4001</b>	7	8.97	22	35.48	29	20.71
<b>Mean</b>	2292.76		4453.77		3249.78	
<b>SD</b>	1445.27		2733.47		2365.72	
<b>t-value</b>			-6.008***			

Note: \*\*\*significant at 1 percent probability level of significance

Source: Own survey (2016) N=140

#### **4.1.3.5. Remittance**

In this study, remittances refer to economic support from relatives in terms of money sent to the household. Somali's have a culture which encourages helping one another, family members always give a help hand to their decent families when they go oversees countries or locally accessed some sort of job opportunity. It was hypothesized that

having relative economic support from abroad or within the country was negatively related to the food insecurity status of the household.

According to the results presented in Table 4.10, the economic support from relatives, in terms of money, given to the respondent households ranged from Bir500 to 3000. About 70.72% of the respondent households got economic support from their relative, while only about 29.28% of the respondents do not get economic support. Out of the total number of food secure respondent households, 87.1% of them had got economic support from relative, while the total number of food insecure respondent households, only about 57.7% of them had got that.

The average remittance of the sampled household heads are Birr 3178.86 (SD=2441.7).the average remittance of food insecure household heads was Birr 2180.17 (SD=1561.48) whereas it is Birr 4435.27 (SD=1561.48) for food secure household heads. There is statistically significant mean difference between food insecure and food secure households at less than one percent probability level.

**Table4. 10:** Food Security Status by remittances earned [in Birr] of HHs

<b>Money Received [in Birr]</b>	<b>Food insecure(N=78)</b>		<b>Food secure(N=62)</b>		<b>Total (N=140)</b>	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
<b>Do not receive</b>	33	42.30	8	12.90	41	29.28
<b>500-1000</b>	15	19.23	10	16.14	25	17.85
<b>1001-1500</b>	19	24.36	15	24.19	34	24.29
<b>1501-2000</b>	8	10.26	18	29.03	26	18.58
<b>&gt;2001</b>	3	3.85	11	17.74	14	10
<b>Mean</b>	2180.17		4435.27		3178.86	
<b>SD</b>	1561.48		2761.84		2441.7	
<b>t-value</b>			-5.741***			

Note: \*\*\*significant at 1 percent probability level of significance

Source: Own survey (2016) N=140

#### 4.1.4. Human capital

The results of the human capital hypothesized to differentiate between food insecure and food secure households are presented and discussed under this subsection as follows:

##### 4.1.4.1. Education level of the household heads

The educational level of the household head is an important human capital which is expected to affect food insecurity status of households negatively. That is, the more the educational level of the household head, the more the possibility of household to diversify their livelihood so that the less possibility the household to become food insecure.

According to the results presented in Table 4.11, Out of the total sampled households 70% are illiterate whereas 30% were read and write. The educational status of the head of the households inclined to illiterate.

About 83.33% of food insecure households, 53.23% of the food secure group and 70% of all respondents are illiterates. So that the education level of the household heads shows significant difference between food secure and food insecure households at less one percent probability level.

**Table 4. 11:** Food Security Status by Education Level of HHs

Education of household head	Food insecure (N=78)		Food secure (N=62)		Total (N=140)		$\chi^2$ -value
	Frequency	Percent	Frequency	Percent	Frequency	Percent	
Read and Write	13	16.67	29	46.77	42	30	
Illiterate	65	83.33	33	53.23	98	70	
<b>Total</b>	78	100	62	100	140	100	14.91***

Note: \*\*\*significant at 1 percent probability level of significance

Source: Own survey (2016) N=140



#### **4.1.5. Institutional factors**

##### ***4.1.5.1. Distance to the nearest market***

Good infrastructure is essential for food security by ensuring low food price and efficient market that can respond to changes in demand. It allows information transfer between producers and traders, and gives farmers access to new technologies (FAO, 2009). As a result it was hypothesized that the distance of the household's residence from the nearest market centre is negatively related with food insecurity status and households nearest to the market centre have less probability of becoming food insecure.

Results presented in Table 4.12 shows that the average distance of the sampled household to the nearest market is 12.88Km (SD=4.19). The mean distance of food insecure households to the nearest market is 14.117 Km (SD=3.84) whereas the food security was 11.33Km (SD=4.13).

During focus group discussions most of the marketing problems that they faced arise from the time they sell their produce. Low price 42.7% and transportation problem 16.62% are the first and second pressing marketing problems that households faced since majority of households sold their produce right after harvesting period.

Furthermore, households were asked the reason of selling when the price was very low to which about 21%, 19% and 13% of the households responded that they sold their produce for their family needs; settle debt and social obligations respectively.

**Table 4. 12:** Food Security Status by market distance [in km] of HHs

Market distance in km	Food insecure (N=78)		Food secure (N=62)		Total (N=140)	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
5-11	17	21.79	31	50	48	34.28
12-15	31	39.74	22	35.48	53	37.86
16-20	30	38.47	9	14.52	39	27.86
Mean	14.117		11.338		12.887	
SD	3.841		4.132		4.194	
t-value			4.077**			

Source: Own survey (2016) N=140

#### 4.1.5.2. Food aid supply

Food aid plays a role to lessen the households from being vulnerable to severe food insecurity. In this study it was hypothesized that households who received more aid will be more likely to escape from being vulnerable to food insecurity than those who received less. However, the mean amount of food aid received by the two sample household groups revealed no significant difference. According to the survey results presented on Table 4.13, the mean amount of food aid received by the two sample household groups are Birr 886.05 and Birr 792.33 by the food insecure and food secure sample household groups, respectively. Moreover, above 36.71% and 36.70% of food insecure and food secure households received less than Birr500.

Likewise, about 63.29% and 62.3% of the food insecure and food secure sample households received greater than Birr500. There is no statistically significant proportion difference between food secure and food insecure households in terms of food aid. Thus, the result shows that there is no great disparity of food insecurity status due to food aid difference among the household head, because of the mitigation problem. That is, the food aid is distributed without discriminating the two groups.

**Table 4. 13:** Food Security Status by Amount of Food Aid Received [in Birr] of HHs

<b>Food aid Received in Birr</b>	<b>Food insecure (N=78)</b>		<b>Food secure (N=62)</b>		<b>Total (N=140)</b>	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
<b>Do not receive</b>	18	21.52	11	16.39	29	19.28
<b>250-500</b>	11	15.19	13	21.31	24	17.86
<b>501-750</b>	5	7.59	12	19.68	17	12.86
<b>751-1000</b>	10	12.66	4	6.56	14	10
<b>&gt;1001</b>	34	43.04	22	36.06	56	40
<b>Mean</b>	886.05		792.33		844.55	
<b>SD</b>	682.38		617.08		653.63	
<b>t-value</b>						0.8515

Source: Own survey (2016) N=140

#### 4.2. Econometric Results

As specified in the methodology part of this study, the analysis was made using binary logistic regression model. This model was used to see the relative influence of household's demographic, socio-economic, human capital and institutional variables on food insecurity status. Identification of the descriptive statistics is not enough to stimulate policy actions unless the relative influence of each factor is known for priority based intervention. Before discussing about the econometric model results, the model specification and data fitting should be made.

#### 4.2.1. Diagnostics of the econometric model

Before running the model, the data were checked whether multicollinearity problems exist or not. In this case, Variance Inflation Factor (VIF) technique was employed for all explanatory variables included in the model. Multicollinearity refers to the case in which two or more explanatory variables in the regression model are highly correlated, making it difficult or impossible to isolate their individual effects on the dependent variable. With multicollinearity, the estimated OLS coefficients may be statistically insignificant even though  $R^2$  may be “high.” The presence of the multicollinearity among explanatory variables was tested using VIF (Variance Inflation Factor) for all variables as shown in the (Table4.14).

**Table4. 14:** Multicollinearity Test Using VIF Test

<b>Variable Name</b>	<b>VIF</b>	<b>1/VIF</b>
<b>Age of the Household Head</b>	4.15	0.240858
<b>Family Size</b>	3.23	0.309227
<b>Household livestock owned excluding oxen</b>	2.60	0.385262
<b>Number of Oxen Owned</b>	1.71	0.585977
<b>Size of Cultivated Land</b>	1.46	0.683107
<b>Dependency Ratio</b>	1.65	0.606999
<b>Income From Off/non-farm activities</b>	3.39	0.295196
<b>food aid received</b>	5.20	0.192200
<b>Distance to Nearest Market Center</b>	3.52	0.283745
<b>Remittances excluding Off/Non farm Income</b>	2.35	0.426364
<b>Sex of Household Head</b>	2.23	0.447997
<b>Education Level of Household Head</b>	4.28	0.233898
<b>Mean VIF</b>	2.78	

Source: own computation from survey data, 2016

As a rule of thumb, if the VIF of a variable exceeds 10, which will happen if  $R^2$  exceeds 0.90, that variable is said to be highly collinear (Gujarati, 2004). However in the current study as can be seen from Table 3.16 none of the variables have a VIF value of 10 and above which is an indication that there is no problem of multicollinearity among the all variables of this study.

#### 4.2.2. Determinants of agro-pastoral household food insecurity

This section presents and discusses empirical findings of econometric model result. Estimates of the parameters of the variables expected to determine the agro-pastoral food insecurity are displayed in Table 4.15. The goodness-of-fit was tested by the Log likelihood ratio (LR) test. The result shows the chi-square of 165.87.21 with 12 df and p-value of zero. This means that  $\chi^2$  is statistically significant and the model displays a good fit. The Pseudo R<sup>2</sup> of the model is also 86.28%. This verifies that the model has a good fit to the data and explained significant non-zero variations in factors influencing food insecurity. Among the total of 12 explanatory variables included in the model, five variables were found to be statistically significant in influencing the food insecurity status while the remaining seven explanatory variables were statistically insignificant. Among factors which had significantly influence food insecurity are number of oxen holding, land cultivated and dependency ratio were statistically significant at 5% probability level; age of households head and family size were significant at 10% probability level.

**Table4. 15:** Maximum Likelihood Estimates of Binary Logistic Model

Variable	Coefficient	Z- value	Standard Error	P>Z	Odds Ratio
Sex	4.723566	1.22	3.867498	0.222	112.5689
Age	-.0986943	-1.67	.0589988	0.094	.9060197*
Family size	-1.206904	-1.68	.7197898	0.094	.2991219*
Dependency ratio	-3.183289	-2.40	1.327832	0.017	.0414491**
Education level	2.230087	0.80	2.798808	0.426	9.300677
Land cultivated	2.661811	2.31	1.149972	0.021	14.32221**
Livestock owned	1.231576	1.06	1.158658	0.288	3.426626
Oxen holding	3.13841	2.15	1.458385	0.031	23.06715**
Food aid	.0014353	0.66	.0021882	0.512	1.001436
Remittance	-.0024658	-1.08	.0022903	0.282	.9975372
Off/Non-farm Income	.0034609	1.41	.0024586	0.159	1.003467
Distance to nearest market centre	-.3047272	-0.96	.3163557	0.335	.7373245
Constant	-5.161788	-0.71	7.264844	0.477	1.001436
LR chi2 (12)					165.87
Log likelihood					-13.189975
Pseudo R <sup>2</sup>					0.8628

Source: Own Regression Result (2016)

Note: \*\*\*, \*\* and \* significant at 1%, 5% and 10%, probability level of significance

#### ***4.2.2.1. Analysis of the significant explanatory variables***

***Age of the household head:*** this variable is found to be negative and significant at less than ten percent probability level. The negative sign is an indicative of its influence in the food security status of the rural households. This means that, an increase in the age of the household head increased the likelihood for the household to be food insecure. One possible reason may be that older household heads have larger number of family size as polygamy is a common practice. This opens up a chance for bearing children even at latter ages. The other possible reason is that a household which headed by older aged head face a family labor shortage since old children become independent having their own household. And due to this the household would be composed of young aged children with large family size. The odds ratio of 0.906 implied that, other things being constant, the odds ratio was in favor of being food secure decreased by factor of 0.906 as age of the household head increased by one year. The possible reason for such result might be the old age bearing of children so that the family number increases while the head of the household was getting older and older. The result is contradicting with the earlier finding of (Abebaw, 2003).

***Family size:*** several empirical studies (Ayalew, 2003; Mulugeta, 2002; Tesfaye, 2005 and Yilma, 2005) showed that the family size was significant in determining the probability of household's food security status of other contexts other than the agro pastoral context. And this study found out the same result in that the variable have negative relationship and it is significant at less than ten percent probability level. Rural households with large family size, having children of non-productive age, could face the probability of food insecurity because of high dependency ratio than farm households with small family size. Therefore, this agrees with the expected that household size with high dependency ratio had role to play in affecting the probability of households to become food insecure. The odds ratio of 0.29 for family size implies that, other things being constant, the odds ratio in favor of being food secure decreases by a factor of 0.29 as family size increase by one person. The possible explanation can be those households with many children could face food insecurity because of high dependency burden.

**Dependency ratio:** Dependency is burden to every households, it is also a catalyst for food insecurity. And this study found out the same result in that the variable have negative relationship and it is significant at less than five percent probability level. It is found that dependence ratio and food insecurity have positive relationship. The positive sign shows that the probability of becoming food insecure is high for households where productive members are less than unproductive members. The odds ratio of 0.0414 implied that, Other variables remaining constant, the odds ratio in favor of being food secure increased by factor of 0.0414 as the dependent age group (<15 and >65) increases by one unit. The possible explanation can be that those households with many dependent family members could be food insecure because of high dependency burden. This shows that those agro-pastoral households with large economically non-active members tend to be food insecure than those households with economically active household members. This result is also in line with the result of Dereje (2008), Indris (2012) and Saadiq (2012).

**Cultivated land size in Ha:** this variable had a positive relationship and significant at less than 5% probability level with regard to food security status of the respondent households. This implies that the household who got more hectares of cropping land would be in a position to cope with food insecurity, this means households with large cultivated land produce more for household consumption and for sale and have better chance to be food secure than those having relatively small size of cultivated land. The reason may be that, the agro-pastoralist who got more hectare of cropping land planted with crops, the probability of getting enough harvest for home consumption increases. The odds ratio of 14.32 implied that, other things being constant, the probability of being food secure increased by factor of 14.32 as total land holding increased by one hectare.

**Oxen owned:** It was found that this variable have significant at less than 5% probability level and positive relationship with household food security status. And even if, most agro pastoralists of Fafan Zone in general and Awbare *Woreda* in particular, used to plough by using tractor driven plows and oxen as well to cultivate their cropping lands. And this study found out that oxen ownership was one of the most important factors of production in the study area and hence determined household food security status. This

variable was significant at a probability less than five percent and had positive association with household food security.

The more the number of oxen available to households, the higher is the probability of being food secure. The positive sign of this variable indicated the contribution of Oxen towards ensuring food security. The odds ratio of 23.06 implies that, if other things are held constant, the probability of food secure increased by factor of 23.06 as the farm household's oxen holding increased by one ox.

### 4.3. Household Coping Mechanisms

Households adopt and develop diversified coping strategies and sequential responses through which people used at times of decline in food availability.

As illustrated in the Table 4.16 agro-pastoralists in the study area use alternative coping mechanisms such as: sale of more livestock than usual, borrowing of food, reduce number of meal, reduce size of meal, sale firewood and charcoal, seasonal migration, seeking alternative or additional job, rely on less preferred and less expensive food, seeking relief assistance, becoming temporary trade, household splitting, consume wild food, remittance, participating in cash basis project works.

**Table4. 16:** Coping Mechanisms of Food Insecurity by HHs

Household coping mechanisms	Food insecure	Food secure	Total
	(55.7%) N= 78	(44.3%) N = 62	(100%) N = 140
	%	%	%
<b>Sale of more livestock than usual</b>	72.5	39.6	58.2
<b>Borrowing of food or cash</b>	97.1	54.7	78.7
<b>Reduce number of meals</b>	65.2	43.4	55.7
<b>Reduce size of meal</b>	62.3	35.8	50.8
<b>Sale fire wood and charcoal</b>	50.7	20.8	37.7
<b>Rely on less preferred and less expensive food</b>	33.3	22.6	28.9
<b>Short term/seasonal migration</b>	5.8	15.1	9.8
<b>Seek alternative or additional jobs</b>	30.4	3.8	18.9
<b>Seeking relief Assistance</b>	27.5	13.2	21.3
<b>Becoming temporary trader</b>	14.5	47.2	28.7
<b>Household splitting</b>	7.2	0	4.1
<b>Consume wild food</b>	24.6	9.4	18.03



<b>Remittance</b>	18.8	24.5	21.3
<b>Participating in cash basis project works</b>	14.5	3.7	9.8

Source: Field survey, 2016 N=140

The first most important coping mechanism used by the large number of surveyed households is borrowing of food or cash which was about 97.1% and 54.7% of food insecure and food secure households respectively which has significant difference between food insecure and food secured households; this strategy was the most common strategy practiced in the study area.

The second, third and fourth most important coping strategies used by large number of agro- pastoral households were sale of more livestock than usual, reduce number of meals and reduce size of meal which was about 69.6%, 59.4% and 53.4% of food insecure respectively and 35.8%, 39.6% and 28.3% of food secure households respectively. Remittances, participating in cash basis project works, becoming temporary trader, household splitting, short term/seasonal migration were also among the coping mechanisms used in the study area.

## **CHAPTER FIVE**

### **CONCLUSION AND POLICY IMPLICATION**

#### **5.1 CONCLUSION.**

This study was undertaken in Awbarre district of Fafan zone of Somali Region with the objectives to measure the food insecurity status of the agro-pastoral households, identifying the determinants of food insecurity in the agro-pastoral households, identifying agro-pastoral household coping strategies used by households in the study area. To achieve these objectives the study relied more on primary data which were collected by conducting household survey from 140 randomly selected households in four randomly selected kebeles of the district. Households' demographic, socio-economic, human capital and institutional data which were deemed to be relevant were collected, organized, analyzed and interpreted to come up with the results.

Data were analyzed using both descriptive statistics and econometric method. The descriptive statistics were used to study the demographic, socio-economic, human capital and institutional factors in relation to food insecurity status of households. The econometric method in which logit model was specified and estimated was used to analyze the determinants of food insecurity in the study area.

The sampled households were classified into food secure and food insecure groups based on kilo-calories (kcal) actually consumed by the households during the previous seven days of survey data either through purchase, gift or other means. Total amount of food commodity consumed by each household during the seven days were converted into equivalent daily kilo calories (kcal) per adult equivalent (AE) and then compared with recommended daily kcal per adult equivalent. Total daily food energy per adult equivalent of less than 2200 kcal was considered as food insecure and 2200 kcal above food secure. Accordingly, 55.7% of sampled households were living on total daily food energy level per adult equivalent of less than the minimum recommended requirement.

Binary logit model was employed to study the relations between the probability of households being food insecure and household's socio-economic characteristic. The result revealed five significant variables out of the hypothesized variables. Among these significant variables were number of oxen owned and land cultivated were positively related with food security status. While the remaining significant variables such as age of the household head, dependency ratio and family size was negatively related with food security status of the households in the study area.

In addition to this, the coping strategies practices by most of the agro-pastoral households in the study area were borrowing cash or food from relatives or neighbors' 78.7%, sale of more livestock than usual 58.2%, reduce number of meals 55.7% reduce size of meals 50.8%, sale of charcoal and fire wood 37.7%.

## **5.2. POLICY IMPLICATION**

The result of this study shows that 55.7% of the surveyed households were unable to get the minimum daily energy requirement. In order to improve households' food security situation in the district, the following may be the major recommendable areas of intervention.

Large family size is a problem for the household if the non-productive members are high. Awareness creation should be the first task to tackle this problem. Therefore, organizations working on the health stream need to create strategic approach for the utilizations of family planning facilities. Since the communities in the study area are Muslim, natural birth control and other alternatives should be assessed by considering the culture and religion aspects of family planning facilities.

Age of the household head had negative impact on food security. This means old household heads are less likely to be food insecure. Therefore, capacity building for older household heads should be given more priority. In addition, interventions intended to help agro pastoralists have to give priority to old aged household heads.

Cultivated land is an important economic factor that positively affects households' food security status in the study area. However, with an increase in population size of the district, cultivated land is becoming in short supply and the farmers are producing crops on small plots of land with lack of technologies and low productivities. Improved agricultural technologies that enhance the productivity of land per unit area should be developed and training of agro-pastoral households on land management should be given a due emphasis.

Oxen were a significant determinant and positively related with food security status. Oxen are vital for food insecurity due to their integral part with farm cultivation. A given household having enough number of oxen was more secured than the one that had no oxen. Moreover, it was observed from the field survey that as a coping mechanism, agro-pastoral households sell their oxen during hard times so as to survive. Losing oxen made them very difficult to recover even during the normal seasons. Finally, this forces more agro-pastoralist farming households to be food insecure in the next unpromising season since they miss their integral part to cultivate the farm. Therefore, there should be intervention in the area; households should be supported to increase their oxen by enhancing rural credits to the farmers which can indeed overcome the farmers' capital problem, there should also be an oxen restocking program for households who lost their oxen from drought or any other shock. Borrowing of food or cash, sale of more livestock than usual, reduce number of meals, reduce size of meals and sale of firewood and charcoal are the most important coping strategies used by agro-pastoral households in the study area which has a significant impact on food insecurity in the area. Therefore, the regional government, zonal and district administration should have to give technical skill training and provide some credit for the agro-pastoral households in order to increase the income of the household and reduce the food insecurity status. In addition to this district administration should also link agro-pastoral food insecure households with international and local organizations which are implementing in the district.

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## APPENDIX

### Tables in Appendix

**Equation 1:** Conversion factor used to compute adult equivalent (AE)

<b>Age group (years)</b>	<b>Male</b>	<b>Female</b>
<10 years	0.6	0.6
10-13	0.9	0.8
14-16	1.0	0.75
17-50	1.0	0.75
>50	1.0	0.75

Source: Storck, et al. (1991)

**Equation 2:** Conversion factor used to compute tropical livestock unit (TLU)

<b>Animal category</b>	<b>TLU</b>	<b>Animal category</b>	<b>TLU</b>
<b>Calf</b>	0.50	Donkey (young)	0.35
<b>Weaned calf</b>	0.34	Sheep and goat (adult)	0.13
<b>Heifer</b>	0.75	Sheep and goat(young)	0.06
<b>Cow</b>	1.00	Chicken	0.013
<b>Ox</b>	1.00		
<b>Donkey(adult)</b>	0.70		

Source: Storck, et al. (1991)

**Equation 3:** Conversion factor used to estimate Kcal of food items

<b>Food item</b>	<b>Unit</b>	<b>Kcal</b>
<b>Barley</b>	Kg	3723
<b>Maize</b>	Kg	3751
<b>Sorghum</b>	Kg	3850
<b>Wheat</b>	Kg	3623
<b>Lentils</b>	Kg	3522
<b>Onion</b>	Kg	713
<b>Pepper</b>	Kg	933
<b>Milk</b>	Lt	737
<b>Sugar</b>	Kg	3850
<b>Edible oil</b>	Lt	8964
<b>Coffee</b>	Kg	1103
<b>Peas</b>	Kg	3553
<b>Tomato</b>	Kg	216
<b>Salt</b>	Kg	1700
<b>Rice</b>	Kg	3330
<b>Meat</b>	Kg	1148
<b>Butter</b>	Kg	7364
<b>Spaghetti/Macaroni</b>	Kg	3550

Source: EHNRI, 19

## Interview Schedule for Collecting Data from the Respondents

**Interview schedule for agro-pastoral household's survey in Awbare Woreda, 2016**

### Part One: General Information

- 1.1 Kebele \_\_\_\_\_  
 1.2 Village \_\_\_\_\_  
 1.3 Name of head of the household \_\_\_\_\_  
 1.4 Name of the enumerator \_\_\_\_\_  
 1.5 Date of interview \_\_\_\_\_ Signature \_\_\_\_\_

### Part Two: Household Demography

2.1 Can the person define the number of members in the household according to the following:

Age category	Sex		Educational status			
	Male	Female				
			Illiterate		Literate	
			M	F		
Number of family members 0-14 years						
Number of family members 15-64 years						
Number of family members $\geq 65$ years						

2.2 What is the gender of the head of household?

1. Female    2. Male

2.3 Marital Status

1. Single    2. Married    3. Divorced    4. Widowed

2.4 How old is the person in charge of the household?

1. Less than 16    2. From 16 to 20    3. From 21 to 30    4. From 31 to 40    5. From 41 to 60    6. Above 60

### Part Three: LIVING CONDITIONS AND ACCESS TO LAND

1. You live in:

- a) Your house
- b) Relative's house
- c) IDP/Other collective settlement
- d) Rented house/apartment

2. Does the HH cultivate the land?

- 1. Yes
- 2. No

3. If yes, how many Qodi:<sup>4</sup>

4. What is the size of land you would have been able to cultivate, considering your current capacities/means, if the land was available?

5. What is the ownership form of your land?

- ✓ Private
- ✓ Lease
- ✓ Sublease

6. What agricultural assets /machinery do you have access?

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7. If you live in the village do you have access to the pastures of

- |                     |          |
|---------------------|----------|
| Your village        | Yes / No |
| Neighboring village | Yes / No |

8. Who is sustaining the HH? \_\_\_\_\_

### Part Four: Crop Production

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\* Qodi is local measurement of land, 1 Qodi = (1/5) of ha.

\*\* Galan is local measuring equipment, 1 Galan = 1.5 Kgs.

- 4.1 Does your household or any of its members cultivate farm land during the last harvesting season? a) Yes b) No
- 4.2 If yes, what is the total area of farm land that your household cultivated? \_\_\_\_\_ Qodi:
- 4.3 How many quintals of crops did you harvest from your farm land through rain-fed/irrigation during for the last year and what portion of it did you sell after harvest?

S.N	Major types of crop	Gu (main rain)		Use of the harvest 1=% for own consumption 2=100% sold for cash 3=Some consumed, some sold for cash
		Area Covered (Qodi:*)	Quantity (Galan**)	
1.	Maize			_____
2.	Sorghum			_____
3.	Wheat			_____
4.	Barley			_____
5.	Beans			_____
6.	Vegetables			_____
7.	Fruits			_____
	<b>Total</b>			

- 4.4 How much do you produce during...  
a) Good harvest year? \_\_\_\_\_ in Galan/Qodi. b) Normal harvest year? \_\_\_\_\_ in Galan/Qodi c) Poor harvest year? \_\_\_\_\_ in Galan/Qodi.
- 4.5 Do you produce enough for your family to eat throughout the year? \_\_\_\_\_ 1) Yes 2) No
- 4.6 If no, what are the constraints in order of importance, that prevent you from doing so?  
a) Minimum rainfall b) Lack of early maturing variety c) Lack of plough oxen / lack of money to rent a tractor d) Others specify
- 4.7 Where there any damage to your crop last year? \_\_\_\_\_ 1) Yes 2) No
- 4.8 If yes, specify the type of crops lost and the extent of loss in the following table.

Type of the crop	Area planted (in Qodi)	Causes of loss	Amount of loss (in Galan)
<b>1</b>			
<b>2</b>			
<b>3</b>			
<b>4</b>			
<b>”</b>			

**Part Five: Household Income and Asset Ownership**

5.1 Does your household possess any assets including cash savings? 1. Yes                      2. No

5.2 If yes, how much and what type of assets your household possess?

No.	Types of assets owned at the household level	Unit	Quantity/Amount	Estimated current value in Birr
1.	Cow	No		
2.	Ox	No		
3.	Calves	No		
4.	Heifer/young bull	No		
5.	Goat	No		
6.	Sheep	No		
7.	Donkey	No.		
8.	Chicken (Poultry)	No		
9.	Bee colony	No		
10.	Radio	No		
11.	Living house with corrugated iron cover	No		
12.	Living house with grass cover	No.		
13.	Cash savings	Birr		
14.	Trees (forest)	No. of mature trees		
14.	Other (specify)_____			
<b>Total asset score value (in birr)</b>				
-				

5.3 What is your average monthly income by the following cash income sources (please, consider only last three months)?

Source of Income	Total income received
Salary	
Hired Labor	
Small Business/private	
IGA	
In cash	
In-Kind	
Natural Farming	
In cash	
In-Kind	
State allowances/cash benefits	
Total	

5.4 What is the average income for your household from all sources during the last three months?

	Income category	Mark X
1.	less than 1,000 birr	<input type="checkbox"/>
2	1,001 birr – 3,000 birr	<input type="checkbox"/>
3	3,001 birr – 5,000 birr	<input type="checkbox"/>
4	5,001 birr – 7,000 birr	<input type="checkbox"/>
5	7,001 birr – 9,000 birr	<input type="checkbox"/>
6	9,001 birr – 11,000 birr	<input type="checkbox"/>
9	More than 11,000 birr	<input type="checkbox"/>



5.5 Did you use oxen for your farm operation?

Yes= 1

No=0

5.5.1 If yes, are your oxen enough for your farm operation?

Yes =1

No=0

5.5.2 If you do not have enough oxen, how do you get additional oxen you need?

1. Pulling oxen to form a pair
2. Borrow from friends & relatives
3. Oxen obtained for labour exchange
4. Oxen obtained with sharecropping
5. Manually
6. With other livestock
7. Hire from someone/renting in
8. Others (specify) -----

**Part Six. HH EXPENSES**

6.1 What was your monthly average household expenses (please, consider the three most recent months)?

Type of Expenditure	Average Monthly Expenses for the Last Three Months
Food	
Medical Care	
Clothes	
Education	
Household Items	
Utilities (electricity, water supply etc.)	
House Repair	
Car	
IT/communication	
Agro-machinery	
Debt	
Other	
<b>Total</b>	

**PART SIX. FINANCIAL STATUS OF THE HOUSEHOLD**

Questions	January	February	March	April	May	June	July	August	September	October	November
1. Did you borrow money?											
2. How much did you borrow? *											

\* put amount in table in Birr

3. What is the term of your credit (dept)?

4. How much is your total debt in this moment?

5. In your opinion, what is the financial status of your HH in comparison with last year?

Better / worse /same

**Part Seven: Input Use**

7.1 Do you use any fertilizer? \_\_\_\_\_ 1) Yes 2) No

7.2 If yes, which ones? \_\_\_\_\_ 1) Inorganic DAP and/or Urea 2) Organic (manure)

7.3 What other inputs do you use? \_\_\_\_\_ 1) Improved seed 2) Improved breeds 3) Chemicals 4) Others specify

**Part Eight: Marketing**

8.1 Which market (s) do your household use? \_\_\_\_\_

8.2 What means of transportation do you use to take your produce to the market? \_\_\_\_\_

1) Pack animals 2) Vehicles 3) Human 4) Other, specify

8.3 What is average market distance you traveled to nearest market from your home, measured in hours of walk?

1) ½ 2) 1 3) 1 ½ 4) 2 5) 2 ½ 6) 3 7) 3 ½ 8) 4 9) 4 ½ 10) > 4 ½

8.4 Amount of food grain purchased and sold by the household during last three months.'

S/N	Type of grain	Purchased in		Sold out	
		Galan	Birr	Galan	Birr

**Part Nine: Credit Services and Remittance**

9.1 Have you received any type of credit for the last couple of years? \_\_\_\_\_ 1) Yes 2) No

9.2 If yes, from where do you get the credit? \_\_\_\_\_

- 1) Local money lender 2) friends and relatives 3) NGOs 4) Commercial bank of Ethiopia  
5) Micro finance institute 6) Other, specify \_\_\_\_\_

9.3 . Has the household received remittance in this year?

Yes =1

No=0

9.4. If yes, the amount in birr/ year: \_\_\_\_\_

9.5. Has the household received remittance in this year?

Yes =1

No=0

9.6. If yes, the amount in birr/ year: \_\_\_\_\_

**Part Ten: Coping Mechanisms**

	<b>10.1 In the past 7 days, if there have been times when you did not have enough food or money to buy food, how often has your household had to:</b>	<b>Frequency Score (0-7)</b>	<b>Severity score (1-3)</b>	<b>Weighted Score (F * S)</b>
1	Rely on less preferred and less expensive foods?		1	
2	Borrow food, or rely on help from a friend or relative?		2	
3	Limit portion size at mealtimes?		1	
4	Restrict consumption by adults in order for small children to eat?		3	
5	Reduce number of meals eaten in a day?		1	
	<b>1. Total Household Score:</b>			

**10.2 How do you (your family) used to cope during minor and major crop failure?**

<b>Stage of the Problem</b>	<b>Coping mechanisms During crop failure in (Rank)</b>	<b>Code for the numbers</b>
At initial stage of a food shortage	1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ "	1. Sale of livestock 2. Borrow grains or cash from relatives 3. Reduce number of meals 4. Reduce size of meals 5. Sale firewood and charcoal 6. Participate in food for work 7. Food aid
At severe stage of a food shortage	1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____	8. Seasonal migration (some of the family members) 9. Go for begging 10. Others, specify

10.2 Have you ever resorted to the below mechanisms in cases of severe food crises?

S/N		How often do you do this?		
		Most years	Every year	Only in famine year*
1	Sale of small animals (Sheep & Goat)			
2	Sale draft oxen			
3	Consume wild foods			
4	Eat exotic and taboo foods			
5	Reduce number of meals			
6	Reduce size of meals			
7	Borrow cash or food from neighbors or relatives			
8	Sale farm equipments			
9	Sale household equipment			
10	Distress migration to find work			
11	Sale fire wood and charcoal			
12	Withdraw children from school			
13	Postponing wedding and other ceremonies			
14	Others, specify			

\* Indicate the year

**Part Eleven: Food Aid**

11.1 If you (your household) have ever received food aid during the last 12 months, please indicate the type and amount received.

S/N	Type of food aid item received per household	Amount received	Season			
			Gu*	Dayr*	Haga*	Jilal*
1	Grain (Galan) a) Wheat b) Other grain, specify					
2	Edible oil (Lit.)					
3	Hand tools (specify)					
4	Others, specify					

\* Season's local names

11.2 Since when do you use to receive food aid (if you receive ever food aid)? Since (year).

11.3 How was the amount of food aid received? \_\_\_\_\_ 1) Increased 2) Decreased 3) No change

**Part Twelve: Non-Farm Employment and Wage Earnings**

ID code* of the household member	Kind of work	If it is Permanent =1 Temporary =2	Do it need qualification	Location of the employment	Total Days of work	Total earning (Birr)

\* ID code : 01- Household head 02- Wife 3- Son 4- Daughter 5- Relative  
06- Raised 07- Other, specify

**Part Thirteen: Other Income Sources**

ID code* of the household member	(Kind of work)**	Total earning (Birr)

\* ID code: 01- Head 02- Wife 3- Son 4- Daughter 5- Relative 06- Raised 07- Other, specify

\*\* A = Sale of fire wood B = Traditional equipment (like *Kabad* making) C = Others, specify

*Kabad* – means traditional Somali house constructing material

**Part Fourteen: Social Capital**

Traditional organization	Member	Committee member	Formal organization	Member	Committee member
<i>Hagbad</i> *			PA		
			Cooperatives		
Others, specify			Others, specify		

\* *Hagbad* = Local organization which is a kind of social economic benefit sharing through a lottery system (it is known as *equb* in Amharic).

**Part Sixteen: Food Security status**

**16.1 HOUSEHOLD DIETARY DIVERSITY**

“You tell me the types of foods that you or anyone else in your household ate yesterday during the day and at night...”

[Read the list of foods. Place a “1” in the box if anyone in the household ate the food in question; place a “0” in the box if nobody in the household ate the food.]

	<b>Questions and Filters</b>	<b>Coding Categories (0 or 1)</b>
1	Cereals (Staples)	
2	Roots & Tubers (Staples)	
3	Pulses, Legumes or Nuts	
4	Vegetables	
5	Fruit	
6	Meat, poultry, Fish, sea food	
7	Fish & sea food	
8	Milk and Dairy product	
9	Eggs	
10	Sugar	
11	Oils	
12	Condiments	
	<b>Total HDDS (0 - 12)</b>	

## 16.2 FOOD CONSUMPTION SCORE

	A	B	FCS
How many days, in the last 7 days, have you eaten the following food Items?	Number of times 0-7	Weighting	Food Consumption Score Calculation (A*B=FCS)
Cereals and tubers		2	
Pulses		3	
Vegetables		1	
Fruits		1	
Meat and Fish		4	
Milk		4	
Sugar		0.5	
Oil		0.5	
Condiments		0	

## 16.3 Household consumption expenditure

7.1.1 What food items were used for consumption during the last seven days in your household?	Food type	Source						
		Home produced		Purchased			Gift/loan/wage in kind	
		Unit	Quantity	Quantity	Price/unit	Total expenditure		Source
7.1.2 Did your household consume any cereals such as sorghum, maize, wheat, barley, millet, etc?	Sorghum							
	Maize							
	Wheat							
	Barley							
	Millet							
	Rice							
7.1.3 Did your household consume any pulses and oil	Lentils							
	Beans							
	Chick pea							



crops?								
7.1.4 Did your household consume any animal product?	Cow Milk							
	Camel milk							
	Cattle meat							
	Camel meat							
	Goat meat							
	Sheep meat							
	Egg							
	Butter							
7.1.5 Did your household consume any chat, cigarettes, tea or soft drinks?	Tea							
	Chat							
	Cigarettes							
	Soft drinks							
7.1.6 Did your household consume any sugar, edible oil, salt or any other spices?	Sugar							
	Edible oil							
	Salt							
	Floor							
7.1.7 Did your household consume any fruits, vegetables or root crops?	Potato							
	S. potato							
	Spinach							
	Onion							
	Carrot							
	Tomato							