



**ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATES STUDIES
COLLAGE OF DEVELOPMENT STUDIES
CENTER FOR RURAL DEVELOPMENT**

**DETERMINANTS OF HOUSEHOLD'S FOOD SECURITY AMONG
COOPERATIVE MEMBERS: THE CASE OF AWBERE DISTRICT
OF SOMALI NATIONAL REGIONAL STATE**

**A THESIS SUBMITTED TO
CENTER FOR RURAL DEVELOPMENT**

**BY
MOHAMED ABDI MIRE**

**October, 2019
Addis Ababa**

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**THESIS SUBMITTED TO THE COLLEGE OF DEVELOPMENT
STUDIES CENTER FOR RURAL DEVELOPMENT AT ADDIS ABABA
UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENT
FOR THE DEGREE OF MASTERS OF ART IN RURAL LIVELIHOOD
AND DEVELOPMENT**

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**October, 2019
Addis Ababa, Ethiopia**

DECLARATION

I, Mohamed Abdi Mire, hereby declare that this thesis work entitled **Determinants Of Household's Food Security Among Cooperative Members: The Case Of Owbere District Of Somali National Regional State**, Submitted by me in partial fulfillment of the requirements for the award of the degree of Master of Artin (Rural Livelihood and Development) to the College of Development studies, Addis Ababa University done by Mohamed Abdi Mire is original work carried out by myself. The matter embodied in this thesis work has not been submitted earlier for award of any degree or diploma to the best of my knowledge and belief. Where other sources of information have been used, they have been duly acknowledged.

Name of the student: Mohamed Abdi Mire

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CERTIFICATION

This is to certify that this Thesis work entitled **Determinants of Food security among Cooperative members in Owbere Woreda, Somali Regional State**. Submitted in partial fulfillment of the requirement for the award of the degree of Master of Art in Rural Livelihood and Development to the College of Development Studies, Addis-Ababa University, done by Mohamed Abdi Mire, I.D No 7406/10 is an original work carried out by him. The matter embodied in this Thesis work has not been submitted earlier for award of any degree or diploma to the best of my knowledge and belief. Where other sources of information have been used, they have been duly acknowledged.

Advisor: Negusse Semie (PhD)

Signature: _____

Date: _____

DEDICATION

I dedicated this thesis manuscript to my beloved and late Mother **Safia Omer Aden** may Allah give her his mercy and My father **Abdi Mire** for giving me unreserved support with affection and love to be successful in my life.

STATEMENT OF AUTHOR

By my signature below, I declare and confirm that this thesis is my own work. I have done it according to all ethical and technical principles of scholarship in the preparation, data collection, data analysis and compilation of this thesis. Any scholarly matter that is included in the thesis has been given recognition through citation.

This thesis is submitted in partial fulfillment of the requirements for MA degree at the Addis- Ababa University. The thesis is deposited in the Addis-Ababa University Library and is made available to borrowers under the rules of the library. I solemnly state that this thesis has not been submitted to any other institution anywhere for the award of any academic degree, diploma or certificate from this thesis may be made without special permission provided that accurate and complete acknowledgement of the source is made. Requests for permission for extended quotations from or reproduction of this thesis in whole or in part may be granted by the Head of the College or Department when in his or her judgment the proposed use of the material is in the interest of scholarship. In all other instance, however, permission must be obtained from the author of the thesis.

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List of Acronyms

AAO	Awbera administrative office
AAU	Addis Ababa University
FGD	Focus Group Discussion
FAO	Food and Agricultural Organization
FSP	Food Security Program
GTP	Growth and Transformation plan
ICA	International Cooperative Alliance
IFPRI	International Food Policy Research institute
KII	Key Informative Interview
MA	Master of Art
MoFED	Ministry of finance and Economic Development
NGOs	Non Governmental Organization
PFE	Pastoral Forum of Ethiopia
SLCRDB	Somali Livestock Crop Production
UN	United Nations
UNDP	United Development Program
USAID	United States Agency for International Development
WFP	World Food Program
SPSS	Statistical Package for Social Science
SRS	Somali Regional State
FAD	Food availability decline
FED	Food entitlement decline

Abstract

Many governments, donors, and international aid agencies or developmental organizations dispersed millions of dollars for reducing the impact of food insecurity and hunger in developing countries including Ethiopia. One of the dominant tools that help reduce poverty at households' level is promoting the role of cooperative include food security and hunger. The objective of this study is to examine the determinants of household food security among the cooperatives members based on the data collected from 120 respondents selected randomly in Owbera Woreda, Somali Regional State. The study used both primary and secondary data sources. Primary data was collected through structured questionnaire interview schedule and focus group discussion while Secondary data was collected from reviewing of various documents related to the role of cooperative on food security. A descriptive statistics and econometric model (Binary logit model) were used for the analysis of the data gathered. The result indicates that the status of food security among cooperative members significantly influenced by factors such as age of the household head, education, total livestock owned by the household and sex of the household head. The findings of the study also shows that, households employ arrange of coping strategies during food insecurity including sale of firewood and charcoal and sale of livestock,. Generally the findings of the study suggests that there is a need to improve their educational level by bringing education intervention programs and to improve livestock production and productivity through provision of veterinary drug services, sustainable forage development programs , improving the capacity of community animal health workers . Moreover the study pointed out major problems effecting food security among cooperative members such as low level of cooperative's performance , climatic shocks, poor rain fall, structural problems , drought and climate change Therefore , cooperative management is recommended to give appropriate attention to make members of cooperative skilled members through training, investing in human capital of the cooperative members and give enough credit facility to improve the performance of cooperative members and to improve their educational level by bringing education intervention programs and to improve livestock production and productivity through provision of veterinary drug services, sustainable forage development programs , improving the capacity of community animal health workers

Keywords: food security, Cooperative members, Owbera Woreda

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Many governments, donors, and international aid agencies or developmental organizations dispersed millions of dollars on addressing the problems of food insecurity and hunger in developing countries including Ethiopia. Despite the many programs and projects on food security, there are still 795 million of people those are food insecure people around the world with many of them living in developing countries particularly in Africa (FAO, IFAD, WFP 2015)

The number of people in the world affected by chronic food insecurity began to rise in 2014 going from 775 million people to 777 million in 2015 and is now estimated to have increased further to 815 million in 2016 (FAO *et al*,2017). Sub-Saharan countries vary considerably in their food insecurity status. However, the region has the highest share of food insecure people and about 301million people which is equivalent to 31.7% of the total population are food insecure (USDA, 2017).

Food security in the Horn of Africa is threatened by one of the strongest El Niño weather phenomena ever seen in the past 20 years. Over 15 million people in the region are food insecure, including about two million internally displaced persons (IDPs) and 1.7 million refugees. Among them, about 10.2 million and 3.2 million people are in need of emergency food assistance in Ethiopia and Somalia, respectively. Drier-than-average conditions are also affecting food security in Sudan, Eritrea, Somalia and eastern South Sudan. March to September rains were the lowest (in 50 years in central and eastern Ethiopia (EC-JRC report, October 2015).

In Ethiopia, prolonged drought conditions are severely affecting the food insecurity in most southern and southeastern pastoral and agro-pastoral areas of southern nations, Nationalities and peoples region, southern Oromia and southeastern Somali regions, where cumulative rainfall was up to 60 percent below average. However, in these areas pasture and water availability have declined to extremely low levels, severely affecting crop production and livestock conditions leading to large scale animal death (FAO, 2018). Moreover, Ethiopia is the worst food insecure country among the sub-Saharan countries as nearly 33 million people are suffering from chronic

undernourishment and food insecurity. This indicate that Ethiopia has one of the highest level of food insecurity in the world, in which more than 35% of its total population is chronically undernourished (FAO 2014).

Karan rainy seasons have failed during the last three consecutive years in Fafan zone, creating decline on agricultural harvest and availability of pasture and this exacerbated the food insecurity situation of the zone and Owbere district was the worst areas which experienced food insecurity (DPPB et al, 2016). Though there are differences in socio-economic and environmental settings within and among the regions of the country, the problem of food security pertinent to each location varies and requires particular attention.

However, conducting such type of study is imperative to address the problem of food security in this area and can identify the status of food insecure households along with certain factors which influence household food insecurity.

From this fact, it is possible to draw the food insecurity to be one of the main challenges that many people are facing. Addressing such magnitude problems requires collective efforts from various parts such policy makers, researcher, practitioners and scholars , when it comes to academicians , for long , most scholarly research workers in the field food security has given attention on the development and refining of methods of analysis that improves prediction accuracy of likelihood of experiencing future loss of adequate food

Thus cooperative is among one of the many alleviation measures to exit poverty and improve the food security status of cooperative farmers. cooperatives have been increasingly considered as a significant instrument for raising the income level of cooperative members , particularly by making their resources more productive uses and developing of entrepreneurial skills and activities. Cooperative is one of the pillars for development Sectors particularly agricultural and food security sectors that they can play a significant role in reducing poverty, improving food security and generating employment opportunities (Bezabih, 2009).

Cooperative in rural areas can contribute to reduce the impact of food insecurity of cooperative members through improving members ‘access to productive resources. FAO (2012) stated that cooperative plays an important role in supporting small agricultural producers and marginalized

groups such as young people and women. Through enabling them to get access credit service, agricultural input supply and marketing service, the cooperatives improves their productivity. Cooperative reduces food insecurity by empowering their members economically, socially and create stable rural employment through business models that are resilient to economic and environmental shocks (ICA & ILO, 2014).

1.2 Statement of the Problem

Agriculture is the key sector in many developing countries and contribution goes to the extent of stimulating other sector by providing input supply .it provides employment to 80%of the population and contributing 35% to the country's GDP . The agriculture has experienced steady growth in Ethiopia since 2004, with overall trend seen as encouraging both in terms of overall agricultural production and productivity. However, the sector continuous to suffer from majority of structural problems. Despite continued effort to strength the sector, agriculture remains poor and vulnerable to frequent climatic shocks (UNDP, 2016)

Ethiopian agriculture is incredibly sensitive to shift in weather when rain fall is erratic or insufficient for even a few successive rainy seasons. The entire country is prone to falling famine; the worsening food security situation is attributed primarily to poor rain fall. A series of successive drought had already weakened Ethiopia’s food situation with poor and erratic rain fall over the last two years. Conditions such as the high food and fuel price that have persisted in the country contribute to Ethiopia’s failing food security (Birara, 2015).

Horn of Africa is considered as the most food-insecure region and more than 15.2 million people are now severely food insecure with some 3.3 million in Somalia, 8.5 million in Ethiopia and 3.4 million in Kenya (IRFC, 2018). Moreover, 7.9 Million people are severely food insecure in Ethiopia and are in need of food assistance (OCHA, 2018).

The poor performance of the last two rainy seasons had severely affected availability of pasture, browse and water in all districts of Fafan zone. However, Food insecurity in agro-pastoral areas is mainly caused by low and erratic rainfall. 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 DPPB (2016).

Karen rains performed below the normal exhibiting low onset, erratic distribution and early cessation leading to moisture deficit and poor performance of crop production in Owbere district which further deteriorated the food insecurity status of the area DPPB (2016). Besides, the agricultural production in the district is low and is not sufficient until the next harvest. On the other hand, livestock holding has declined in the area instigating more households to abject condition. Furthermore, poor infrastructure and market shock further exacerbates the food insecurity situation in the area.

In this regard government and developmental organization strongly believe that Cooperatives can expand poor people's access to financial ability and services and increase investment in generating income activities. They can also reduce vulnerability by allowing them to boost their saving pattern and increase their sufficiency of food security, enhance livelihood capabilities and improve consumption (FAO, 2010). But cooperatives are not still well studied particularly with regard improving the food security situation and poverty reduction and their role is not designed.

Another empirical study undertaken by Abiyot (2010), tried to show how cooperatives are working towards empowering rural cooperatives. The study has determined members related factors affecting the performance of cooperatives. This study implies that cooperatives play a key role in employment creation, capacity building. Yet the issue of how cooperatives address the stresses and shocks which rural cooperatives face and how they perceive the role of cooperatives is not addressed in the study.

Berhane (2013), in his empirical study argued that women in Ethiopia have benefited a lot from participating in cooperatives which enriched them with what they want in their lives. His finding also exposed that cooperatives are playing key role in augmenting income for women. However, the perception of members towards the role of cooperatives and how these in turn affect their participation is also not addressed in the study.

The knowledge gap which is found in empirical evidence including study made by Bezabih (2009), Berhane (2013) and Abiyot (2010) tried to investigate the role of cooperative on food security in analyzing the role of cooperative in areas of food security and their perception of cooperative members towards the contribution of cooperatives on food security. The literatures

inclined towards studying the problems of members face in joining cooperatives, but those members still face other problems while participating in cooperatives which needs to be studied further which is not well studied so far.

Despite, the limited studies conducted in the Zone, the spotlight was only for those of accessible areas. However, there was no such study conducted to address the food insecurity in Owberé district and the food insecurity condition is getting worse. As a result there is severe shortage of information to give proper advice to prepare appropriate policy and development strategies in order to address the problem of food insecurity in the district. Therefore, this study is planned to narrow the gap.

1.3. Research Questions

1. What does study household's food security status among cooperative members look like?
2. What are the determinants that influence the food insecurity situation in the study area?
3. What are the food insecurity coping strategies of households among cooperative members in the area?

1.4. Objectives of the Study

1.4.1 General Objective of the Study

The objectives of the study was to examine the determinants of household food security among the cooperatives members

More specifically, it attempts to:

- investigate food security status of the households among cooperative members
- identify the determinants of food security of the households among cooperative members
- analyze households among cooperative members coping strategies against food insecurity in the study area.

1.4 Significance of the Study

Studying about determinants of the households food security among cooperative members in Owbera district is pivotal as it will provide decisive information to concerned bodies to tackle the problem of food insecurity so as to enhance the measures taken to lessen the number food insecure households in the area.

Challenges of food insecurity in developing countries are vast and complex. Food insecurity affects people of different characteristics and backgrounds in different ways, because they play different roles, have different needs and face different constraints and opportunities as many countries have developed different programs and approaches to improve food security. The reason that focused only cooperative members was since cooperatives are one of the pillars for agricultural development and food security and play a crucial role in reducing poverty, improving food security and generating employment opportunities. As a result of this, many developing countries have promoted cooperatives as a development strategy that empowers communities to exit poverty. Proper understanding of the role of cooperatives in food security and rural development is a key to the formulation of policies, designing appropriate strategies and practical steps that the government can take in order to reduce poverty and promote sustainable growth at macro and micro levels.

Encouraging the role of cooperatives on food security is a way to address poverty and food insecurity challenges. Given such promises and understanding the role of cooperative on the food insecurity in the particular context is the paramount theoretical and practical relevance

This study is vital because it provides with information that will enable effective measures to be undertaken so as to improve food security status. Besides, the audience of the study, accordingly, includes academicians, policy makers and nongovernmental organizations might help acquire better knowledge to carry out development interventions at the right time and place to decrease vulnerability to food insecurity. This study can helpfully identify the different coping strategies in order to make interventions appropriate to the study area. Moreover, from theoretical point view the study is value adding as it contributes to the existing literatures of cooperatives on food security in multiple. Furthermore, no work of this type of study has been done in the study areas. Hence beside it is narrowing potential of wide gap of knowledge about livelihood strategies. It is

also expected to equip the different organizations and policy makers with more pertinent information of livelihood strategies adopted by rural households among cooperative members in the area. As researchers can promote the opportunities and mitigate challenges of food insecurity in promoting the role of cooperatives on food security and using cooperative as transforming structure while development organizations may bring intervention to alleviate poverty in general, and food security in particular that would benefit the farming population and non-farming population

1.5 Scope/ Delimitation of the Study

This study took place in Owbera District, Somali Regional State of Ethiopia as investigated the determinants of food security among cooperative members along with the food security coping strategies devised by households against the food insecurity in Owbera district, Somali Regional State as a case study. The study was undertaken between February and April 2019. In addition to this the study depends on the information which was provided by the sample respondents that were taken from the cooperative members to make precise and understandable manner. The study was undertaken in one of the 90 districts of Somali Regional State and Owbera district is one of the 26 districts of Fafan Administrative zone. Due to limited resources (human, financial and material) the study was restricted to 120 respondents of cooperative members. The results from this study would have practical validity mainly to the study area and can serve as a basic ground for any further studies to be conducted in this discipline.

1.6 Thesis Organization

This thesis research is organized into five chapters. The current one is introductory chapter which deals with the overall ground of the study. Chapter Two presents review of literature which focuses on the basic concepts of the current study and provides the general analytical framework for the study. The overall methodology including research philosophy of the study has been discussed in Chapter Three. Chapter Four deals with the results and discussion of the research outcomes and finally Chapter Five presents summary, conclusions and recommendations of the study

CHAPTER TWO: LITERATURE REVIEW

2.1. Concept and Definitions of Food Security

Early definitions of food security emphasized on the aggregate food supplies at national and global levels and analysts advocated agricultural production self-sufficiency as a strategy for nations, individuals or even households 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).

According to the World Food Summit plan of action of 1996, food security is generally explained as “all people, at all times, have physical and economic access to sufficient, safe and nutritious food for a healthy and active life”. So the Food insecurity definition 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 emerged an issue of importance in the mid of 1970s at the world food conference of 1970, which initiated in response to the global food crisis (clay, 2002). Since that conference than, it has been it remained to be among the center of the concern and attention of the global, national and local communities and institutions as achieving food security remains to a challenge at all levels

The most widely accepted definition of food security is from the food and agricultural organization of the united nations(FAO), " a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preference for an active and healthy life." (FAO, et al, 2014).

The emergence of the concept of food security very much relates to the political (policy) concerns towards combating an increasing malnutrition and food insecurity at global level. The early years of the 1970s¹⁹ was when the proportion of the malnourished world population was

higher than ever before. This was why the UN/FAO took the initiative to call upon the world nations to take part the combating an increasing food insecurity problems

The First World Food Conference in 1974, which adopted the Universal Declaration on the Eradication of Hunger and Malnutrition. The declaration proclaims that: ‘Every man, women and child has the inalienable right to be free from hunger and malnutrition in order to develop fully and maintain their physical and mental faculties’ (UN 1975). Hence, the main emphasis was placed on how to enable the world able to feed every individual, at global level, and what should every nation do to become food self-sufficient. In other words, the main issue was how enough food can be made available to eradicate hunger. These questions have indeed attracted academic efforts, particularly a concern to identify and understand predicaments that hinder

Nations to produce sufficient food and how to enable each person to access adequate food.. Thus, the issue of food security has therefore become central to academic research. Food insecurity, on the other hand, is condition that can be existed when people lack secure access to sufficient amounts of safe and nutritious food required 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 considered as food insecure when it has no access to basic livelihood resources, when it is highly vulnerable to external shocks, and when the government system excludes it from development and decision making . These needs include adequate food, health, and shelter, minimal levels of income, basic education and (Devereux et al, 2004).

People are food secured 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 absents. Further, different levels of household asset building must be considered if the underlying causes are to be effectively understood (Drimie et al., 2006).

2.2 Historical Perspective on Food Security

The term food security was established in 1960s in the international development literature (Osman, 2002). Maxwell (1996) identified three overlapping paradigm shifts in thinking about the concept of food security. These shifts are (1) from global and national level to household and individual level (2) from the food perspective to a livelihood perspective and (3) from objective indicators to subjective perspective

2.2.1 from Global and National level to Household and Individual Level

The development of domestic and global food security increased during the world oil and food crisis in 1972 to 1974. During this period an international delegation gathered in Rome to discuss the issue of food security. In 1975 the committee of global food security was developed at the United Nations food security conference. The purpose of the committee was to manage development in food security (FAO, 2003:5). Efforts to understand and tackle food insecurity were organized under the auspices of the food and agricultural organization of the United Nations. During this period the international conference defined food security as the availability at all times of adequate supplies of basic food stuffs to sustain a steady expansion of food security to offset fluctuations in production and prices (FAO, 2003:5). Abdulla (2007:18) notes that in 1970s the demand for food was not an issue but rather the supply and distribution was the main concern for food insecurity. The primary focus in this regard, was on national food security by ensuring that there was adequate production and distribution of food throughout the world.

During 1980s FAO (1983) acknowledged that there was a need to balance the supply and the demand side of food. The food crisis in Africa during the early 1980s brought to the fore that the availability of sufficient food at a national level did not imply food security at household level Frankenberg, (2001). In the early 1980s Sen (1981) developed a paradigm shift that many emphasize the importance of access and entitlement to food. Sen (1981) observed that many people throughout the world were food insecure because of limited access rather than the availability at national level. Further developments in the understanding of food security resulted in the expansion of the concept of food security by FAO (1983), by incorporating the food secure access for vulnerable people to available supplies. This implies that there had to be a balance between the demand and the supply side of the food insecurity equation. The focus was that there

should be assurance for all people at all times by ensuring both physical and economic access to the basic food that they needed (FAO, 1983).

2.2.2 From Food first Perspective to a Livelihood Perspective

The second shift mainly occurred after 1985 due to the lessons from the African famine of 1984/85. This famine mainly occurred in countries such as Ethiopia, Kenya, Angola, Lesotho, Somalia and Zimbabwe (McCarthy, 1986). Food security was viewed as a primary need and as such categorized as a psychological need in Maslow's hierarchy of needs (Maxwell, 2000:18). A study conducted by De Waal (1991:8) in Darfur, Sudan, about famine during the period of 1984 to 1985, revealed that people were able to carry the heavy burden of preserving seeds for planting, cultivate their own fields or rather avoid having to sell an animal. The World Bank (1986) report on 'poverty and hunger' revealed that attention should be given to causes of temporary food insecurity at a household level. During this period food insecurity was worsening worldwide and there was a need to implement various strategies and effective policies to achieve food security (World Bank, 1986).

Almost half of low-income countries in Africa and Asia were faced with the challenge of hunger because of increased world food prices (Van Zyl & Kristen, 1992:2). Research by Maxwell and Smith (1992) during the 1990s revealed that the food security status of households was the main indicator that showed whether a household was poor or not. The quality and quantity of food purchased by households determined the decisions that were taken by poor households. Oshaug (1985:5) emphasized that 'a society which can be said to enjoy food security is not only the one which has reached a food norm but rather the one which has also developed the internal structures that will enable it to sustain the norm in the face of crisis threatening to lower the achieved level of consumption'. Oshaug (1985) further identified three types of households which vary in terms of attaining their livelihood sufficiency: (i) Enduring households – which have the ability to maintain household food security on consistence basis, (ii) Resilient households – which are households that suffer from shocks but are able to recover rapidly and (iii) Fragile households – which are households that become increasingly food insecure and vulnerable to any type of shocks.

2.2.3 From objective Indicators to Subjective Perceptions

The purpose behind the shift from objective indicators to subjective perception is that during the 1960s to mid-80s, many food security discussions in terms of the conventional approaches to food security relied on objective measurements, such as targeting the level of consumption (Simwalla & Valdes, 1890). Reardon and Malton (1989) noted that the targets of consumption had to be less than 80% of WHO (World Health Organization) average required daily calorie intake, or more generally, food supply had to be nutritious and adequate (Staatz, 1990). However, explaining food security using these terms had two main restrictions: firstly, nutritional adequacy was affected by socio-economic factors such as age, health, work and the environment (Payne & Lipton, 1994) Secondly, the qualitative factors relating to food quality, cultural acceptability and human dignity were excluded in quantitative technique measurements (Bryceson, 1990; Oshaug, 1985).

These two major restrictions implied that the nutritional adequacy was needed, but it was not an adequate condition for food security. Maxwell (1988) argued that ‘quantity’ to food entitlement was not the only important factor that mattered, ‘quality’ to food entitlement was also vital. Maxwell (1988) further purports that food security is a subjective concept and used the following working definition: “a country and people are food secure when their food system operates in such a way as to remove the anxiety that there will not be enough to eat.”

2.3 Cooperatives on Food Security

The country has undertaken various measures to improve food security situation of the rural community. One of the strategies that the country has undertaken to reduce food insecurity and enhance rural development in the rural area is the establishment and strengthening agricultural cooperatives. Cooperatives are pillars for agricultural development and food security and play a crucial role in reducing poverty, improving food security and generating employment opportunities (Bezabih, 2009).

Cooperatives play can a great big role by allowing people to pool their human and financial resources and raise more capital. Individuals who failed to start a business on their own are able to do after being a member of cooperatives. Benefits to members those are tangible including

improved services, more product availability, and better prices which could help reducing food insecurity (Thomas, 2004).

Agriculture, petty trading, fishing and livestock – is the main source of employment and income in rural areas, where most of the world's poor and hungry people live. Cooperatives particularly agricultural co-operatives play an important role in supporting small agricultural producers and marginalized groups such as young people and women (Belloc et al., 2002). They increase their purchasing power and empower their members economically and socially and create sustainable rural employment through business models that are resilient to economic and environmental shocks.

Cooperatives promote and support entrepreneurial development, productive employment creation, raising incomes to reduce food insecurity, helping to reduce poverty while enhancing social inclusion, social protection and community-building (Smith and Ross, 2006). Thus, they directly benefit their members and have a transformational impact on the economy.

Many developing countries have taken and improved cooperatives as a development strategy that empowers communities to exit from poverty (Develtere et al., 2008; Eman, 2009). However, despite the potential gains that cooperatives have for poor rural communities (e.g., increasing bargaining power of smallholders in imperfect markets; facilitating access to new markets; allowing communities to share risk collectively), it is not clear if they can boost people out of poverty (Bernard et al., 2010). Studies have shown that poor households are less likely to participate in cooperatives and that, in most cases, cooperatives are located in areas where access to markets are better than average. In fact, this suggests that cooperatives tend to favor better-off households (i.e., more educated and with more land) (Bernard et al., 2008; Francesconi, 2009; Kodama, 2007).

Following Carter and Barrett (2006), a poverty reduction policy should be oriented to households who otherwise would not be able to climb out of poverty on their own. They propose an asset-based approach which differentiates between transitional and structural poverty by identifying an asset threshold at which households can escape poverty. Therefore, if cooperatives are to be successful at poverty reduction, it is necessary to understand first whether poor smallholders

participate in cooperatives and whether this participation provides a means for structurally poor households to exit poverty

2.4 Theoretical Review on Food Security

To understand clear the theory of food security is an essential element to better understand sustainability of household food security status and its determinants. The major theories which need to be considered in the study includes: general explanations of food insecurity, models of food insecurity and sustainable livelihood approach. The general explanation theory mainly emphasizes on the impacts of drought, flood, land degradation, inaccessibility to productive resources and population pressure on the performance of household food security status. It results in disruption of agricultural production and attributes the household to decline in food availability (Devereux, 1993; Getachew, 1995; Degefa, 2002). This implies that one or a combination of these factors can decrease or disrupt food production.

Sustainable livelihood approach enables to identify a multiple of natural, cultural, social, economic, and political factors that enhance or constrain peoples living situation in general and food security in particular; and it offers more attention and priority on human environment. It is used to understand the sustainability of the quality of life and food security of the poor and recognizes the complexity, diversity and continuous change of people's activities and their strategies over time. In addition, the approach helps to holistically addresses how context interact with various forms of assets in affecting the livelihoods and strategies that households depend on (Degefa, 2008).

In order for household to be food secure in rural areas is whether the household can produce sufficient food from own production or sell some of their livestock and purchase food grain with highly quality in the market place. This implies availability of enough food and the capacity of the household to acquire determines household food security. Therefore, household food security means the complementarities of food availability and entitlement. As a result, Food Availability Decline (FAD) model and Food Entitlement Decline (FED) model are considered to be important in this study.

2.4.1 Food Availability Decline

This is considered as the oldest and still functional theory whose origin is traced back to Mas Malthus work. The central focus of this theory is on the equilibrium between population and food and it says that on order to maintain equilibrium the rate of food availability should not be lower than the rate of growth of population (Burchi and De muri 2012). However, Degefa disaggregates the FAD theory in to two set of theories. Climatic theory that links food shortage with natural calamities such as floods and drought and demographic theory that focuses on the nexus between food availability and population growth

Climatic theory links food insecurity with natural causes like drought and flood. According to Degefa (2005, climatic variety can lead to famine , especially in rain fed agricultural areas by causing crop failure, as well as by adversely affecting other assets of livelihood among subsistence farmers .

Degefa states that the existence of two divergent and competing theories regarding the relationship between population and growth and food availability. the first one focuses on the comparing the relative pace at which population and food means of subsistence increases and argues while population increases geometrically , production and means of subsistence increase arithmetically with clear outcome of such imbalance is inducing hunger and other forms of human poverty and misery . Thus the thinking of malthuis is bit criticized by the writers like Deveeus (1993) in Degefa in (2005) for its failure to foresee the mediation effect of technological improvement such as production, distribution and communication technology

Food security in the context of FAD theory in general is a matter of aggregate or per capita food availability (Alamgir, 1980, in Degefa 2001. Burchiand De muro, 2012) and the focus is merely on food production and supply side variables (Deveruex ,1993 and Sen ,1980 in Tangel , 2012). According to Burchi and De muro, (2012) , achieving availability depends on mainly food production and stocks and also food trade in the context of open economy . in terms of level of analysis , the focus of food availability theory is at macro level including the whole globe , a nation or particular sector such as agricultural sector , when it comes measurement , food Balance sheet is commonly utilized foor food availability assessment (FAO, 2001in Burchi and De muro , 2012).

2.4.2 Entitlement Approach

According to Degefa (2001). The origin of this approach which can be considered as food entitlement decline (FED). In Maxwell and Smith, 1992 is traced back to the work of Sen (1981) emerged as alternative to FAD and argues that food availability in the market or economy does not necessarily mean entitle a person to consume and famine can occur without decline in aggregate food availability (Degefa, 2005), Sen (1981:45). Describes this approach as

“ The entitlement approach concentrates on each person's entitlements to commodity bundles including food, and views starvation as resulting from a failure to be entitled to a bundle with enough food.”, in the context of this theory, food insecurity can be conceptualized as result of entitlement failure. in a way of affirming this view According to Sen (1981:7) says that starvation is a function of entitlement not a food availability as such and an entitlement failure can be considered in ability to grow subsistence food, an ability to exchange labor or property on the market. According to Burchi and De muro (2012). Groups those mostly face direct entitlement failures are food producers and those who exposed to trade or indirect entitlement failure are producers of commodities other food: when their terms of exchange fall or when food availability total decline the entitlement approach has significantly affected the notion of food security and contributed for food security analysis by adding access to dimension , with this comes belief that having enough food per capita at national level can only be necessary condition but not sufficient condition for food security. hence making food security assessment need widening the informational basis by incorporating variables related to peoples endowments such as productive and non-productive assets , intangible resource such education and social capital as well as information on the wage and other prices of food and non-food items (Burchi and De muro 2012). With this framework food security assessment can be conducted at micro level and both individuals and household can be unit of analysis. This approach is appreciated for its capacity to provide information on the future vulnerability to food insecurity as it considers full set of assets.

2.4.3 Disaster Based Theory of Food Security

Disaster based theory of food security was developed by Blaikie et al (1994) cites Degefa (2005) and Yasir (2009). It was mainly meant for analysis of vulnerability and theory considers food insecurity as disaster and state that natural hazards cannot only cause food shortage unless is combined with other human factors (Degefa 2005). It argues that for disaster to happen there must be vulnerable people whose livelihood cannot withstand certain kind of hazards (Degefa 2005). According to yasir 2009, disaster theory centered on the organized complexity between natural hazards and human actions

There exists two variants of disaster theories : pressure and release (PAR) model and Access model as cited in Degefa (2005), Blaike et al. (1994:22) explained the notion of PAR as the basis for PAR idea is that disaster is interaction between two opposing forces: those process generating vulnerability on one side, and physical exposure to a hazards on the other. The release idea incorporated to conceptualize the reduction of disaster. According to yasir (2009) PAR model focuses on the identification of various forces and their interaction at macro level and the need to trace out the progression of vulnerability from the root causes to resultant unsafe condition and their interaction with natural hazards. In the context of PAR, disaster and food insecurity is the outcome of interaction of hazards and vulnerability, which intern produced by three factors: root causes of disaster, dynamic pressure and unsafe condition' in a way that dynamic pressures channeling root causes in to unsafe condition (Degefa 2005). According Degefa (2005), the main causes to raise vulnerability are economic, demographic and political processes having hands on allocation and distribution of resource between different groups of people. They can affect the level of rural household's vulnerability to food shortage either by providing or denying access to resource such as land for instance. the focus on access model is on the explaining how the unsafe condition arise in relation to economic and political processes that allocate assets, income and other resources in the society (Degefa 2005, Twigg ,2005). the main idea of this is that individual's and rural household's relative access to resource is the function of class structure in society and hence once position within society or community can determine its access to resource which in turn determine its level of vulnerability to hazard impact

Food Availability Decline model is directed towards understanding of the main hindrances for an increased agricultural production which, in turn, would lead to decline in food availability. The central argument of the model is that, anything which disturbs food production, such as drought and flood by reducing the availability of food for extended period of time causes famine (Getachew, 1995; Vadala, 2008). Food Entitlement Decline model was developed by Sen (1981). As Sen argues the mere presence of food in the economy or in the market does not entitle a person to consume and famine could persist without aggregate availability decline. Sen profoundly believes that it is access to food that plays a crucial role in securing command over food.

Food security has three major components: availability, access and utilization (Haddad, 1997; Kifle and Yoseph, 1999). They are presented as follows:

Food availability: Food availability refers to 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).

Food access: refers to people's ability to get economic access to this food. Economic access is typically constrained by income; if the households are unable to generate income to produce enough food then they lack attainment of the food

Utilization: Utilization of food through adequate diet, clean water, sanitation and health care to reach a state of nutritional well-being where all physiological needs are met. This brings out the importance of non-food inputs in food security and the ability to promote health and nutrition will be impaired. (Haddad, 1997).

Chronic and transitory refer to temporal dimensions of food insecurity, where the former is long-term or persistent, while the latter seasonal or temporary. Some of common definitions of chronic food insecurity include: the inability of a household or an individual to meet the minimum daily food requirements for a long period of time (IFAD, 1997); persistent inability on the part of the household to provide itself adequately with food (FAO, 2005) And when households are unable to the standard food requirement in normal times because they lack

sufficient income, land or productive assets, high dependency ratios, chronic sickness or social barriers (WFP,2004).

Transitory food insecurity, on the other hand, is usually defined as: a sudden (and often precipitous) drop in the ability to purchase or grow enough food to meet physiological requirements for good health and activity and is mainly associated with structural deficiencies or vulnerability (Barrett *et al.*, 2001), the sudden reduction of a household's access to food to below the nutritionally adequate level' (IFAD, 1997); and When there is a temporary inability to meet food needs, due to shocks or stresses like drought , floods or even civil war (DFID, 2002).

Transitory food insecurity can be further divided into cyclical and temporary food insecurity (CIDA, 1989, cited in Maxwell and Frankenberger, 1992).

Temporary food insecurity occurs for a limited time because of unforeseen and unpredictable circumstances; cyclical or seasonal food insecurity when there is a regular pattern in the periodicity of inadequate access to food. This may be due to logistical difficulties or prohibitive costs in storing food or borrowing.

2.5 Households Coping Mechanisms against Food Insecurity

To reduce the food insecurity in the country, government and developmental organizations have been formulating and implementing different programs, coping mechanisms as well as policies to cope with the food insecurity situation of the households in the country

According to Elias (2000) cited in (Mjanano , 2008), coping strategies comprises the methods used by households to survive when confronts with unanticipated livelihood failure. In Fisha and Degefa (2017), they have been described as responses by households to improve the declining of their food security. As rational decision takers, households make selection of such responses based on conscious assessment of existing alternatives before them.

Tran (2013) argues that adverse events have possibility of causing a decline in assets and incomes in short run and may have negative on the household livelihood in the long run. However, the extent effect. According to Tran (2013), depends on the nature of shocks, the assets dynamics, as well as coping strategies employed by a household in response to the shock

Cart et al (2006), maintain that when a particular shock occurs, it affects the household's assets or resource and in effect their resilience to the future shocks both directly and indirectly. First the shocks its self-causes damage or deterioration of assets quality directly. The indirect effect is through household's response to such shocks

Frankeberger et al. (2012), argues that some household level response can have negative impact future ability. In a way of relating coping strategies to the food security, Pasteur (2011) in Frankerberger (2013) classifies household coping strategies in to two categories: positive and negative coping strategies. positive coping strategies are those that the household use based on available skills and resources that will not diminish their future ability to cope even if they are used to the level of exhausting. They include using stored assets such as saving, extra food and excess livestock. Pasteur (2011) in Frankerberger (2013) labels such strategies eating less, eating less nutritious food, delaying medical treatment taking children out of the school exploiting natural resource unwisely and eroding productive assets as negative coping strategies as they undermine future options, making it more difficult to cope with coming shocks or stresses

Maxwll (1996:74) cited in Fisha and Degefa (2017), categories households coping responses to food insecurity in to coping strategies and adoptive strategies. Coping strategies are responses made by households to improve their declining situation of the household's food security. Adoptive strategies, on the other hand involve a permanent change in the mix of ways in which food is acquired. They refer to long term adjustment. Maxwell and Caldwell (2008) identify four set of coping strategies that the households employ when they face food insecurity and don't have money or any other resources to buy food. The first, household may change their diet for preferred food to less preferred substitutes. Second option is attempting to increase supplies to using short term strategies such as borrowing, begging, consuming wild foods and the like. Third option is to reduce the number of people that they have to feed by sending some of them to other relatives or neighbors. The fourth and the most common is managing the shortfall by rationing the food available to the household through such actions cutting portion size, the number of meals, favoring certain household members over others, or skipping the whole day without eating.

According to these authors, strategies may not be practiced in same order by all households and don not have same message to convey regarding to the level of food in security of the households. Pastoralists in Somali region have faced droughts and other repeated shocks like floods since time in memorial. Nowadays the severity of drought has increased its magnitude that it is now becoming difficult for the pastoralists to reconstitute sufficient herd size to help them lead a semi-nomadic way of live; and the twin dragons, drought and famine, are given much pain to the pastoral societies as whole. Through time, pastoralists in Somali region have used their own coping strategies that can greatly contribute to managing droughts. These coping mechanisms differ from one pastoral group to another depending on the type of drought experienced, the type of geographical location and resources available to the pastoralists (SLCRDB, 2011). Some of these strategies are as follows

Dispersal of resources from relatives: as indication of a typical communal society, the Somali highly depend on the clan for any kind of assistance.

Herd splitting: in the Somali area, pastoralists divide their herds into two and send those matured ones and bulls to distant places while keeping lactating and heifers around their home. These are called herds. In some cases, animals may be herded in some other areas to reduce not only droughts but also localized raids and diseases that usually accompany droughts.

Income generation from non-pastoral activities: these include subsidiary activities that generate money for the pastoralists as additional revenue during normal years and to purchase food grains in times of drought Change of composition of diet: during acute drought period, Somali pastoralists are forced to change their normal food intake.

Change of composition of diet: during acute drought period, Somali pastoralists usually change their normal food intake and composition so that they can easily adapt to the type of vegetation available

According to Save the Children (2010) other coping mechanisms in pastoral areas in Somali region are extra livestock sale than normal time , migration, slaughtering livestock for household consumption, and adjusting eating habits, wild food consumption, seeking support from relatives and sub-clan members, seeking relief assistance, Increase bush product collection, splitting the household and even the herds.

2.6 Food Security Indicators and Measurement

2.6.1 Food Security Indicators

food security situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preference for an active and healthy life.(FAO, et al, 2014:50). Together with the development of the food security concept, many indicators were identified and classified into different groups by different researchers. For instance, Franken Berger (1992) classified the different types of indicators into two main categories: process indicators which reflect both food supply and food access and outcome indicators which serve as proxy for food consumption. Food supply indicators provide information on the likelihood of shock or disaster that will adversely affect household food security. But, the importance of indicators that measure food access become apparent when it is realized that household food insecurity were occurring despite the availability of food. These indicators provide information on the capacity of the population affected by shock or disaster to withstand the effect. But, according to Franken Berger (1992) their use as indicator is location specific.

Household food security outcome indicators include all direct and indirect indicators. Direct indicators of food consumption include those indicators which are closest to actual food consumption rather than to marketing channel information or medical status. Indirect indicators are proxy indicators for food consumption like using food in storage during a critical time of the year to assess the household food security status but people may be reluctant to discuss food in storage due to culture). Many of the indicators that are appropriate for one area may not be appropriate for another. So that aggregation of the information at the regional or national level is difficult (Hoddinot, 2001; Franken Berger, 1992).

2.6.2 Measuring Food Security

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. 13 (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: this measurement can be useful because the measurements are taken at the individual level. The changes of health and sanitation environment will be considered.

In the work by Franken berger (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 household 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 household distribution, maternal care and time allocation.

Income and consumption have 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). Since they may report their level of income more than what they do with consumption. Thus, so consumption can be taken as a better measure of longer-term household welfare (MoFED, 2008). Consequently, most analyses rely on measuring food consumption. Hoddinot (2001).

2.6.3. Food Security Status of Households in Ethiopia

In Ethiopia there are different studies of food security were conducted in rural and urban areas of the country and these studies concluded that the food status differ from one region to an the region and from Worada to another Worada or even from one household to another household. The evidence of empirical studies argued that the majority of households in the central part of the country are food insecure. For example, Beyene and Muche (2010) pointed out that about 64% of the households were food insecure and the rest 36% were food secure. It also revealed that average value of the energy available for food insecure and secure households was 1,822 Kcal/AE/day and 2,908 Kcal/AE/day, respectively. The minimum and maximum energy available for food insecure households was 1,043 Kcal and 2,098 Kcal, respectively. Whereas the minimum and maximum energy intakes of food secure households were 2,203 Kcal and 3,492 Kcal, respectively.

Furthermore, another study conveyed that 58.16 % of the total households in the area were food insecure with food insecurity gap and severity being 20 % and 9.4 %, respectively (Girma, 2012).

2.6.4. Pastoral Communities and Food Security

According to Nesses et al. (2009), pastoral communities are highly vulnerable to food insecurity. Vulnerability to food insecurity is caused by many internal and external factors and lack of

internal capacities to cope. Vulnerability in pastoral areas is associated with structural conditions, rendering some populations more vulnerable to acute food shortages, such as poverty and lack of basic services. External shocks are associated with prevalence of or stress factors, such as repeated droughts , floods, conflict during in hard times pastoral communities their Internal capacities to cope refer to peoples' capacities to cope with the shock depend on factors such as social networks, assets, and political status. based on the above mentioned factors even though pastoral communities they have a significant contribution to the national economy at same time they face such incredible challenges that cannot be solves unless it is found collaboration between government, developmental organizations and community. Livestock production system in pastoral areas is under hard condition and unable to adequately support the livelihood of the pastoral communities particularly the poor and very poor segments of pastoralists (PFE et al., 2010). Growth in livestock numbers has not kept up with human population growth due to a number of reasons such as animal disease and death as a result of lack of water/food (drought, flood, and limited grazing land) and neighbouring raids/conflict (insecurity in area). The implication is that pastoralist average livestock per capita ratios have declined and so their ability to manage a mobile pastoral livelihood is becoming less viable with the declined livestock numbers. Because mobility is relevant scenario to pastoral livelihood, with decreased mobility, pastoralists become more vulnerable to food insecurity and poverty. So as pastoralists settle, they are less able to cope with climatic shocks such as drought, which they normally would cope with by moving their household and animals to better pastures (Chung, 2007). Pastoralists' food insecurity during droughts is well known and documented, but in general they are actually chronically under-nourished compared to international standards

2.7 Empirical Studies on Food Security

Danial (2006), In his conclusion stated that cooperatives are assisting farmer's remote areas in Afar region to redistribute agricultural input, facilitated and increased purchasing power. He also finds that despite international price increases price over time for agricultural inputs particularly fertilizers, cooperatives are distributing at faire and responsible price

As discussed by Dessalegn (1989: 16-21), mutual support networks such as Iqqub, Eddir, are wide spread in rural areas, involving both women and men in rural and urban areas. Members'

mutual support network, provide a wide variety of benefits; these are used as potential vehicles of independent economic viability and poverty reduction. Dessalegn also revealed that despite women's minor position that made the rural women the most vulnerable, they do have still high resilience partly and capacity to recover from the problems of food insecurity and stresses because of these self-help associations practiced by the women.

Julia and Marí (2002) proposed that agriculture co-operatives in Spain could contribute to rural development because: 1) they are stable organizations in the local economy; 2) they have developed new support functions and new sustainable production methods; 3) they are protagonists of agro-industrial development and new local services; 4) finally, the co-operative sector can be an active actor in the designing rural development policy.

Leistriz (2001) studied the importance of cooperatives in Minnessota. The study was covered 337 cooperatives, of which 58 % were agricultural cooperatives. The result shows that the cooperatives have provided 9078 direct jobs and 42290 secondary (induced) jobs. As a result, the livelihood of the employed individuals has grown by about 1.2% per annum. They concluded that cooperative societies have virtually solved unemployment problem in the state.

Studies made by Simon and Birchall in 2008 explained that cooperative society have an imperative role in ensuring household food security, distributing farm inputs, creation employment, providing financial and material support to poor people . this implies that the probability of being food insecure will be when we compare those are not a member of cooperative

The empirical study undertaken in the southern regional state of Ethiopia in wolayita, showed that majority of the rural households (74.2%) are food insecure. A binary logistic model was used to determine the factors, which influence households' food security status.

The results obtained from the analysis indicated those households with large family sizes, large dependents, and young heads were food insecure. Livestock ownerships, farm inputs, employment in off farm sectors have positive impact on the household food security status (Adugna and Wogayehu, 2011).

Studies done by Tsegaye (2009), Tagel, (2011) ; Zerihun , Getachew, (2012) & Sisay, (2012).

Indicated the households whose head is a male the probability being food secure is high than the others due to the household whose head is a male have better access to different types of resources.

Sadik (2012) undertook a study on dimensions and determinant of Food Insecurity among Agro-Pastoral Households in Jigjiga District, Somali Regional State, Ethiopia. The binary logit model results revealed that the independent variables mentioned in the model, income from non-farm activities, tropical livestock unit, size of irrigable land, credit experience of a household head and number of ox owned influences food insecurity of the households negatively whereas family size and dependency ratio influence household food insecurity positively.

This shows that a household with large family size could not be able to provide sufficient basic needs to family members because most of them are children and not economically active.

Yusuf (2007) carried out a study on determinant of Food Insecurity in pastoral and sedentary livelihoods in Erer District of Somali Regional State. Using binary logit model according to the result he found that annual income and livestock holding have negative on the households food insecurity whereas family size, age of the household head, spread of livestock diseases are identified to influence household food insecurity positively. The possible explanation is as family size increases, the probability of household being food secure is less. In addition the more the household head is getting older, the less labor force the household has to carry out both livestock and crop production and this can lead the spread of livestock disease that can directly or indirectly affect household access to food. However, this situation where spread of livestock disease is severe, the probability of a household to loss his livestock is very high and so can easily be vulnerable to food insecurity

Tefera (2009) carried out a study on the determinants of household food security and coping strategies in Farta district, south Gondar zone using logit model found that sex of household head, total livestock holding (TLU), total cultivated land, non-farm activities, improved seed use and soil fertility status were found to have positive influence on food security status.

Basher (2010) made analysis of food security status and coping strategies of kabribayah district of Jigjiga zone of Somali regional state he found that the education, livestock owned, farm

income, availability of off-farm and non-farm income, farming experience all these explanatory variables have positive relationship with food security whereas large family size and age of the household have negative relationship with food security

2.8 Determinants of Household's Food Security

A study conducted by Ephrem (2008) household food security in the north eastern part of Ethiopia are strongly associated with various socio-economic and bio-physical factors that influence the food security status of households were age of household head, dependency ratio, size of cultivated land, total number of livestock owned, manure application, land quality and farmer's knowledge on the effect of land degradation on food security.

According to studies conducted in Ethiopia, ownership of livestock, farmland size, family labor, off farm income, market access, use of improved technology, education, health status, amount of rainfall and distribution, crop diseases, number of livestock, and family size are identified as major determinants of household food security Regassa (2011) and Bedeke (2012).

The study conducted in Nigeria by Oluyole *et al.* (2009) using probit model found out that sex of household, educational level, age of household head and income have positive influence on food security; whereas, households size has negative influence on household food security. However, study, by Sikwela (2008) in South Africa using binary logit model showed that per aggregate production, fertilizer application, cattle ownership and access to irrigation have positive effect on household food security; whereas, farm size and family size have negative effect on household food security. On other hand, Fekadu (2012) using multivariate logistic regression analysis indicated that dependency ratio, household family size and market accessibility have showed significant and negative effect on food security; whereas cultivable land size, access to irrigation, number of livestock showed positive role for food security.

Other similar, study conducted by Bogale and Shimelis (2009) using binary model reveals that age of household head, cultivated land size, livestock ownership, total income of the household, irrigation and amount of credit receive have negative and significant effect on household food security. Similarly, as studied by Beyena and Muche (2010) using binary logit model showed that age of the household head, size of land cultivated, livestock ownership, soil and water

conservation practice and oxen ownership have positive and significant relationship with household food security; whereas, education of household head, household size and off-farm/non-farm income have negative and significant influence on household food security

2.9 Gap in the Literature

From the above empirical literature reviewed, different factors that affect the food security status among cooperative members have been identified. All the studies reviewed were conducted in different determinants like socio-economic, demographic factors and institutional factors which are the primary factors that influence the food security status among cooperative members. Considering the socioeconomic and environmental peculiarities across regions, it is therefore necessary to carry out thorough investigation of the various aspects of food security status among cooperative members, or lack thereof, in the Somali Regional State. This exercise is important from two fundamental standpoints. First, Cooperatives are the foundation in which the negative impact of food insecurity and hunger can be minimized, not just in the study area. Second, information generated on various aspects of cooperatives on food security are importance to policymakers, the lending institutions, a variety of governmental and nongovernmental agencies engaged in reducing poverty in developing countries.

Hence, the major concern of this study is to supplement previous research and bridge the knowledge gap by looking back previous studies to determine various aspects of food security service among cooperative members in Owbera woreda, fafan Zone, Somali Regional State. In order to identify the major socio-economic, demographic and institutional factors that affect the performance cooperative members is one way to improve their status of food security. In the literature reviewed, there was neither study investigating determinants of food security among cooperative members in Somali agro pastoralist, in particular, nor those financed by the concerned bodies well in the region. Hence, this research was contributed substantively to narrowing the research gap and generates foundational information.

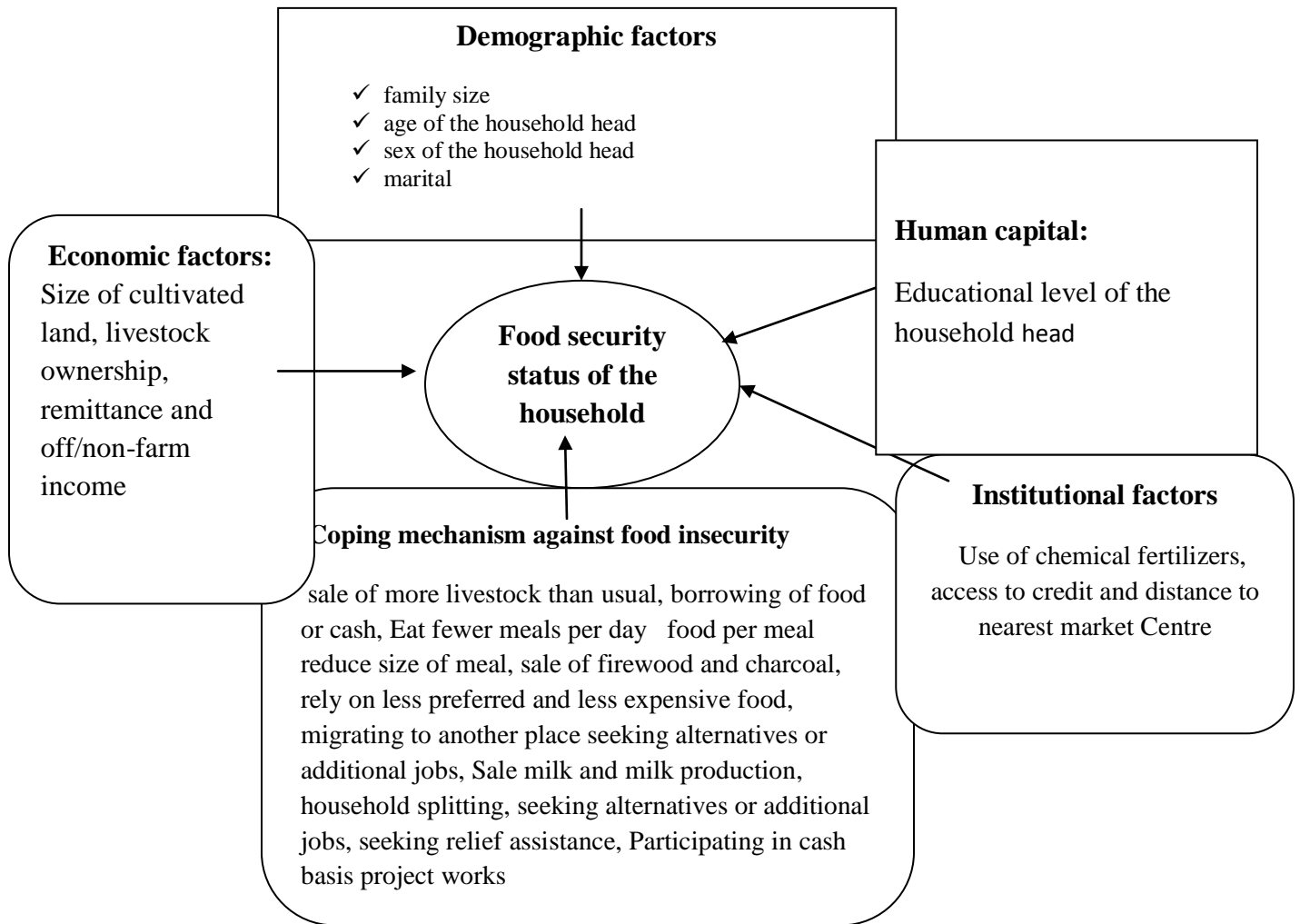
2.10 Analytical Framework of the Study

Sustainable livelihood framework was utilized to analyze household food security status of the study area. The framework was developed in line with the general definition of food security

mentioned above: availability, food access and utilization. Within the framework, five factors determining household food security status were incorporated. These include the demographic, bio-physical, productive asset/resources, infrastructural and socio-cultural factors (Figure 1). The outcome of the study provided an understanding of whether the household in the study area are food secure or not. The linkages and interactions between household food security status and determining factors are briefly explained as follows:

- I. Food availability addresses the households' adequate supply of food and is determined by the level of home production, purchase in the market or food transfer (Degefa, 2002; Aidoo, Mensah and Tuffour, 2013). Food availability can be affected by disruptions of food production due to bio-physical problems (erratic rainfall distribution, recurrent drought, soil erosion, poor soil fertility, crop pest and disease, and livestock disease), poor access to productive resources (farm size, oxen, skill, farm and off-farm income, farm implements, modern farm input utilization) and demographic factors (family size, sex and age of household) (Figure 1).
- II. Food access is the way in which households acquire available food in different forms that include home production, purchase in the market, borrowing, gifts from relatives/friends, and provisions through relief systems or food aid (Sen, 1981; Devereux, 1993; Degefa, 2002; 2008; Aidoo et al., 2013). This can be determined by household productive asset (farm size, oxen, skill, farm and off-farm income, farm implements, modern farm input utilization), socio-cultural factors (saving habit and social support) and infrastructural factors (access to road, rural credit, storage facility, extension services, irrigation practice and location of market) (Figure 1).
- III. Food utilization is the way in which people consume their food (Degefa, 2002; 2005; Aidoo et al., 2013). This can be determined by demographic factors (educational level of household), socio-cultural factors (eating habit, food preferences, food rationing, social and religious ceremonies, nutritional knowledge and health status) and infrastructural factors (water supply and health services) (Figure 1).

Figure 1 Source: Analytical framework based on literatures



CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Description of the Study Area

3.1.1. Location

Somali Regional State is the second largest in the country after Oromia and covers a total area of 350,000 km². 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 45Co. 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* which is the short dry season of the year falls between June and October, with the *jilaal* stretching from December to March. For the *karan* 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 (SDPPB, 2012).

Hagaa season is a dry season which is from June to October.

- Jilaal season is a dry season which is from December to March.
- Karan season is a rainy season which is from July to September.
- Deyr season is dry season which is from June to march

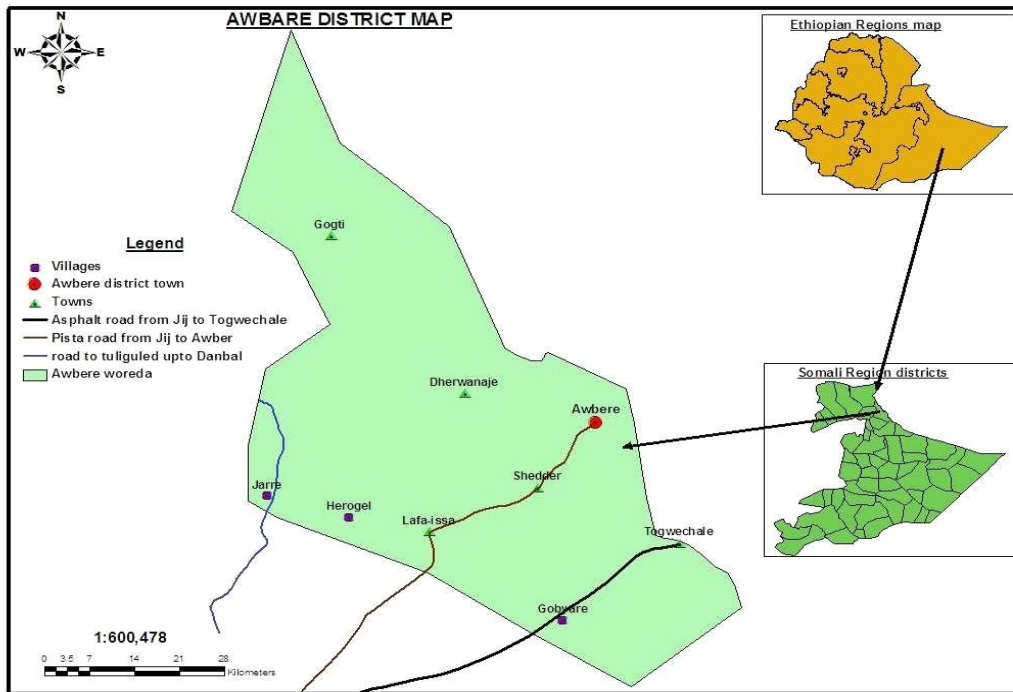
and is followed by the *hagaa* which continues to mid-July. The *karan* rains fall from mid-July to late September. The *jilaal* season which is normally the most difficult time of the Year and hunger season for both pastoralists and agro-pastoralists, is from October to mid-March (SRS BoFED, 2013).

The 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° 18' and 10° 12' N. Latitude and 42° 37' and 43° 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 vast majority of the population of the region is pastoralists and agro-pastoralists who are depend on livestock and farming for their survival. The livelihood Zones of the region generically classified as pastoral, agro-pastoral, and riverine and sedentary farming. The major sources of income include livestock and livestock product sales, crop sales, firewood and charcoal sales, petty trade, agricultural products and remittance from western living Diaspora of the region (SRS BoFED, 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. The highest peak of the district is 2117 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 16⁰c to 29⁰c (AAO, 2013).

Figure 2: map of the study area



3.2 Research Design

The study was concerned with assessment of the determinants of food security of the household among cooperative members. A cross-sectional study was made to investigate the determinants of food security of household among cooperative members by collecting data from randomly selected respondents at a single point in time. The choice of this design is due to the fact that it is cheap in terms of time and human resources as data was collected simultaneously from cooperative members at a distinct point in time. The design further enabled to triangulate between the quantitative survey questionnaires and the qualitative FGDs and key informants interviews. Descriptive studies and econometric model were needed to obtain quantitative information more about the food security status of household among cooperative members the in the study area.

3.3 Source and Methods of the Data Collection

This paper is based on the secondary data to be collected from secondary source such as rural community development document, rural development policies and strategies and document of ministry of agriculture and rural development policy documents, different published documents about rural cooperative document

3.3.1 Data Collection Instruments

Secondary data are information collected by governmental and non-governmental organizations for different purposes. Secondary data also helps gain better understanding of the issue under study before getting into the fieldwork.

I used secondary data from different sources that comprises published and unpublished sources, newspapers, websites and etc. Furthermore, documents produced by different organizations were used on the basis of food security in the region (Yeraswork, 2010:134).

The primary data for the study was generated through three main tools: key informant interviews, focus group discussions and observation

- I. Key informant interviews were carried out to obtain information on community profile, food security situation of the Woreda. The informants were included cooperative leaders.
- II. Focus group discussions were conducted in the study communities. The participants get involved in the study will be representatives of cooperatives. The participants of focus group discussion included various villages of the communities, households of different economic strata and both sexes to maintain gender balance.
- III. Questionnaire was used to collect the data which was prepared for the respondents of the study in structured manner, as they are advantageous for gathering data from a number of respondents at one place. Therefore, questionnaire was prepared based on the research questions and a review of related literature and questions was focused on determinants of food security of the households among cooperative members In the field, enumerators were trained to develop their understanding regarding the objectives of the study (See Appendix I)

3.4. Sampling technique and sample size

Sampling Technique and Sample Size was an important decision which was 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). The study area was purposively selected. In the second stage, three Kebeles were selected randomly from those Kebeles where cooperative are found. To calculate the sample size was provided by Yamane (1967) which is given by the simple random sample is chosen because it gives equal chance of being selected to all cooperative members of the cooperatives.

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

Where n is the sample size

N is the number of households

e is the level of precision.

According to the selected members of cooperative in Owbere district, the total household of cooperative members were 520 members those are currently in operation. A 95% confidence level, 0.05 degree of variability and $e = 8\% = 0.08$ the level of precision measures how close an estimate is to actual characteristics in the population which are inserted into the equation

$$n = \frac{520}{1+520(0.08)^2} = 120$$

Then according to the Yamane (1967) formula the sample size of 120 cooperative members were selected randomly from selected the total number of 6 cooperatives 'of 520 and was investigated their food security status considering of different variables. This sample size was assumed to enable us to gather richer data with regard to demographic, socio-economic behaviors. The selected 120 sample beneficiaries 'was interviewed by using un-structured survey questionnaires.

3.5 Method of data analysis

3.5.1 Descriptive statistics

Descriptive statistics was used like percentages, mean and standard deviation, minimum, maximum and others were used to describe the determinants of food insecurity status in the study area. 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 factors by using STATA-25 software.

3.5.2 Measuring food Security

The household food security status was measured by direct survey of the household consumption. In this study, seven day recall method was employed as it provides notable information. However, the person responsible for meal preparation was asked how much food was prepared for consumption from purchase, stock, gift, loan, lost , home produced and sold over a period of time by using household Food Balance Model (HFBM) was utilized to quantify the available food for the households and determine per capita kcal consumed per annum in the household. Conversion factor was utilized in order to convert grains available into kilocalorie. The HFBM is a modified form of the Regional Food Balance Model (Degefa, 1996; 2002). Data used for the computation was generated through field survey. The assessment covers a period between November 2018 and May 2019 the model was given by the following mathematical expression.

$$NGA = (GP + GB + FA + GG) - (HL + -GS),$$

Where, NGA: Net grain available/year/household

GP: Total grain produced/year/household

GB: Total grain bought/year/household

FA: Quantity of food aid obtained/year/household

GG: Total grain obtained through gift/year/household

HL: Post harvest losses/year

GS: Amount of grain sold/year/household

3.5.3 Econometric Model Analysis

In order to identify the determinants of food security of the households among cooperatives members, logit model was used

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

$$P_i = \frac{1}{1 + e^{-Z_i}} \dots \dots \dots (1)$$

Where: p_i ; is a probability of a household being food secure for i th household 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:-

$$Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots \dots \dots \beta_n X_n \dots \dots \dots (2)$$

Where β_0 is the intercept and β_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

$$(1-p) = \frac{1}{1 + e^{Z_i}} \dots \dots \dots (3)$$

Therefore,

$$\left(\frac{P_i}{(1-P_i)} \right) = \frac{1 + e^{Z_i}}{1 + e^{-Z_i}} = e^{Z_i} \dots \dots \dots (4)$$

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

$$\left(\frac{P_i}{(1-P_i)} \right) = \frac{1 + e^{Z_i}}{1 + e^{-Z_i}} = e^{\beta_0 + \sum_{i=1}^n \beta_1 X_1} \dots \dots \dots (5)$$

$$\left(\frac{P_i}{(1-P_i)} \right) = \ln \left(e^{\beta_0 + \sum_{i=1}^n \beta_1 X_1} \right) = Z_i \dots \dots \dots (6)$$

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

$$Z_i = \beta_0 + \sum \beta_1 X_i + U_i \dots \dots \dots (7)4.$$

3.6 Definitions of variables with hypothesis

X₁- Age of household head (AGEHHH): It was hypothesized to influence food security status positively in that household through the experience and knowledge in farming and accumulate wealth through time which enables households to be food secured than the one who is young

X₂-Sex of household heads (SXHHH): Is a dummy variable which take 1 if household head is male, 0 if female. Household headed by male is supposed to have better access to maintain Household's seasonal food security than households headed by female.

X₃ -Family size (FZ): In the study area, the expectation of food security is less when the family size is large and the probability being food insecure will increase , thus large family size affects Household's food security situation negatively.

X₄- Cultivated land (CL): This variable is the size of land cultivated by the household measured in hectare. Size of the cultivated land is a prominent resource expected to be associated with food security and household cultivating more hectares of land produce more crops and will be in better position in its food security status. However, Lewin and Fisher (2010) indicated in their study that size of cultivated land and food insecurity has negative relationship. In light of this, it is expected that cultivated land size and food insecurity are negatively correlated in the study area.

X₅ -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 labour members (i.e. age15-64). As the number of dependents increases the active labour 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 labour force and hence a decline to the wellbeing of the household in average terms. A study conducted by Abdirahman (2015), indicated that food insecure is high for households where the ratio of productive members are less than unproductive members. Therefore, it is expected that dependency ratio and food insecurity are positively correlated in the area.

X6- Credit size (CS): Credit is continuous variable and it's the amount of money received by the borrowers. Those households who acquired the credit they wanted had better possibilities to invest. They could purchase agricultural inputs and livestock. The possible explanation is that those households who were willing to participate in credit scheme became capable of improving their income positions by performing different activities. Hence it was hypothesized that credit and food security are positively correlated

X7- Off farm activity: this variable refers the other income generating activities involved by the household. Households involving more off-farm activities are more likely to get additional income in the last three months and have more chance to be food secure. A study conducted by Abdirahman (2015), indicated that this variables that statistically significant and has negative relationship with food insecurity. Thus, it is expected that off-farm activities and food insecurity are negatively correlated.

X8- Remittance: This variable refers the amount of money that households get from their relatives inside and outside the country measured in Birr in the last three months . In Agro-pastoral context, Somali communities support each other by kinship system. However, Households that get remittance within and outside the country are more likely to be food secure compared to household that doesn't get remittance from elsewhere. Gulled (2006) and Abdirahman (2015) in their study indicated that remittance ha negative relation with food insecurity. In light of this, it is expected that the amount of remittance received per month and food insecurity are negatively correlated.

X9-Use of chemical fertilizers (FERTILIZER): The use of chemical fertilizer is taken as important yield improving in kg per Hectare of the land . Soil fertility reduction is believed to be among the major factors for low food production that hinders food security (Tesfaye, 2005). The households that use fertilizer are expected to have better yield than non-users. It is represented as a dummy variable taking value 1 if the farmers not use chemical fertilizer, 0 if the household use chemical fertilizer. Therefore, it is hypothesized that relationship between the food insecurity and use of chemical fertilizers has negative relationship.

X10- Distance to the market: This variable is the distance between household's resident area and the nearest market center that they usually make transactions. In this regard, access to market center eases households to get income generating opportunities and sell their livestock with better price. Proximity to market center creates access to additional income by providing opportunities of selling livestock and livestock products as well as opportunities of engaging in employment and easy access to inputs and transportation (Wali, 2012). Hence, it is hypothesized that the distance to market Centre and food insecurity are positively correlated.

X11- Education level of the household head (EDULEVEL): Education is a dummy variable taking a value of 1 if household Head is literate and 0 otherwise. Household head with better knowledge believed to have a chance of income diversification from different angles and have ability to manage his farm and nonfarm activities. It is hypothesized that Educational level of household head and food insecurity are expected to be related negatively.

X12- Livestock ownership (TLU): Livestock ownership is the total number of livestock that the households have including cows, camels, sheep and goats and horses in expressed in tropical livestock unit. Thus it is hypothesized that household with more number of livestock have a chance to cope with food insecurity.

X13 –Food aid received (FAID): Since the study area is marginalized and its productive resources especially land is less productive, it is mostly in short of food at least for four months of the year. Hence households in the study area are vulnerable for food insecurity and mostly cover their food shortfalls through emergency food aid. So the amount of kilogram of food aid received by the household in the last four months is good indicator of household food insecurity in the study area. As a result, it is expected that households who are receiving food aid are more likely to escape the risk of food insecurity.

Table1: Definition of Variables

Dependent Variable		Definitions	Hypothesis
1	Household food security	This is a dummy variable ; whether they are food secure or not	
Independent Variable		Definitions	
1	Education	Educational level of household head 1 if the household is illiterate, 0 otherwise (continuous variable).	+
2	Age of the household head	Age of the household head in years (continuous variable).	-
3	Land	Land cultivated in hectares (continuous variable).	+
4	Sex	1 if the household is male 1 otherwise 0 (Dummy variable).	+
5	Family size	The total number of members living in a particular Household (continuous variable).	+
6	Livestock	Livestock owned by the households in TLU (continuous variable).	+
7	Off farm activity	The other income generating activities involved by the household. in the last three months 1 if the household get involved in offfarm activity ; 0 otherwise (Continuous variable).	-
8	Distance to nearest market	Distance to market centers in km (continuous variable).	-
9	Remittance	The amount received as remittance from relatives in last three months in terms of Birr (continuous variable).	+
10	Credit	The credit amount taken by the household in birr 1 if the household gets credit service; 0 otherwise (continuous variable).	+
11	Food aid received	The amount of food received in terms of kg , 1 if the household receives food aid; 0 otherwise (continuous variable).	+
12	Dependence ratio	Ratio of dependents to active members (continuous variable).	-
13	Chemical fertilizers	1 if the household not use (continuous variable).	+

Source: own source from the survey,

CHAPTER FOUR: RESULT AND DISCUSSIONS

This chapter presents the results of findings of the study obtained from survey and discussion resulting from the findings. Descriptive results are discussed in section 4.1. Section 4.2 presents and discuss the econometric model results. While the final section 4.3 deals with the households coping mechanisms against food insecurity

4.1 Descriptive Result

4.1.1 Food security status of the sample 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 2100 kcal per adult per day. If the consumption/acquisition is less than the required or 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, lost 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 to kilocalorie and then divided to household size measured in AE. 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. 2100 kcal). As a result, from all respondent households, 50 households among cooperative members was found to be food secure and 70 of them found to be food insecure.

Results presented in Table 4.21 reveals that the mean per capita calorie intake of the sample household was 2037.6036 kcal, which is lower than the minimum required amount of kilocalorie which is 2100kcal. The average calorie intake among the food secure and food insecure sampled households among cooperative members were 2458.0694 (which is higher than the minimum requirement per adult per day to live active and a healthy life) and 1737.2709. Kcal per AE per day respectively.

Table 4.1.1 Food security Status of the households

Food security status of the households	Mean	Std. deviation	Maximum	Minimum
Food secure	2458.0694	291.90729	3271.00	2200.00
Food insecure	1737.2709	285.07736	2091.75	1063.73
Total	2037.6036	457.76590	3271.00	1063.73

Source: own survey, 2019

4.1.2 Demographic characteristics

This section discusses the demographic characteristics of the sampled household among cooperative members in the study area. The identified characteristics were compared to see the difference among the food secure and food insecure households. Accordingly, sex of the household head, age of the household head, dependency ratio and educational status of the household were among the demographic variables found to influence household food insecurity.

Table.4.1.2 Age distribution of respondents

Age of the HH	Number	Mean	Standard deviation	maximum	Minimum	Total %
Food secure	50	39.80	8.480	53	27	41.7%
Food insecure	70	46.86	11.762	66	25	58.3%
Total	120	43.89	11.041	66	25	100,0%

Source: Own data, 2019

Age is an important demographic characteristics of the household assumed to bring food insecurity difference among households of cooperative members. The average age of the sampled household heads was 43.89 years (SD= 11.041) with minimum and maximum of 27 and 66 years respectively. The average age of food insecure household heads was 46.81 years (SD=11.762) whereas it was 39.80 years (SD=8.480) for food secure household heads.

Table.4.1.3 frequency and percentage distribution of the respondent by educational level

Education level of the household head	Food secure		Food insecure	
	Frequency	%	Frequency	%
Cannot read and write	8	16.0	29	41.4
Can read and write	10	20.0	18	25
Attended grade 1-4	3	6.0	8	11.4
Attended 5-8	8	16.0	2	2.9
Attended 9-12	10	20.0	9	12.9
College diploma and above	11	22.0	4	5.7

Source: Own data, 2019

Survey indicated that 8(16%) and 29(41.4%) of the sample household heads of food secure and food insecure could not read and write, 10(20.0%) and 18(25%) were reported to be able to read and write (Table 4.2), 6.0% and 3 (6.0%) , 8 (11.4%) , 8(16.0%) and 2(2.9%) , 10(20.0%) and 9(12.9%) completed grade 1-4, grade 5-8 , grade 9-12 and college diploma and above respectively . This result shows that almost half of the respondent cannot read and write which may be or may have gap to manage and utilize the funds effectively at the same time other percentage of educated group are more likely to manage the funds or income effectively.

Table 4.1.4 Marital Status of Respondents

Marital status	Food secure		Food insecure		Total	
	Frequency	%	Frequency	%	Frequency	%
Never married	2	4.0	6	8.6	8	6.7%
Married	42	84.0%	56	80.0	98	81.7
Widowed	5	10.0	7	10.0	12	10.0
Divorced	1	2.0	1	1.4	2	1.7
Total	50	100.0	70	100.0	120	100.0

Source: Own data, 2019

As shown in the Table 4.3 among sampled household heads indicated that 2 (4.0) and 6 (8.6) of the both food secure and food insecure were never married respectively, while the majority of both food secure and food insecure 42 (84.0%) and 56 (80.0%) and were married. 5(10.0%) and

7(10.0) of the household heads were to be food secure and food insecure respectively. This shows that majority of the household heads of the cooperative members were married because it assumed that it increases the probability of being food secure is high than the others

Table.4.1.5 Sex of the household head

Sex of the household head	Food secure		Food insecure		Total	
	Frequency	%	Frequency	%	Frequency	%
Male	36	72.0	23	32.9	59	49.2
Female	14	28	47	67.1	61	50.8

Source: Own data, 2019

The proportions of male to female headed households within the food insecure and secure groups were highly different where male heads dominated the headship for many households. Male and female headed households from the overall sampled households were 59(49.2%) and 61(50.80%) respectively. It was found that around 36(72%) and 23(32.9%) of the food secure households were male headed respectively while the remaining 14(28%) and 47(67.1) of the food secure and food insecure were female headed households respectively. The proportions of females were less compared to males. This result shows that Hence, based on the earlier hypothesis of the study, which was hypothesized that female headed households were negatively related with food insecurity than male headed ones, has not been met. This result shows that household who headed by female are more likely to be food insecure than the household headed by male

Table. 4.1.6 Family size of the respondent

Family size	Food secure		Food insecure		Total	
	Frequency	%	Frequency	%	Frequency	%
<=6.6	32	64	41	58.6	73	60.8
>6.6	18	36.0	29	41.4	47	39.2

Source: Own data, 2019

Regarding the size of household, the data from survey has revealed that among respondents, those with household size <=6.6 account for 32(64%) and 41(58.6%) were found to be food secure and food insecure respectively. Respondents whose household size is >6.6 account for 18 (36%) and 29(41.4%) of food secure and food insecure respectively. This shows that the higher the family size measured in study area, the more of household to be food insecure in the study

area. Therefore, the main point of inclusion in this variable is to find out the role cooperative service with large and small family size on food security (credit service). As there is higher level of consumption of the large family size which in turn requires more income from cooperative was minimal.

The participants of the focus group discussions stated the situation of family size as follows: Family size has a direct and negative effect of cooperative service on food security . However, families who have a large number of family sizes could not be able to manage the income from cooperative. This is because using of the services for unplanned purpose like family needs and living conditions of the households. As a result of this, using that income efficiently was very poor **(FGD, Participant, cooperative member)**

In addition another 33 years old man noted that the situation likes this

“My family size is only four members; I got credit from the cooperative and used to buy farming items, seeds and materials. And just worked, after using the income efficiently I was able to pay back the money” **(Key informant interview, from cooperative member)**

The dependency ratio shows the ratio of economically active persons compared to economically dependent household members. Household members whose age was between 0-14 and above 64 were considered as economically inactive and dependent members of the household.

The mean of dependency ratio of the sample households in the study area was found to be 1.0043 (SD=.80367). The mean dependency ratio of food secure households was .8553 with standard deviation of .65019 whereas; the food insecure households were 1.1108 with standard deviation of .88662. This shows that food secure households had larger dependency ratio than food insecure households.

Table.4.1.7Dependency ratio

Dependency ration	Food secure		Food insecure		Total	
	Mean	St. deviation	Mean	St. deviation	Mean	St. Deviation
	.8553	.65019	1.1108	.88662	1.0043	.80367

Source: Own data, 2019

The income of respondents analyzed in this case is the dividend which they got in cash in 2018/19. As the data from survey has revealed, the mean income of respondents' 2018/19 from the cooperatives was 676.66 birr. the mean of both food secure and food insecure were 952 Birr(SD=326.227666) and 480 Birr(SD=211.509413) respectively . this result The relatively shows that there is great variation in terms of income among the respondents.

The following table shows the frequency distribution of respondents in terms of their income as dividend from cooperatives in 2018/19

Table. 4.1.8 Income dividends from the cooperative

Income from cooperative	Mean	St. deviation	Maximum	Minimum
Food secure	952.00000	326.227666	1400.000	300
Food insecure	480.00000	211.509413	1120.000	250.000
Total	676.66667	352.654599	1400.000	250.000

Source: Own survey, 2019

4.1.3 Economic factors/Resource ownership

Cultivated land size is a prominent resource and associated with household's food security and those cultivating more hectares of land produce more crops and will be in better position in its food security status. According to a study made by Lewin and Fisher (2010), size of cultivated land and food insecurity has negative relationship. It was hypothesized that the amount of land cultivated by agro-pastoral households and food security are positively correlated.

The mean of the cultivated land size of the sample households was 0.94 (SD=1.136) whereas the average mean of the food secure households was 1.20 (SD=1.330) and the food insecure households was 0.76 (SD=0.945).

Livestock is major determinant which needs to be improved and plays major role both in mitigating the hazards of food insecurity as well as coping mechanisms of agro-pastoral households (Abdurrahman, 2015). Households who possess large number of livestock are expected to be less vulnerable to food insecurity than the one who have few numbers of livestock. Since, households with larger number of livestock produce more milk, milk products and meat for direct consumption and owners could be more food secured.

Moreover, the contribution of livestock 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 are source of cash income and act as store of wealth and hence play important role for the household's food insecurity (Taye, 2014, and Mohamed, 2015).

It was hypothesized that the number of livestock holding in TLU has positive correlation with household food security and households having less number of livestock are more vulnerable to face food insecurity compared with households having large number of livestock.

The mean of TLU of the sample household respondents in the study area was 3.6125 (SD= 5.08159) and the average of livestock holding of food secure households was 4.9038 (SD= 4.97095) whereas the mean of the food insecure households was 2.6901 (SD= 4.99989).

In agro pastoral context, Somali communities support each other by kinship system. Households that get remittance within and outside the country are more likely to be food secure compared to households that don't get remittance. Gulled (2006) and Abdirahman (2015) in their study indicated that remittance has positive correlation with food security. The more remittance that households get measured in Birr and the more is food secure.

In line with this premises it was also found in this study the mean of the remittance that sample respondents receive on monthly basis was 671.91 (SD= 326.656) and the average of the food secure households was 733.77 (SD=348.757) whereas the food insecure households among cooperative members was 568.81 (SD=265.656).

Off/non-farm activities play a vital role in enhancing households food security in agro-pastoral areas and households involving more off/non-farm activities are more likely to get additional income and have more chance to be food secure. Crop production and income from livestock sale are not adequate for households to sustain food security in the study area. In the light of this, it was hypothesized that the amount of income received from off/non-farm activities measured in birr and household food security are positively correlated.

The average of off/non-farm income of the sample household was 753.65 (SD= 472.243) and the average income of the food secure was 928.4 (SD=537.710) whereas the average income of the off/non-farm activities of the food insecure households was 517.65 (SD= 199.576).

According to some empirical reviews most farmers have access to credit while some others may not have due to problems related to high interest rate. As indicated in Table 4.9, out of the total household sampled only 73 (60.8%) of the households had access to credit. While the households those had no access to credit service were 162 (92.0%). From the total sampled households, 35(66%) were food insecure households and 38(56.6%) were food secure households had received credit in the past years. Therefore credit has effect on food security, since it encourages cooperatives ‘borrowers to grant larger money from cooperative. In addition to this most of the cooperative’ members in the study area were responding critical challenges about the credit size which was not much enough for them to utilize and believe that if the loan size increases the probability of their food insecurity will be also decrease . Regarding the situation a key informant Haliimo a chair person of cooperative in the study area said that

Before joining the cooperative, I used to suffer from financial stress. But joining the cooperative helped me to get access to credit service and improve my income. With the money I got through credit, One of the main services of the cooperative was to provide to its members is credit service. The credit service was aimed at empowering the members financially there by to allow increased investment and better economic returns. I started Betty trading, and I used to start another which I invest agriculture with the given amount of credit and utilized well. This in turn allowed me to obtain increased income through the profit I get from trading. Now I do have a good business and earn better. (Key informant interview, cooperative member)

Table 4.1.3 Economic factors/Resource ownership

Variables	Food secured		Food insecure	
	Mean		Mean	Total
Cultivated land	1.20		.76	.94
TLU	4.9038		2.6910	3.6125
Oxen	0.7200		0.4143	0.5417
Camel	0.56000		0.3100	0.4200
Remittance	733.77		568.81	671.91
Off-farm income	928.04		517.65	753.65

Source: Own data, 2019

Table 4.1.4: Credit

Variable	Food secure		Food insecure			
	Frequency	Percentage	Frequency	Percentage	Total	
Credit						
Yes	35	66%	38	56.6 %	73	60.8
No	16	36.0%	31	41.4 %	47	39.2

Source: Own survey, 2019

4.1.4 Institutional Factors

Availability of market centers close to agro-pastoral household's resident areas lesson several pitfalls that triggers food insecurity. A part from selling of livestock with good body conditions and crop production with fair price, existence of functional market center facilitate pastoral households among cooperative members to get menial works which reduces their vulnerability to food insecurity. Moreover, the more proximate agro-pastoralist lives to nearest market center, the more chance of food secure. It was also hypothesized in this study in line with description.

The average distance in km to nearest market for the overall sampled respondents was found to be 5.33 (SD=3.080) and that of the food secure and the food insecure households was 4.00 (SD=2.491) and 6.29 (SD=3.121), respectively. In addition another 45 years old man noted that the situation likes this

Before joining the cooperative, I used just strive to produce foods for my family's consumption. Many factors force me to decide so. First of all, I faced challenge in accessing farm inputs which worsen the problem of productivity combined with declining fertility of soil. Even if I produce for market sell, I could not access transportation to bigger markets, Wujaale town (Main market).My income couldn't allow me to afford the transportation costs. But after joining the cooperative, I accessed farm inputs for low price. I also learned how to produce better quality products of both cereals. Through the cooperative, I could access market chain. The cooperative provided me with better profits which in turn motivated me to produce more and more (FGD, Participant and cooperative member)

Table 4.1.4 Distance to nearest market

Variables	Food secure		Food insecure		Total	
	Mean	St. deviation	Mean	St. deviation	Mean	St. deviation
Distance to nearest market	4.00	2.491	6.29	3.121	5.33	3.080

Source: Own source, 2019

Access to extension agent helps agro-pastoral households to practice modern farming systems and enhances both livestock and crop production levels. Ahmed et al (2015) indicated that extension agent contact is important in the adoption of modern farm practices that ultimately influences the level of farm output and income earning capacity of the households.

Almost 44(36.7%) of sampled households in the study area was having access to chemical fertilizers. In addition, among the food secure households 24(48.0%) were having access chemical fertilizers while 20(28.6%) of the total food secure households were having access to chemical fertilizers. The proportion of households that have no access to chemical fertilizers from the total number of food secure and food insecure households was 26(52.0%) and 50(71.4) respectively.

Table. 4.1.5 Chemical fertilizer used by the precipitants

Chemical fertilizer	Food secure		Food insecure		Total	
	Frequency	%	Frequency	%	Frequency	%
Yes	24	48.0	20	28.6	44	36.7
No	26	52.0%	50	71.4%	76	63.3

Source: Own survey, 2019

Owbere district is among the districts in the region which the Bureau of livestock, crop and rural development implemented productive safety net program (PSNP). Survey result indicated that 45.8% of the sample household heads 32(64% of the food secure and 23(23% of the food insecure) were receiving food aid while 65(54.2% of sampled households 18(36% of the food secure households and 47(67.1% of the food insecure) were reported that they were not receiving food aid (Table 20).

Table. 4.1.6 Food Aid

Food aid	Food secure		Food insecure		Total	
	Frequency	%	Frequency	%	Frequency	%
Yes	32	64	23	32.9	55	45.8
No	18	36.0%	47	67.1%	65	54.2%

Source, Own 2019

Only 54(45%) of the respondents had asserted that they received training from the cooperative or local government bodies. 66(55%) of the respondents had some type of training (Table 4.13). This implies that the cooperatives or concerned local government bodies had not provided the necessary training to cooperative members in order to be able to use resources efficiently and effectively for the sake of improving their income and their saving habit.

For example, one respondent named Ayan a cooperative member who is a cooperative member stated that the importance of training service given by the cooperative

“..... Cooperative provides both training service as well as financial support. The training support includes rendering training to both members and the leaders particularly with aim of performing well. In addition to the training support, the cooperative funded its members. In addition to this, this promoted the quality of their production than previous time. Being member, women has also benefited from the support particularly with regard to earning better cash. (Key informant interview, cooperative member)

Table .4.1.7 Training provided to cooperative members

Training provided	Food secure		Food insecure		Total	
	Frequency	%	Frequency	%	Frequency	%
Yes	30	60	24	34.3	54	45
No	20	40	46	65.7	66	55

Source: Own survey, 2019

Food consumption pattern had changed due to support of the cooperative. According to respondents, 27(54%) and 32.9(50%) of the food secure and food insecure had claimed that the consumption pattern had improved while 18(36%) and 40(46%) of the food secure and food insecure had said the change in food consumption how it was before they joined cooperative and the rest of portion of 5(10%) and 19(27.7%) of food secure and food insecure had claimed that the change in food consumption had decreased

Table 4.1.8 Change in Food consumption pattern

Change in Food consumption pattern	Food secure		Food insecure		Total	
	Frequency	%	Frequency	%	Frequency	%
Increase	27	54	23	32.9	50	41.7
Same	18	36	28	40	46	38.3
Decrease	5	10	19	27.1	24	20

Source: Own data, 2019

According to the household survey 23(46%) and 19(27.1%) of food secure and food insecure members respectively had claimed that expenditure on school expenses increased due to increase in their income. However, 27(54%) and 51(72.9%) of the food secure and food insecure members responded that their expenses on health care did not show any change

Table 4.1.9 Change in expenditure for school expense

Change in expenditure for health	Food secure		Food insecure		Total	
	Frequency	%	Frequency	%	Frequency	%
Increase	23	46	20	28.6	43	35.8
Same	27	54	43	61.4	70	58.3
Decrease	0	0	7	10	7	5.8

Source: Own data, 2019

According to the household survey 23(46%) and 20(28.6%) of food secure and food insecure members respectively had claimed that expenditure on health expense increased due to increase in their income and also 27(54%) and 43(61.4%) of the food secure and food insecure members responded that their expenses on health care did not show any change while the last portion of 0(0%) and 7(10%) of food secure and food insecure of the households had claimed that expenditure on health increased due to the increase in their income from the cooperative

Table 4.1.10 Change in expenditure for health

Change in expenditure for school expense	Food secure		Food insecure		Total	
	Frequency	%	Frequency	%	Frequency	%
Increase	23	46	19	27.1	42	35
Same	27	54	51	72.9	78	65

Source: own survey, 2019

Study findings from household survey had indicated that 14 (28 %) and 11(15.7%) of the respondents those are food secure and food insecure had claimed there was an increase of their expenditure to purchase chemical fertilizer respectively; while 59(84.3%) and 36(72%) of the respondents had claimed that the expenses on chemical fertilizer had not changed for 19.2% of the respondents

Table 4.1.11 Change in expenditure for Fertilizer and other inputs

Change in expenditure for Fertilizer and other inputs	Food secure		Food insecure		Total	
	Frequency	%	Frequency	%	Frequency	%
Increase	14	28	11	15.7	25	20.8
Same	59	84.3	36	72	95	79.2

Source: Own data, 2019

The study findings indicated that 29(40%) and 16(30.1%) of the food secure and food insecure had stated that their expenditure on household items increased due to the income from the cooperative respectively while 59(84.3%) and 36(72%) of food secure and food insecure claimed that there was no any change on the expenses of household items respectively

Table 4.1.12 Change in expenditure for school expense

Change in expenditure for household items	Food secure		Food insecure		Total	
	Frequency	%	Frequency	%	Frequency	%
Increase	29	40	16	30.1	40	37
Same	20	47	55	65.9	78	65

Source: Own data, 2019

Over all there was a positive attitude towards the role of cooperative on food security. For example one of the cooperatives reveals as follows

“There are great changes in my household wellbeing because of the membership of the cooperative we have been able to buy household items, to send our children to school, and builds confidence of decision making and gaining of self-respect” (Key informant interview, cooperative member).

4.2 Determinant Factors that Affect the Household Food Security

4.2.1 Econometric analysis Result

Binary logistic regression model was used to identify determinants of food security of the among cooperative in the study area. The result of the model revealed the relative significance of demographic, socio-economic and institutional factors to food security.

The binary logistic regression model was employed to estimate the effects of the independent variables on food security status of households. From all sample farmers, 80.0% were correctly

predicted food secure and food insecure categories by the model. The correctly predicted food secure (sensitivity) and correctly predicted food insecure (specificity) of the model were 76 and 84.3 respectively. Thus the model estimated groups of food secure and food insecure accurately.

Table 4.2.1 classification

Predicted				
Food security				
Observed		Food insecure	Food secure	Percentage correct
Food security	Food insecure	59	11	84.3
	Food secure	12	38	76.0
Overall				percentage
80.0				

Cut value is .500

Livestock holding in tropical livestock unit of the respondents positively affected households' food security at a 0.05 level significant. The larger the livestock unit of households has the leaser the food insecurity, i.e., the probability of the households to be food secure was 4.046 times more than those households with less number of livestock when other variables in the model kept constant. The livestock unit is a proxy to wealth status and households with higher livestock were expected to have diversified better income, which may in turn lead to increased consumption and household food security.

Education is a human capital that enables agro-pastoral households to diversify their means of income. The result of the binary logistic regression model revealed that educational status of the household head and food insecurity has negative relationship and significant at 5 percent probability level. The positive sign shows that, increase in the educational status decreases the likelihood of the household to be food insecure while keeping other factors constant, as the level of their education increases by one unit than the probability of household to be food secure increases by 19%. The possible explanation is that, when the educational status increases the household would be able to diversify its means of livelihood and can easily adopt modern ways of farming which in turn reduces household food insecurity. This result is supported by Abebaw (2003).

Age of the household head this variable is found to be positive and significant at 5 percent probability level. The positive 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 3.202 implied that, other things being constant, the odds ratio was in favor of being food secure increased more than 2.899 times 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 (A bebaw, 2003).

Sex of the household head was found to have positive correlation with household food security and significantly influencing at 5 percent probability level. The positive sign indicates that as the household head becoming male increases, the probability of the household to be food secure increases. the odd ratio of 3.938 means, other variables being constant, the probability of the household to be food secure increased 3.938 times more than those whose household head is not male as a chance getting household headed by male increased by one factor.

Table 4.2.2 Logit model outputs of determinants of food insecurity

Independent Variables	Estimated coefficient	S.E	Wald	Sig. level	Odds Ratio Exp (B)	95% C.I for EXP (B)	
						Lower	Upper
AGE OF HH	1.164	.537	4.701	.030*	3.202	1.118	9.171
EDUCATION	1.631	.858	3.616	.057*	.196	.036	1.051
MRTLISOFF HH	-1.099	1.633	.453	.501	.333	.041	2.702
SEX OF HH	1.371	.550	6.215	.013*	3.938	1.341	11.567
FS OF HH	.229	.382	.360	.548	1.257	.595	2.657
LAND	-.023	.371	.004	.951	.977	.473	2.021
REMITTANCE	.606	.376	2.600	.107	1.833	.878	3.830
OFFFARM INCOME	.136	.523	.067	.796	1.145	.411	3.195
TLU	1.398	.658	4.506	.034*	4.046	1.113	14.707
CHEMICAL FERTLIZER	.262	.552	.225	.636	1.299	.440	3.837
FOOD AID	.599	.497	1.451	.228	1.820	.687	4.822
DEPENEDCY RATION	1.242	.888	1.105	.293	2.571	.442	14.966
DS	1.257	.572	.152	.696	1.250	.488	3.202
Credit	.162	.441	.115	.585	2.240	.376	5.756
Constant	-4.176	1.195	12.213	.000	.015		

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

Source: Binary logistic regression model output, (2019).

4.3 Household's Food Insecurity Coping Mechanisms

Agro-pastoral households apply a range of activities during critical food shortages in order to cope and escape with the adverse effects of food insecurity.

The coping mechanisms engaged by agro-pastoral households among cooperative members in the study area include; borrowing cash or grain, sale of more livestock than usually, remittance, seeking alternative or additional job, migrating to another place, Sale milk and milk product, eating fewer meals, sale of firewood and charcoal, participation in cash basis projects works, eating less preferable food and household splitting

Table 4.3.1 Household coping mechanisms against food insecurity

Number	Household coping mechanisms	Food secure		Food insecure		
		Number	%	Number	%	Total
1	Borrowing cash or grain	34	68.0	54	77.1	73.3% 88
2	Sale of more livestock than usually	29	58	54	77.1	69% 83
3	Remittance	26	52.0%	36	51.4%	51.7% 62
4	Seeking alternatives or additional job	19	38.0%	29	41.4%	40.0% 48
5	Migrating to another place	11	22.0	29	41.4	33.3% 40
6	Sale milk and milk product	16	32.0	19	29.2	29.2% 35
7	Eating fewer meals	9	18.0%	13	18.6	18.3% 22
8	Sale of firewood and charcoal	8	16.0	12	17.1	16.7% 20
9	Participation in cash basis projects works	10	20.0%	10	14%	16.7% 20
10	Eating less preferable food	3	6.0%	17	20.0%	14.2% 17
11	Household splitting	7	14.0	9	12.9	13.3% 16

Source: own survey, 2019

Borrowing cash or grain was found to be the first and commonly practiced coping mechanism to escape with the adverse effects of food shortages in the area. About 88(73.3%) of food insecure households were borrowing cash or grain. Therefore, Borrowing cash or grain is the main coping mechanism employed by food insecure households during critical times in the study area.

Livestock serve as a store of value that can be converted into cash to meet the immediate needs of the households. The findings of the study reveals that 83(69%) of the food insecure households were engaged selling of livestock and was the second common activity that household use as a coping mechanism.

Remittance is the third most important strategies which used by food insecure household during food insecurity condition to escape from the negative impact of food insecurity. The findings of the study reveals that 62(51.7%) of the food insecure households were getting income from outside/inside relatives in kind of remittance. Therefore, Remittance and was found to be the third common activity that household use as a coping mechanism.

The fourth, fifth and sixth most important coping strategies used by large number of households those are among cooperative members were Seeking alternatives or additional job, migrating to another place and Sale milk and milk product which was about 48(40.0%), 40(33.3%) and 35(29.2%) of both food secure and food insecure respectively

The number of meals that household consume food in normal condition is reduced during harsh situations to cope with the unfavorable settings. In light of this, reducing the number of the meal was found to be the seventh most common important coping mechanism that food insecure household put in place to respond adverse effects worsening the food insecurity conditions. The results of the survey reveals that 22(18.3%) of both food secure and the food insecure households during food insecurity were employing reduction of the number of meals as coping mechanism to limit the adverse effects of food shortages.

The other important activities that household device as a coping mechanism in the study area which was about 20(16.7%) , 20(16.7%) , 17(14.2%) and 16(13.3%) include ; Sell of firewood and charcoal, participating in cash basis project works, eating less preferable food and household splitting were also among the coping mechanisms used in the study area.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATION

This chapter presents the conclusions regarding the determinants of food security among cooperative members and forwarded key areas for policy recommendations and further research based on the findings of the study.

5.1. Conclusion

The objective of the study was to examine the determinants of household food security among cooperatives members in Owbera Woreda, Somali National state as case. In this regard the study presented in the study reveals that the mean per capita calorie intake of the sample household was 2037.6036 kcal, which is lower than the minimum required amount of kilocalorie which is 2100kcal. The average calorie intake among the food secure and food insecure sampled households among cooperative members were 2458.0694 (which is higher than the minimum requirement per adult per day to live active and a healthy life) and 1737.2709. Kcal per AE per day respectively.

The result of the binary logistic regression model reveals the status of food security of the households among cooperative members is significantly influenced by factors such as age of the household head, livestock owned by household, education and sex of the household head. Age was found to be very essential for food security of the household among cooperative members. Due to this reason, the probability of affected by food security decline in that stage .This result is parallel with the study undertaken by Mohamed (2015) who argues that an increase in the age of the household head increased the likelihood of the household to be food insecure while other things being constant. Total livestock unit was significant determinant and positively related with food security. This result is parallel the study undertaken by Abdirahman (2015) who argues that Livestock is the major determinant which needs to be improved the performance of livestock and Livestock played major role both in mitigating the hazards of food insecurity as well as coping mechanisms of households. Therefore, there is a need to improve livestock production and productivity since llivestock alone can no longer the livelihood without the complements of cultivation, Upgrading livestock productivity; by promoting it's genetically through artificial insemination, creating livestock market which can make livestock as well as its products more marketable.

Education is a significant variable and the Household head with better knowledge is believed to have a chance of income diversification from different angles and have ability to manage his farm and nonfarm activities. But, their educational performance needs to be improved by bringing education intervention programs.

Sex of the household head and education are other significant determinants those have positive impact on food security.

More over different constraints were forwarded and mentioned by participants of Focus group discussion and key informant interview as major challenges hindering the performance of cooperative members in the study area. Some of them were in adequate amount of credit, It's clear that some cooperative members need much amount of credit which they use multiple purposes; either they may engage in petty trading or other purposes. Weak monitoring and evaluation is another main challenges faced by cooperative due to that the cooperative officials don't evaluate the performance of cooperative members and they lack capacity to implement effective monitoring system of the performance of cooperative members.

5.2 Recommendations

Based on the findings of the study the following crucial points were forwarded

- Rural household in the study area, used mostly hand tool for cultivation which is traditional mean of cultivation, hence for these peoples'' to change their life style, they need to be aware of model plowing system such as using oxen and other new technology that can change their traditional way of farming system. This can be done through giving them a training, sharing experience with others and introduced them with model cropping system.
- The high dependency ratio from the study result calls for policy makers to focus on projects like family planning. Large family size is as aside problem for the household if the nonproductive members are high. Awareness creation should be the made to tackle this problem. Therefore, to prevent devastating food insecurity in the future, there should be focuses on integrated health and education services

- Some cooperative members still did not know how to read and write. This calls for a need to have adult literacy education program.
- The study revealed that cooperative and responsible local government bodies had not provided training to each member of the cooperative. The provision of training to members would facilitate their financial management and skill development. Lack of training would hinder the positive impact of cooperative on food security
- Management of the cooperatives is advisable to make follow-up of cooperative members who have received the services from the cooperative to make certain whether these members of the cooperative use the services for the intended purpose or not.
- The finding of the study also implies that the performance of the cooperatives is falling off as their financial power is slumping. The inadequate capital of the cooperative in turn is hampering the almost all aspects of cooperative activities, including hiring skilled manpower, investing in human capital of the cooperative members, providing credit service, purchasing better farm inputs and accessing better market opportunities. This consequently calls for increased effort for boosting the financial capital of the cooperative. Cooperative development policies should be geared towards enhancing the capital power of the cooperatives as determines both the function of the cooperatives and the potential benefits of the members

Suggested for further studies

- Lastly similar studies should be carried out in other districts of the region to see if the findings are parallel so the comprehensive food security policies and practices may be formulated to improve the wellbeing of residents in the Somali Regional State and in the country as a whole.
- Cooperative management is recommended to enhance performance of cooperative members through technical facilities

6. References

- Abebaw Shimeles. 2003.** Dimensions and determinants of food security among rural households in Dire Dawa, Eastern Ethiopia. Department of Agricultural Economic, Haramaya University. 152p
- Abiyot Eliyas. 2010. Potential of Cooperatives in Empowering Rural Women: the case of Chellela Rural Saving and Credit Cooperative Union, Sidama Zone, SNNPR. MA Thesis, Department of Rural Livelihood, Addis Ababa University, Addis Ababa, Ethiopia.
- Adugna Eneyew and Wogayehu Bekele (2011). Causes of household food insecurity in Wolayita: Southern Ethiopia. *Journal of Stored Products and Postharvest Research*, 3(3): 35–48
- Basher sheikh, 2010. Analysis of Food Security Status and Copping Strategy in Kabri Bayah District of Jigjiga Zone of Somali Regional State. An M.sc Thesis Presented to the School of Graduate Studies of Haramaya University. 60p
- Babbie, Earl. 2008. *The Basics of Social Research*. Thomson Wadsworth. Fourth Edition. Belmont, USA
- Bekele Eshetu. 2008. Status of extreme poverty and hunger in pastoral areas of Ethiopia: Looking forward and inward. In S. Adi & D. Temesgen (Eds.), *Millennium Development goals and pastoral development: Opportunities & challenges in the new Ethiopian millennium*. Proceedings of the Fourth National Conference on Pastoral Development in Ethiopia (pp. 92-108). Addis Ababa: PFE.
- Bernard, T. et al (2010). *Cooperatives for Staple Crop Marketing: Evidence from Ethiopia*. International Food Policy Research Institute. Washington
- Beruk Yemane. 2003. Food security situation in the pastoral areas of Ethiopia. pp.1-3. National Pastoral Programme Coordinator, Oxfam GB.
- Beyene F. and M. Muche (2010). Determinants of Food Security among Rural Households of Central Ethiopia: *Quarterly Journal of International Agriculture* 49 (2010), No. 4: 299-318
- Burch, F. and De Mur, P. 2012. A Human developemnt and capability Approach to food security : Conceptual framework and Informational Basis : WP 2012-009: Feberuary 2012 , for UNDP Regional For Africa
- CAADP (2009). *Policy Framework for Food Security in Pastoralist Areas consultative Draft*. pp. 2-4. (CAADP) Pillar III
- Chlembo, P. M.. 2004. Gender and food security in an irrigation scheme: case study of Chipapa households, Kafue District. M. Sc. Thesis, Center for Women’s and Gender Research, University of Bergan.

- Chung, K., L. Haddad, J. Ramakrishna and F. Riely. 1997. Identifying the food insecure: The application of mixed method approach in India. IFPRI Washington, D.C.
- CIDA (Canadian International Development Agency). 1989. b Food Security: A Working Paper for the 4As. Area Coordination Group. July. De Waal, A. (1989). Famine that Kills: Darfur, Sudan, 1984-1985. Clarendon Press, Oxford.
- CSA, 2011. Central Statistical Agency Population Estimates. Ethiopia, Addis Ababa
- Daniel 2006 . performance of agricultural cooperatives And determinants of members decision to use as marketing agent in adaa liben and lume district , Msc paper Alemya University
- DFID (Department for International Development).2002.Food Security Strategy and Priorities for Action Eliminating Hunger, London
- DPPB (Disaster Prevention and Preparedness Bureau).2009. Somali Region 2009 Multi-sect oral Emergency Response Plan. DPPB: Jijiga.
- Degefa Tolossa. 2002. Household Seasonal Food Insecurity In Oromiya Zone Ethiopia: Causes. Social Science Research Report Series Number 26. Organization for Social Science Research in Eastern and Southern Africa. Addis Ababa: OSSREA.
- Degefa Tolossa (2002). Rurak Livelihood , poverty, Food security in Ethiopia : Acase study at Erenssa and Garbi communities in Oromia Zone , Amhara National Regional State . Doctorail Thessis for the Degree of Filosofiae , Trondeim, May 2005
- Degefa Tolossa (2002). Household Seasonal Food Insecurity in Oromiya Zone, Ethiopia: Causes. Social Science Research Report Series, No.26: OSSREA, Ethiopia, Addis Ababa
- DegnewEshete. (2000). The Role and Contribution of Non-Governmental Organizations in Food Security in Ethiopia. Paper presented at the panel discussion on the 30th Anniversary in of Agri-service Ethiopia. February 2000.
- Dessalegn Rahmto (1989). Rural Women in Ethiopia: Problems and Prospects. Paper Prepared for the Seminar on Gender Issues in Ethiopia, Institute of Ethiopian Studies, Addis Ababa. December 1989
- Devereux, S. 1988. Entitlements, availability and famine: A revisionist view of Wello, 1972-74. *Food Policy* 13, no.3.
- Devereux, S. and Maxwell, S.(2003). Food Insecurity in Sub-Saharan Africa, University of Natal
- Devereux S., 2010. Food Insecurity in Ethiopia. Department For International Development
- Devereux, Stephen (1993). Theories of famine. Harvestor wheatsheaf: New York and London
- Diana P.(2007): Food Security in Development countries: A systematic Perspective, Medllindistrict, Eastern Wellega of Oromia, Ethiopia; Thesis paper AAU.

- Dominguez, A(2010). Why was there still malnutrition in Ethiopia in 2008? Causes and Humanitarian Accountability. Journal of Humanitarian Affairs, Retrieved from <http://sites.tufts.edu/jha/archives/640>
- Drimie et al., 2006 . The regional network on HIV/AIDS, rural livelihoods and food security (RENEWAL), International Food Policy Research Institute (IFPRI)
- EU (European Union). 2012. Effectiveness of European Union development aid for food security in Sub- Saharan Africa. Special report No. 1, 2012.
- FAO (Food and Agriculture Organization of the United Nations). 1996. Rome declaration on world food security and World food summit plan of action. Rome
- Food and Agricultural Organization (FAO), 1998. Agriculture, Food and Nutrition for Africa. A resource book for teachers of agriculture. Rome, Italy.
- FAO (Food and Agricultural Organization).2001. The State of Food Insecurity in the World:When People Live with Hunger and Fear of Starvation. UNFAO. Rome, Italy
- FAO (Food and Agriculture Organization of the United Nation). 2003. Trade reforms and food security: Conceptualizing the linkages, Rome.
- FAO 2005. Assessment of the World Food Security Situation, Committee on World Food Security, Thirty-first session, 23–26 May 2005.
- FAO 2010. The state of food insecurity in the world: Addressing food insecurity in protracted crises. Rome, Italy
- FAO 2012, Agricultural Cooperative: Key to Feeding the World
- FAO (food and agriculture organization), 2013. Annual report of food insecurity in Ethiopia.
- FAO, IFAD AND WFP (2015). the state fo food insecurity in the world 2015. meeting 2015 international hunger targets : taking stock of uneven progress . Rome , FAO.
- FPRI (2002).rural community coping strategies with droughth driven food in security kawale country Kenya
- Frankenberger, 1992. Indicators and data collection methods for assessing household food security. In Maxwell S. and Frankenberger (1992). Household food security: concepts, indicators and measurement, technical review, UNICEF and IFAD, Rome.
- Frehiwot F,2007:Food Insecurity and its determinants in Rural household in Amhara region
- FSP (Food Security Program). 2003. The new coalition for food security in Ethiopia, Vol. I, Addis Ababa, Ethiopia.
- Getachew Diriba, 1995. Economy at the crossroad: Famine and Food Security in Rural Ethiopia. Printed by Commercial Printing Enterprise, Addis Ababa Ethiopia.

- Gulled Abdullahi, 2006. Food Insecurity and Coping Strategies of Agro Pastoral Households in Awbare Woreda, Somali Region Ethiopia. An M.sc Thesis Presented to the School of Graduate Studies of Haramaya University. 63p
- Girma, G. (2012). Determinants of Food Insecurity Among Households in Addis Ababa City, Ethiopia, Aksum University, Shire Campus Investment potentials of Ethiopia, Addis Ababa, 10(2): 159-173
- GTP (2014/15). Annual progress report for march 2013, unpublished
- Guajarati, D.N., 2004. Basic econometrics, 4th Edition, McGraw-hill Inc. New York.
- Gupta, S.P., and Gupta, M.P (2002). Business statistics.Suttan Chand and sons, New Dehli.
- Hoddinott, J., 1999. Operationalizing Household Food Security in Development Projects: An Introduction (Technical Guide 1). International Food Policy Research Institute, Washington D.C.
- Hoddinot, J., 2001a. Choosing outcome indicators of household food security. IFPRI, Washington, D.C.
- Hoddinot, J., Weismann, D., L. Bassett, and T. Benson,(2009). Validation of the world food programme's food consumption score and alternative indicators of household food security. IFPRI discussion paper.
- Hosmer, D.W, and Lemeshew,S. (1989). Applied logistic regression. A wiley interscience publication. New York, USA.
- IFAD (International Fund for Agricultural Development). 1997. Food Security, Poverty and Women: Lessons from Rural Asia.
- IFPRI (2009): International Food Policy Research Institute. Proceedings from sustainable in Emergency Needs Assessments, Institute of Development Studies, Rome Italy.
- International Cooperative Alliance (ICA) (2004). Cooperative Principles: <http://www.coop.org/>
- Indiris Siraje, 2012, Assesment of food insecurity, its Determinants and Coping Mechanisms Among Pastoral Household Case of Zone One Chifra District Afar National Regional State, An M.sc Thesis of Graduate Studies of Haramaya University. 70p
- Julia and Mari, 2002. Agricultural Desarrollo Rural: Contribucionesde las Cooperativas Agrarias”, CIRIEC - España. Revista de Economía Pública, Social Co-operative, Vol. 41, pp. 25-52
- Kifle Lemma and Yosef Gebrehiwot (1999). The food security situation in Ethiopia. Concept,
- Kostas G.S., 2001. Food, Agriculture and Rural Development Current and Emerging Issues for Economic Analysis and Policy research. FAO, Rome.

- Lewin, P. and M. Fisher. 2010. The determinants of food insecurity in rural Malawi: implications for agricultural policy. Malawi Strategy Support Program (MaSSP). Policy note, 4:1-3.
- Maxwell, S. 1996. Food security: A post-modern perspective. *Food Policy* 21, 155-170.
- MoFED (Ministry of Finance and Economic Development). 2008. Ethiopia: Sustainable Development and Poverty Reduction Program. pp. 34, 71 & 76. Federal Democratic Republic of Ethiopia (FDRE) Ministry of Finance and Economic Development (MoFED) Addis Ababa Ethiopia.
- Motbainor A., A. Worku and A. Kumie (2016). Level and determinants of food insecurity in East and West Gojjam zones of Amhara Region, Ethiopia: a community based comparative cross-sectional study. *BMC Public Health*: 16:503.
- Nessef M., et al. 2009. Pastoralism and climate change: Enabling adaptive capacity. London. HPG/ODI
- AAO (2013). Progress status of the district performance in 2013. Awbare, Ethiopia.
- PFE (Pastoralist Forum of Ethiopia), 2010. Proceedings of the Fourth National Conference on Pastoral Development in Ethiopia, Millennium Development Goals and Pastoral Development: Opportunities & Challenges in the new Ethiopian Millennium UN ECA Conference Hall August 29-30, 2007 Addis Ababa.p2
- Russell, Bernard. 2006. *Research Methods in Anthropology; Qualitative and Quantitative Approaches*. Fourth Edition. AltaMira Press, Oxford, UK.
- Sadik Abdi. 2012. Dimensions and Determinants of Food Insecurity among Agro-Pastoral Households in Jijiga District, Somali Regional State, Ethiopia. A Thesis Prepared to the school of graduate.
- Save the Children, 2010. Somali region livelihood zones compiled report.
- SCF-UK , 20010 . Household Economy Approach baseline study
- SDPPB), line Bureaus and NGOs, 2012. Deyr-need assessment findings November 24-13 Dec 2012 Jijiga, Ethiopia
- Sen, A. 1981. *Poverty and Famine: An Essay on Entitlement and Deprivation*. Oxford: Clarendon Press.
- SBOFED, 2013. Assessing Development Gaps in Somali Regional State of Ethiopia.
- Simmons, R. & Birchall, J. (2008). The role of cooperatives in poverty reduction: Network Perspectives. *Journal of Socioeconomics*, 37 (6), 2131-2140
- Sisay Belay. 2012. Food insecurity and coping strategies: a perspective from Kersa district, East Hararghe Ethiopia *Food Science and Quality Management* www.iiste.org ISSN 2224-6088 (Paper) ISSN 2225-0557 (Online) Vol 5, 2012.

- SLCRDB (Somali Livestock, Crop and Rural Development Bureau). 2011, annual report. Unpublished
- Smith, C.L, H. Alderman and D. Aduayom. 2006. Food insecurity in Sub Saharan Africa. New estimates from household expenditure survey. IFPRI, Washington, D.C.
- Tefere Mekonen. 2009. Determinants of Household Food Security and Coping Strategies the Case of Farta District, South Gondar Zone, an M.Sc of Graduate Studied of Haramaya
- Tsegay Gebrehiwot (june2009): Determinants of Food Security in Rural household of the Tigray Region; Master thesis In AAU.
- UNDP (United Nations Development Program), 2013. Quarterly key economic and social indicators produced by advisory unit UNDP, Ethiopia. At <http://www.et.UNDP.org> (updated in August 2014).
- United Nations. 1975. Report of the World Food Conference. Rome, 5-16 November 1974, New
- USAID (United States Agency for International Development). 1999. Food security indicators for the use in the monitoring and evaluation of food security program. York
- USAID (2009). United States of Agency International Development. Poverty and hunger: Issues and options in developing countries. A world bank policy study, Washington, D.C Use, Addis Ababa.
- Von Braun, 1992. Improving Food Security of the Poor: Concept, Policy, and Programs. International Food Policy Research Institute. Washington, D.C, U.S.A
- WFP (World Food Program). 2004. Emergency Needs Assessment, WFP/BE.1/2004/4-A Rome.
- WFP (World food program), 2006. A review of emergency food security assessment practice in Ethiopia. A study commissioned and prepared for World Food Programme, Rome.
- WFP (2006). Baseline food security analysis in developing countries. WFP country office. Addis Ababa, Ethiopia.
- Weibe, K. and D. Maxwell. 1998. Land tenure and food security. A review of concepts, evidence and methods. Research Paper. University of Wisconsin, Madison. University. 114p.
- Yamane, T., 1967. Statistics: An introductory analysis, 2nd Ed. New York: Harper and Row.
- Yasir A (2009) the political economy of Disaster Vulnerability : A case study of Pakistan Earth quarter
- Yeraswork Adimassie. 2010. Social Research Methods. The Office of Chief Academic Officer for Research. CACOR. Office of the Vice President for Research and Dean of School of Graduate Studies. Addis Ababa University, Addis Ababa

- Yusuf Aliyi. 2007. Determinants of Food Security in Pastoral and Sedentary Livelihoods: The Case of Erer District, Shinille Zone, Somali Regional State. An M.Sc Thesis Presented to the school of Graduate Studies of Haramaya University. 67P.
- Zerihun Nigussie and Getachew Alemayehu. 2012. Levels of household food insecurity in rural areas of Guraghezone, Southern Ethiopia Wudpecker. *Journal of Agricultural Research* 2(1): 008 – 014
- Zeuli, K. (2002). The role of cooperatives in community development, University of Wisconsin Center for Cooperatives, Bulletin No.3.

7. APPENDICES

7.1 Tables in Appendix

Appendix table 1.conversion factor used to compute adult equivalent (AE)

Age group (years)	Male	Female
<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 : stock, et al (1991)

Appendix table 2: conversion factor used to compute tropical livestock unit (TLU)

Animal category	TLU	Animal category	TLU
Calf	0.50	Donkey (young)	0.35
Weaned calf	0.34	Sheep and goat (adult)	0.13
Heifer	0.75	Sheep and goat (young)	0.06
Cow	1.00	Chicken	0.013
Ox	1.00		
Donkey (adult)	0.7		

source : stock, et al (1991)

Appendix table 3: conversion factor used to estimate Kcal of food items

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

source : ETNRI, 1997

APPENDIX I/ QUESTIONNAIRE

Dear respondent, the purpose of this questionnaire is to study the determinants of household's food security among cooperative members. The following questions are aimed at obtaining information about the food security status of cooperative members and how the cooperatives are working in promoting the status of household food security among cooperative members. This study is conducted as a requirement for the degree of Masters of Art in Rural Livelihood and Development, and any findings from the research will serve as a valuable resource for further studies on the issue at the same time revealing the existing reality. Furthermore, your identity and the information you provide in this questionnaire will remain confidential, hence I request you to be honest and forthcoming in your response. Thank you in advance for your collaboration!

Instruction

Please choose the appropriate answer that reflect your opinion and put the number of your choice in the box provided or circle the later of your choice which best represent your opinion and you can choose more than one item with which you agree. If choice not provided, write your answer in the space provided

Part one

Social, Economic and Demographic Issues

101. Age of the respondent-----

102. Marital Status

- | | |
|------------------|-------------|
| 1. Never-married | 2. Married |
| 3. Widowed | 4. Divorced |

103. Are you a household head?

- | | |
|--------|-------|
| 1. Yes | 2. No |
|--------|-------|

104. What is the size of your family members? -----

105. Your level of education

- | | |
|------------------------------|------------------------|
| 1. Can't read and write | 2. Read only |
| 3. Can read and write | 4. Attended grade 1-4 |
| 5. Attended grade 5-8 | 6. Attended grade 9-12 |
| 7. College diploma and above | |

106. Labor force status (for those whose age is above 18 years): Were you participating in cooperative activities in the last 6 months?

1. Yes 2. No

107. If no for Q106, what is the main reason?

1. Disabled 2. Didn't want to work
3. No job/ No employment opportunity 4. Sick
5. Old 6. Others (specify) _____

Part Two

Information about cooperative members

201. Who organizing the cooperative?

1. Your own initiative 2. Local government initiative
3. NGO 4. Other specify -----

202. Does the cooperative have its own bylaw?

1. Yes 2. No

203. As the member of Cooperative, do you get training?

1. Yes 2. No

Part Three

Agriculture related questions

301. Do you have your own agricultural land?

1. Yes 2. No

302. If yes for Q301, what is the total size of your land holding? _ in ha _____ (in Hectore)

303. How did you acquire your own land?

1. Inherited/ gifts from family 2. Purchase
3. Land distribution 4. Other (specify) _____

304. Do you produce enough, for your family, product to eat throughout the year?

1. Yes 2. No

305. If no for Q304, what are the constraints in order of importance, which prevent you from doing so?

1. Shortage rainfall 2. Lack of early maturing variety
3. Lack of plough oxen 4. Lack of money to rent a tractor
5. Due to the limited land size 6. Others

505.3.1 The last three month of income of the work

506.Total income of the

507. What are the reasons behind you start off farm activates? (*Multiple response*)

1. Lack of land and reduce the farm size of household for farming practices
2. Low productivity of agriculture
3. To cover cost related to farming activities
- 4.It is less risk than agriculture
5. Cooperative helped me to start off farm activities

507. Do you participate in off farm activities at your maximum capacity?

1. Yes 2. No

508. If no for Q506, what are the factors that limit you to participate in off farm activities at your maximum capacity and/or upgrading the existing? (*Multiple response*)

1. Lack of market facilities
2. Lack of skill
3. Lack of raw materials
4. Lack of startup and working capital
5. Lack of support from cooperative and government
6. Limited time to engaged in off farm activities
- 7.Other specify __

Part six

Credit Services

601. Have you received any type of credit for the last year?

1. Yes 2. No

602. Has the household received remittance in this year?

603. If yes for Q605, how much you received

Part Seven
Changes after Cooperative

701. As you are a member of cooperative, does it improve your income?

1. Yes 2. No

702. If yes for Q701, what change do you achieve?

1. Construct new houses 2. Sending students to school
3. Buy livestock 4. Purchase productive assets
5. Others specify: -----

703. If no for Q701, what is the main reason?

1. I don't have enough knowledge how I manage my income
2. Due to the presence of marketing link problem which hindered the exchange product
3. The loan what the creditor provided not enough to run the business
4. The loans couldn't excide beyond to spend for other social events (like wedding)
5. Others specify-----

704. Income sources from different activities

	Source of income	After cooperative			Reasons for increase or decrease*(give answer from)
		Increas	Same	Decrease	
1	Petty trade				
2	Others (gift, loans, remittance)				
3	Sales of crop				
4	Sales of the product of poultry farm				
5	Sales of vegetable				
6	Sales of goat/sheep				
7	Sales of fire wood and charcoal				
8	Sales of meat				

705. Food consumption per day per person before member of cooperative

1. One meal 2. Twomeals3. Three meal

706. Food consumption per day per person after member of cooperative

1. One meal 2. Two meals 3. Three meals

707. Change in source of expenditure

Ser. No	Type of expenditure	After member of cooperative			Reasons for increase or decrease** (give answer from)
		Increase	The same	Decrease	
1	Food				
2	Health care				
3	School expense				
5	Fertilizer				
6	Household items				
7	Others____				

Part Eight

Shocks and Coping Mechanism

801. What coping mechanism do you use when you have food shortage at your home to have enough food? Rank the given option according to how you prioritize them

S/No	Coping mechanism	1. Yes 2. No	How often do you do this?		
			Most years	Every year	Only in famine year
1	Borrowed cash or grain				
2	Sold firewood				
3	sale of more livestock than usual,				
4	Sell milk and milk product				
5	Migrating to another place				
6	Eat fewer meals per day				
7	Remittance				
8	Household splitting,				
9	Seeking alternatives or additional jobs				
10	Seeking relief assistance,				
11	Participating in cash basis project works				

802. Did you receive any food aid in the year 2018/19?

1. Yes 2. No

803. If yes for Q802, specify the types of food aid

1. Cereal grain 2.Oil3. Other _____

Part Nine

Marketing

901. Where do you buy foodstuffs and non-food items (clothes and the like) for your household consumption?

1. From nearby market

2. In any villages market

3. Other (specify) _____

902. How far is the market place from your residence? ___Km

903. How long it take from your home to the nearby shopping center? _____Minutes

904. When do you sell most of your livestock? _____Months/seasons

905. Do you get livestock and its products with reasonable prices at this particular time?

1. Yes 2. No

906. If No for Q905, what are the reasons? (*Multiple answers are possible*)

1. Lack of access to potential markets

2. More supply of livestock

3. Lower or no demand for livestock

4. Others (specify)

907. If No for Q905, why did you sell your livestock product with unreasonable price? (*Multiple answers are possible*)

1. To settle debts

2. To pay tax

3. Social obligations (wedding, funeral, etc.) 4. To meet family requirements

5. Others (specify) _____

908. What are the problems in marketing of your product? (*Multiple answers are possible*)

1. Transportation 2. Low price

3. Too far from market 4. Others (specify) _____

Part Ten

Livestock Ownership

1001. Do you own livestock?

1. Yes 2. No

1002. If yes for Q1001, which classes of livestock do you own?

No	Type of livestock	Owned in 2018	Sold in 2018		Reason for sale	Purchased in 2018	
			No	Value in birr		No	Value in birr
1	Cattle						
2	Sheep and Goat						
3	Camel						
4	Donkeys						
5	Poultry						

Part eleven

Household Consumption and Expenditure

1101. Household consumption during the last seven days (considering both home and outside of home situation). *(Here, wife and/or the person involved in purchases and preparing the meal should be the principal respondent/s).

Food type	Source						
	Home produced	Purchased		Sold		Gift/loan/wage in kind	
A. Cereal	Quantity	Quantity	Price/Unit	Quantity	Price/Unit	Quantity	Source
1. Maize (Kg)							
2. Sorghum (Kg)							
3. Rice (Kg)							
4. Buns dry (Kg)							
5. Wheat (Kg)							
B. Meat and other animal products							
6. Cow milk (L)							
7. Camel milk (L)							
8. Goat milk (L)							
9. Cow meat (Kg)							
10. Camel meat (Kg)							
11. Goat meat (Kg)							
12. Sheep meat (Kg)							
13. Butter (Kg)							
C. Beverages and drinks							
14. Tea (L)							
15. Drinking water (L)							
D. Vegetables							
16. Potato (Kg)							
17. Onion (Kg)							
18. Garlic (Kg)							
Others							
19. Sugar (Kg)							
20. Salt (Kg)							

Appendix 2

Interview Questions for cooperative Officials

1. How much was your household income before you involved cooperatives?
2. Do you have positive towards being a membership of cooperative?
3. do you get training after when join cooperative
4. Did cooperative help you improve you income?
5. What shocks do members of the cooperative frequently suffer from

Appendix 2

7.3 Focus Group Discussion (FGD) Questions

1. If your family size is large, how you manage the credit service?
2. Do you think being a member of this cooperative has impact on your food security status?
3. How cooperative helped you transportation cost?
4. How the cooperative helped you in coping with the troubles?