

BAHIR DAR UNIVERSITY

Institute of Disaster Risk Management and Food Security Studies

Disaster Risk Management and Sustainable Development Department Livelihood and Food Security Program

Post Graduate Program

DETERMINANTS OF HOUSEHOLD FOOD INSECURITY IN SEKOTA DISTRICT, WAGHIMIRA ZONE

M.sc Thesis

By

SOSINA MENGESTIE AGEZE

August 2021

BAHIR DAR, ETHIOPIA



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*BY*

SOSINA MENGSTIE AGEZE

A Thesis Summited to Bahir Dar University, Institute of Disaster Risk Management and Food Security Studies in the Partial Fulfillment of the Requirements for a Master’s Degree in Livelihood and Food Security Program

 Advisor BIRHAN SISAY (PHD)

 August 2021

 BAHIR DAR, ETHIOPIA

**DECLARATION**

This is to certify that this thesis entitled “Determinants of household Food insecurity status the case of Sekota District” I submitted in partial fulfillment of the requirements for the award of the degree of Master of Science in "Program" to the Graduate Program of Institute of Disaster Risk Management and Food Security Studies, Bahir Dar University by Sosina Mnegstie (ID No: BDU/1207259PR) that is my original work produced under the guidance of my advisor Birhan Sisay (Ph.D.) Different source used is duly acknowledged in this study.

# Name of the student

Sosina Mengstie

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name of the supervisors;

Birhan Sisay (PhD) (Major Advisor)

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# APPROVAL SHEET

As a member of the Board of Examiners of the MSc Thesis-Open Defense Examination, I certify that I have read and evaluated the thesis prepared by Sosina Mengstie and examined the candidate. I recommend that the thesis be accepted as fulfilling the thesis requirements for the degree of Master of Science in Disaster Risk Management & Sustainable Development and livelihood and food security program.

Name of External Examiner Wuletaw Mekuria (PhD) Signature  Date: 11August 2021

Name of Internal Examiner Zerihun Yohannes (PhD) Signature………Date; 11August 2021

Name of Chair person Tesfehun Asmamaw (PhD) Signature…….. ,… Date; 11August 2021

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I would like to express to Amhara National Regional State Disaster prevention, food security program, and areas in need of special support coordination commission Early Waring Dairoctrat Dirocter Ato Jumberu Desse

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# ABBREVIATIONS AND ACRONYMS

|  |  |
| --- | --- |
| ADLI  | Agricultural Led Industrialization |
| AIDS | Acquired immunodeficiency syndrome  |
| CDF  | Cumulative Distribution Function |
| CRGE | Climate Resilient Green Economy |
| CSA | Ceneteral Stastics Agency  |
| DA | Direct Support |
| FAO | Food and Agriculture Organization |
| FSP | Food Security Program |
| FSS | Food Security Strategy |
| GTP | Growth and Transformation Plan  |
| HABP | House Hold Asset Building Program |
| HIV | Human Immunity Virus |
| MDG | Millennium Development Goal  |
| NNP | National Nutrition Programme |
| NPSDRM | National Policy and Strategy on Disaster Risk Management |
| NPSFS | National Program for Food Security |
| PASDEP | Plan for Accelerated Sustained Development to End Poverty |
| PRSP-1  | Poverty Reduction Strategy Program |
| PSN | Productive Safety Nets |
| PSNP | Productive Safety Net program |
| PW | Public Works |
| SDPRP | Sustainable Development Poverty Reduction Paper |
| SNNP | Nouthern Nations, Nationalities, and Peoples |
| SPFS | Special Program for Food Security |
| SSA | Sub Sharan African |
| TB | Tuberculosis |
| WB |  World Bank |
| WFP | World Food Program |
| WHO | World Health Organization |

# *ABSTRACT*

*The study was conducted in Sekota woreda, Waghimira Zone, Amhara Regional State, Ethiopia with the main objective of identifying determinants of food insecurity that influence the food security status of rural farm households in the study area. A simpl random sampling method was employed to select 282 sampling units from four kebeles. Both primary and secondary data sources were used to collect the relevant data for this study. The primary data were collected through structured questionnaires and observations, while secondary data were conducted from various sources. The data were analyzed using descriptive statistics and econometric model. Descriptive statistics such as standard deviation, percentage, mean, and t-test were used to describe the characteristics of food secure and food insecure groups. The descriptive analysis result revealed that about (65%) of the households were found to be food insecure while (35.2%) were found to be food secure. Moreover, the binary logistic regression model was fitted to analyze the potential determinants affecting household food insecurity in the study area. Among eleven explanatory variables included in the logistic model, nine of them were found to be significant at 5 and 1 percent probability levels. The variables that determine the probability of households’ food security status positively affected were sex of household, family size, landholding size of the household,**number of oxen owned, education level of the household head, and fertilizer using statues of the household while the remaining variable of the number of dependent in the household,age and livestock size of the household determines the probability of households’ food security status negatively affected. Thus, priority should be given to these factors while strategy and policy aimed to improve rural household’s food security status, to limit population size through integrated family planning and education services. There is also a need to strengthen and expand both formal and informal or skill training for the rural household, support the productivity of land and livestock through integrated strategies to enhance rural household food security status.*

***Keywords:*** *Sekota Woreda, Household Food Insecurity, Food Security Status, Logistic Model.*

# CHAPTER ONE

# INTRODUCTION

## 1.1. Background of the Study

Food is both a need and human right, but food insecurity is prevalent in today’s world in general, and in sub-Saharan Africa in particular.Bekele et.al report in 2019, the 10.9% of the world, 20.4% of Africa and 31.4% of Eastern Africa people were undernourished in 2017. World developing countries face ever increasing challenges of food insecurity (Ellen, 2012). Africa, which reversed from being a key exporter of agricultural commodities into being a net importer, has the highest percentage of undernourished and has shown the least progress on reducing the prevalence of undernourishment in the last 30 years.

Food security has over the years undergone several definitions. Famine Early Warnings Systems Network (2014) defines food security as a state when all people have access at all times to safe, nutritious, sufficient food to maintain an active and healthy life. Food Security exists, at the individual, household, national, regional, and global levels when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for a healthy and active life (FAO, 2001; Barrett, 2002). It is however a complex issue that encompasses sustainable development, malnutrition, health, and economic progress as well as trade, and has over the years elicited debates as different societal members voice their concerns (FAO, 2010). It is a basic right of all people to have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs for an active and healthy life.

However, Food insecurity a key problem and development challenge for our planet, there are more than 820 million people in the world who are hungry, Ahiman et al., (2020). Limited rural development, weak infrastructural development of power, road, and market access aggravate food insecurity in sub-Saharan Africa. Weak government policy that adversely affected the agricultural sector is another factor contributing to food insecurity in the region. Poor health condition also poses its impact on food insecurity. The region is also characterized by the prevalence of contagious and fatal but preventable diseases of HIV/ AIDS, malaria, tuberculosis (TB), and other diseases. This reduces rural labor participation in agriculture and of-farming activities contributing to food insecurity Kedir (2017).

Ethiopia is one of the poorest countries in the world, and about 80% of the population lives in rural areas. In this layer, more than half suffer from food insecurity (Barnett 2001). Similarly, Doocy et al. (2005) indicated that poverty and food insecurity are endemic and are exacerbated by the frequent droughts that plague the region, wars, and lack of public policy. According to the FAO (2010), 41% of the Ethiopian population lives below the poverty line and more than 31 million people are undernourished. A large portion of the Ethiopian population has been affected by chronic and transitory food insecurity. The situation of chronically food-insecure people is more and more severe (Adimasu et.al ,2019).

As we see Ethiopia is nationally having suitable and fertile land for domestically food requirement production that we rely on for our food consumption as a means for mitigating the shortage to meet our domestic sources and needs but consistently failing to meet those national food needs because of weak or primitive farming practices and systems. The let alone the poor developing countries food security issues like Ethiopia, but also the total world’s food problem is increasing at alarming rate overall the world as population pressure increases, environmental degradation, arise in domestic conflicts in different countries or climate change dangerously and seriously affecting the life of specially poor rural people in developing countries. Most food insecure households are concentrated in the central part of northern Ethiopia, generally described as drought- and famine-prone areas (Chiwele and Sikananu, 2006).

 One of these is the mixed farming production system area which is the Waghimira zone. Most of the land resources (mainly the soils and vegetation) of this part of the country have been highly degraded because of the interplay between some environmental and human factors such as relief, climate, population pressure, and the resultant over-cultivation of the land, deforestation of vegetation and overgrazing. The area is generally considered resource-poor with limited or no potential and hence highly vulnerable to drought as Sekota Woreda Food Security Office information found.

The problem of food insecurity has continued to persist in the country as many rural households have already lost their means of livelihood due to recurrent drought and crop failures. According to NPC (2017), poverty is higher in rural areas (25.6%) than it is in urban areas (14.8%). Among regions with the largest proportion of poor people was Tigray (27%) and a large proportion of poor people were also found in Benishangul Gumiz (26.5%) followed by Amhara (26.1%), Oromia (23.9%), Afar (23.6%), Gambella(23%) and the southern nations, nationalities, and Peoples (SNNP) region (20.7).

Waghimira administrative zone, like other parts of the region most of the rural population in the district has been suffered from food shortages every year (WFECD, 2019).In 2015/16 the number of people that have been vulnerable to a series of food shortages and need food assistance as a result of the impact of Elinno was 415,340 (WFS& EWO,2016).

Sekota District is among the fourteen chronically foods insecure Woredas of Waghimira Zone incorporated under the Productive Safety Net Program with the ultimate goal of “Resilience to shocks and livelihoods enhanced, and food security and nutrition improved for rural households vulnerable to food insecurity” through preventing asset depletion at the household level and create assets at the community level (MoAD, 2014). Rural community agricultural production is mostly for the purpose of consumption. According to the data obtained from Sekota Woreda food security office, most of the Woreda rural community does not understand, and motivated to participate in different alternative income generating sources to ensure their food even during chronic food insecurity times.

##

## 1.2. Statement of the Problem

Food insecurity and poverty are critical and persistent problems facing the majority of Ethiopians today. Each year about five million people, particularly in the rural areas, faced food shortages in the country (Yenesew, 2015). Food insecurity in Ethiopia is a wide range of areas to be covered with a large number of people to be attended for different identified causes of food insecurity problem. Among these causal factors per capita land holding with increasing population growth, livestock availability, education, per capita income of the household from agricultural and nonagricultural activities, soil fertility, conflict, under-funded agriculture are the major and commonly mentioned factors (Gebre, 2005; Negatu, 2010; Ramakirshina et al, 2009; Madeley 2007).

This implies the existence of socioeconomic, demographic, and other factors underlying the poverty and food insecurity problem in the study area. According to BoA (2017), the food insecurity problem in Ethiopia particularly in Amhara regional state has appealed to many scholars and researchers to undertake studies on the issue. For instance; the survey study by Arega (2013) in Lay Gayint District, South Gondar Zone showed that the majority (74%) of the sampled households experienced food insecurity among which 86% are female-headed households. Another study by Yilebes (2015) in Libo Kemikem District, South Gondar Zone revealed that 50.7% of households were found to be food insecure in the district. In addition a study by Tibebu & Sisay (2017), in North Wollo Zone, Amhara Region revealed that about 42 % of the sampled households were measured to be food insecure in the area.

 The combinations of factors particularly, recurrent drought have resulted in a serious and growing problem of food insecurity in Ethiopia at the household level (Mequanent et al, 2014). According to (Yilebes, 2015) poor soil fertility, small land holding size, occasional droughts, degradation of farm lands, frost attack of crops, and chronic shortage of cash income, poor farming technologies, weak extension services, high labor wastage, poor infrastructural & institutional arrangements were the causes leading to the loss of ownership of key productive factors including farm, crop, live stack, family labor, farm implements and other economic values in the Region. Food insecure households are concentrated in the central part of northern Ethiopia, generally described as drought- and famine-prone areas. One of these is the mixed farming production system area which is the Waghimira zone. Sekota district is one of the food insecure woredas of the Amhara Regional State. Most of the average rural households in normal seasons get harvests that could cover only 5 month's food consumption requirements in the district.

Most of the land resources (mainly the soils and vegetation) of this part of the country have been highly degraded because of the interplay between some environmental and human factors such as relief, climate, population pressure, and the resultant over-cultivation of the land, deforestation of vegetation and overgrazing. The area is generally considered resource-poor with limited or no potential and hence highly vulnerable to drought. The number of chronically food insecure in the woreda aided by productive safety net program (PSNP) for each year was about 31,244 beneficiaries it is a high number in the region compared with other woredas in the region (WZAO,2020). The area is vulnerable to child and maternal malnutrition (stunting, wasting, and underweight), starvation, dependency, dropout of education, migration, and need of emergency food aid.

According to the Woreda agriculture and food security office, one of an indication of existence food insecurity problem in Sekota Woreda, rural community the wored was that the working force or young part of the community migrates to the town looking for subsistence labor markets. Due to their weak understanding, poor capacity and poor educational status their willingness to struggle with food insecurity and poverty is declining.

The study incorporates some important variables from their model which could affect the food security situation of rural households that are not examined previously by researchers, like envaromntal factors and as to the best of the researcher knowledge, no published study is conducted in the study area dealing with determinates of the food security situation of rural households. Therefore this study was attempted to fill this gap for existing problems in this study area.

## 1.3. Research Objective

### 1.3.1. General Objective

The General objective of the study was to assess the determinants of food insecurity among rural households in Sekota district.

### 1.3.2. Specific Objectives

* To measure the status of household food insecurity in the study area
* To assess the determinants of household food insecurity in the study area.

## 1.4. Research Questions

The study attempts to address the following research questions:

1. What is the food insecurity status of households in the study area?
2. What are the Demographic socioeconomic determinants of household food insecurity in the study area?

## 1.5. Significance of the Study

The study was to determinants food insecurity of households and it is vital and very important because it will provide information that will enable effective measures to be undertaken to improve food security status and bring the success of food security by applying food economic development stratagies in the study area’s. Especially the result of the research may help the concerned Governmental Organizations (GOs) and Non-Governmental Organizations (NGOs) to design and implement effective, holistic, and sustainable food security strategies in the district.

This study will give information to play a role in ensuring the food security status of rural households in the study area. In addition, the result of this research will be used as instrumental, by development planners and policymakers, while dealing with food insecurity and sustainable development endeavors. Moreover, the results of this study may serve as inputs to other studies on food security in the rural household context.

## 1.6. Scope and Limitation of the Study

This study was concerned with the analysis of the main determinants of food insecurity among rural households in Sekota district. The research was undertaken on the specified woreda and selective four rural kebeles alone. In addition to coverage limitation, the research is also most of the data collected were based on the recall ability of the respondents who may not have given very accurate information and measurement of calorie food intake was not appropriate. Therefore, lack of detail information from the household is the main limitation of the study and not uses time using cross-sectional data. Due to those reasons, the study might not able to show the full image of the complex and dynamic nature of food insecurity.

## 1.7. Organization of the Paper

This thesis would organize into five chapters. The first chapter deals with the introduction together with background of the study, statements of problem, major and specific objectives of the study, research problem question, scope and limitation of the study, significance and organization of the study. The second chapter discusses literatures on gowning insights about household food insecurity; including theoretical and empirical literature review. Chapter three, research data and methodology of the study include data type and source, sample size determination, specification the empirical model, estimation method. Chapter four includes descriptive result, characteristics of sample household (continues and discrete variables) and also econometric result analysis and interpretation. Finally, conclusions and recommendation.

## 1.8. Conceptual Framework of the Study

Institutional factors

* Access To Market
* Fertilizer Utilization Status

**Economic factors**

* Land Holding Size
* Livestock Ownership
* Number Of Oxen
* Off-Farm Income

Household Food Security Status

Demographics Factors

* Age Of Household Head
* Sex Of Household Head
* Family Size Of Household
* Education Level Of Household
* Number Of Dependents

**Environmental factors**

* Drought

Figure 1: Conceptual framework of the study

# CHAPTER TWO

# LITERATURE REVIEW

This chapter is concerned with a review of literature on determinants of food insecurity relation was present and discuss. It consists of concepts, theories, measurement, determinants and empirical works on the subject matter. Presents a review of related literature on the concept and definition of food security, historical of food security, levels of food security, measurement of food security, determinants of food security and the remaining part presents empirical studies of food insecurity.

## 2.1. Theoretical Literature Reviews

### 2.1.1. Definition of Food Security

Food security is defined as a situation that achieved at the individual, household, national, regional, and global levels when all people at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences as recommended for an active and healthy life (Abduselam,2017). As a multidimensional concept, food security is also about equitable access to markets, distribution of resources within households, among individuals, across communities and viable options and opportunities to take action and make decisions (Mulumebet, 2010).

The concept of food security was brought to light by the early stages of increasing food supply to reduce famine and hunger throughout the world. (Wiggns, 2004). Since the World Food Conference of 1974, definitions have changed from viewpoints that ranged from national food security or an increase in supply to those emphasizing improved access to food in the 1980s (FAO, 1983). Hoddinott (2001) cites that relevant literature provides about 200 definitions of food security. During the 1970s the United Nations defined food security in terms of sufficient production and supply of food at the global and national levels (Clover, 2007).

Food security was regarded as a primary need. The most common definition today was adopted by the World Food Summit in 1996 and this has become a general understanding of what food security entails (FAO, 1996). The definition states that; ‘at the individual, household, national, regional and global level, food security is achieved when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life’ (FAO, 1996). Four fundamental elements of food security are food access, availability, utilization, and stability.

There are approximately 200 definitions and 450 indicators of food security (Hoddinott, 1999). Maxwell and Frankenbergers (1992) report list 194 different studies on the concept and definition of food security and 172 studies on indicators. The following are the major historical & conceptual paradigm shifts to our current understanding and practice of Food security.

Food security is defined here as access by all people at all times to enough food for active, healthy life (World Bank, 1986). It is in this new definition of food security that Maxwell (1996) located a shift in the terms of debate from the global/national to the household/individual level. Food security is observed from the perspective of the food insecure; the focus has shifted from the aggregate supply of food at the global/national level to the localized demand for food at the household/individual level. the main elements of food availability, accessibility, utilization & food stability issues.

**Food Availability:** According to FAO (2012), food availability refers to the presence of food at the global, national, household, and individual level; it means sufficient quantities of appropriate and necessary types of food from domestic production, commercial imports, commercial aid programs, or from any food stocks which are consistently available to individuals, households or nations.

In general, the term availability tends to be applied to food available at a regional, national, district, or community level (Pasquale & Matteo, 2011) and when it is at the micro-level it is taken as households’ capacity to produce the food they need which indicates the availability of active family labor that could able to create incomes and assets. The food availability indicators capture not only the quantity but also the quality and diversity of food. In case of assessing food availability, adequacy of dietary energy supply, the share of calories derived from cereals, roots, and tubers, average protein supply, and the average value of food production should be analyzed in this regard.

**Food Accessibility:** According to Anderson et al. (2015), accessibility refers to the resources that households have to obtain foods, either through their products or through purchase. Individuals need to have assets or incomes to produce and purchase to obtain foods needed to maintain their consumption. So, food access depends on; income available to the household, the distribution of income within the household, the price of food in the market, individual’s access to the market, social and institutional rights are some of the factors (Kuwornu, A. Mensah & H. Ibrahim, 2011). Food access consists of three elements, which are physical, economic/financial, and socio-cultural concerns. Food insecurity in terms of the physical dimension is a situation where food is being produced in one part of a country but insufficient or non-existent as a result of lack of infrastructure (transport) that food cannot be delivered to another part suffering from lack of food accessibility.

 From the economic point of view, food insecurity arises when food is available but people are unable to afford it. For instance, in rural areas, most people, and especially the poor, rely on market systems to provide food and essential goods and services and also for selling their produce. The third element is the socio-cultural dimension which arises when food may be physically available and the potential consumer has the money to buy the food but is prevented from so being a member of a particular social group or even gender which is full of social conflict and civil rivalry. This condition can seriously interrupt food production and the loss of livestock leads to households for food insecurity situation (Pasquale & Matteo, 2011).

**Food Utilization:** Is commonly understood as the way the body makes most of the various nutrients in the food and the nutritional benefits derived from food consumption. The availability and access to food on their own are not enough; people have to be assured of “safe and nutritious food”. Utilization also inculcates factors such as safe drinking water and adequate sanitary facilities and the food consumed has to provide sufficient energy to enable the consumer to carry out routine physical activities (Pasquale & Matteo, 2011). This aspect is highly related to proper food processing, storage techniques, adequate knowledge of nutrition, cooking practices; and adequate health and sanitation services exist.

 In general, according to Jrad, B. Nahasand, and H. Baghasa (2010), food utilization is proper biological use of food, requiring a diet that contains sufficient energy and essential nutrients as well as knowledge of food storage, water supply, and sanitation, processing, basic nutrition, child care, and illness management.

**Food Stability:** Refers to the stability of all other dimensions of food security over time; that means stability must be present at all times in terms of availability, access, and utilization to avoid food insecurity situations (Pasquale & Matteo, 2011). According to FAO (2008) even if our food intake is adequate today, we are still considered to be food insecure if we have inadequate access to food periodically, risking a deterioration of our nutritional status. Factors such as adverse weather conditions, political instability, or economic factors (unemployment, rising food prices) may have an impact on our food security status. Hence, food security to be insured at global, regional, national, household, and individual levels that food stability should be maintained in this regard.

### 2.1.2. Food Insecurity

The Food and Agricultural Organization (FAO, 2002) defines food insecurity as a situation where there is limited availability of safe and nutritious food needed to live an active and healthy life. This condition also involves being worried about not having sufficient food to eat or not having money to buy food when it runs out (Burns, 2004).

People found to be food insecure generally cannot consume or grow enough food due to limited resources (Boussard *et al.,* 2006). Other instances of food insecurity are found amongst those who have been victims of wars, the urban poor, and low-income households, especially in underdeveloped countries.

 Moreover, women residing in low-income households are most vulnerable to food insecurity. This is because women usually spend a large share of their income on children’s needs. They are also responsible for producing or preparing the food they purchase (FAO, 2011). Von Braun *et al*., (1992) note that theory differentiates two types of food insecurity, chronic and transitory food insecurity.

 **Chronic Food Insecurity**: Chronic food insecurity occurs when the shortage of food lasts for long periods and is usually caused by a lack of productivity and financial resources due to poverty (FAO, 2008). It persistently affects individuals that are not able to meet the requirements to purchase or produce enough food (European Commission, 2006). Chronic food insecurity breeds conducive conditions for vulnerability, which is defined as continual susceptibility to food insecurity (Devereux, 2006). Chronic food insecurity is regarded as mild or moderate food insecurity and it usually dominates when there is a consistent market or structural failure within a nation (Misselhorn *et al.*, 2010).

Chronic food insecurity affects almost one billion people each year (Staatz *et al*., 2009). Cathie (2006) argued that the minimum daily food intake and nutritional policy measures are essential policy recommendations to alleviate the challenges related to chronic food insecurity.

**Transitory Food Insecurity**: Transitory food insecurity is a temporal shortfall of food and lasts for short periods. It is rooted in several factors such as short-term shocks and lack of food availability due to fluctuations in food prices (FAO, 2008). The condition of transitory food insecurity happens when there is an unexpected change in the ability to purchase or produce sufficient food to maintain a healthy lifestyle.

Transitory food insecurity is regarded as the most serious manifestation of household food insecurity because it causes hunger and famine, even though the condition occurs in the short term (Staatz *et al.,* 2009). Inappropriate government policy may lead to transitory food insecurity due to the destabilization of food consumption trends (Cathie, 2006).

 Chronic and transitory food insecurity is interrelated because chronic food insecurity is rooted in one or more incidences of transitory shocks (Misselhorn*etal.,* 2010). Coping strategies employed by households outline a clear indication of the relationship between the two concepts. A household is likely to sell off its assets in an attempt to cope with transitory food insecurity, thus this sacrifices its ability to attain food or income, which in turn leads to chronic food insecurity. This whole process is called a poverty trap (Staatz *et al.*, 2009).

### 2.1.3. Levels of Food Security

Global food security entails that globally sufficient food is produced to make it possible for national and sub-nationals to have access to sufficient food worldwide. Global food security is associated with food systems that are characterized by the food chain activities of production, processing, distribution, and consumption among different regions (Misselhorn *et al.*, 2010). It focuses on issues that affect the supply and distribution of food both domestically and internationally (Ecker & Breisinger, 2012).

National food security is defined within the context of national food self-reliance. It entails that a country can produce and distribute adequate food that is needed by all its citizens (Smith *et al*., 2012). National food security can be estimated by using the equal balance between food demand and food supply at an acceptable price.

 The unequal distribution of food demand and supply does not necessarily imply that all households within a country are food insecure; it simply means that a household is food insecure because they have limited entitlement to food due to inadequate resources explained that food security at a national level does not guarantee food security at a household level because food security is no longer viewed as a problem of food supply but rather as a livelihood failure because of inadequate access to acquire food (Devereux & Maxwell, 2001).

Although there is an improvement in global food availability, food insecurity and undernourishment remain relatively high throughout the world (Fan, 2012). Economic growth related to poverty alleviation and equal distribution of income among the population is important for the accomplishment of national food security (Babu and Sanyal, 2009). Ames *et al*.

 (2011) argue that although economic growth does not guarantee poverty alleviation and food supply, the government must implement policies for improving the unequal distribution of income and resources, through land reform and better access to financial markets for low-income households. Community food security involves a situation where all community residents have access to sufficient and nutritious food obtained through sustainable food systems. (Gottlieb, 2002). To ensure community food security, food systems should be operated efficiently and in sustainable environments. Policy makers within a community are responsible for the quality of nutritional food for its society (Allen, 2004). When the issue of food security is addressed; social justice, self-reliance, and community economic development should be emphasized among all local and regional leaders (Babu and Sanyal, 2009).

 A household is food secure when all members of its household have access to sufficient food needed to sustain them and live a healthy life (Tonukar and Omotor, 2010). Households are food secure when they have access to the amount of safe food needed by all members of the household. At the household level, food security refers to the ability to secure sufficient food by either producing or purchasing food for all members of the households (FAO 2010).

### 2.1.4. Measurement of Food Security

Anderson (1990) observed that national food security is measured differently as compared to household food security. Two methods can be used to measure the food security status of a nation, namely, the first is the measurement of projected food supplies, calculated by using GDP over a particular period and it includes farming and commercial imports minus non-food uses.

 The second measure is the measurement of nutritious food supply it is calculated by differentiating between the projected food supplies and the amount of food needed within a country for those individuals who cannot afford to consume enough food because they earn low income (Labadarios *et al.,* 2009). The different categorization of food insecurity requires different means to measure the existence of each condition.

Attention to global food insecurity versus national versus household. The importance of measuring food security at a household level provides an understanding of how individual households are affected by the condition of food insecurity and how they react to the circumstances related to food insecurity (Qureshi 2007).

Faridi and Wadood, (2010) note that measuring food insecurity at the household level is indirect and is founded on three components; which are the balance sheet, national income distribution, and consumer expenditure data. Furthermore, these measures are applied when hunger and inadequate food intake are linked, to ensure that food security is measured in terms of availability and consumption of staple foods or energy intake. Identifying appropriate measures for food security is important for distinguishing households who are food secure from the food insecure households and characterizing the nature of the cause of food insecurity (Hoddinott & Yohannes 2002).

The measurement of household food security is needed so that public officials, policy makers, and service providers can implement effective policies and programs for assessing the changing needs of food security (Bickel *et al*., 2000).

## 2.2. Determinants of Food Security

The dimensions of food security make it clear that the concept of food security is a complex one with many dimensions. At one level the concern is with national food security, which is the ability of countries to produce or import sufficient food all year to meet their requirement for both private and public distribution (Omonona et al., 2007).

 The generation of household food security is dependent on the physical availability of food at the market or community level, the ability of the household to access the available food, the ability of individuals particularly those especially susceptible to food deficits such as women, infants, and children to eat the food, and finally the body‘s ability to process the nutrients consumed. The physical availability of food is a function of productive agriculture, effective trade infrastructure, and efficient food aid logistics, if necessary. Agriculture, trade, and aid policies are important in influencing the availability of staple and non-staple foods (Obayelu and Elijah, 2010).

 The recent concept of food security has given more attention to households and individuals than its availability at international, national, and regional levels. This is because increasing food production, supply, and sufficiency at broader levels does not necessarily ensure that every individual is food secured. This is why, as reported by the WFP (2009), over 1 billion people throughout the world have been suffering from hunger and malnutrition even though there is more than sufficient food supply at the global level at present. At another level, the concern is more with the problem of malnutrition. The levels of the nutrient requirement have been determined by the World Health Organization (WHO) and the Food and Agricultural Organization (FAO). The basic minimum requirement figure is 65 grams of protein and 2500 kcal of energy per capita intake of which if consumed otherwise, leads to a state of malnutrition (FAO and WHO, 1993).

**Demographic factors**: [According to CSA (2021), Ethiopia](https://worldpopulationreview.com/countries/ethiopia-population)’s current population is about 115 million and is expected to surpass 200 million by the end of 2049. Ethiopia’s population is growing about 2.7% annually with no projected peak year or period of decline and the average household size is also large when compared with other Sub-Saharan countries. At the micro-level, household size is one of the factors expected to influence the food security status of households. The majority of farm households in Ethiopia are small-scale semi-subsistence producers with limited participation in non-agricultural activities since landholding size and financial capital to purchase agricultural inputs are very limited. Kidane (2005) in his work found that family size tends to exert more pressure on consumption than the labor it contributes to production. Another demographic factor that strongly influences household food security is the sex of the household head. Studies by Degafa (2002), Ramarkrishaet al. (2002), and Kidaneet al. (2005) independently conducted in different parts of rural Ethiopia came out with a common conclusion that the livelihood of female-headed households was disadvantaged when compared with their male counterparts. This is because the researchers justify, female household heads have limited access to livelihood assets like land, education, saving, labor force and oxen (drought power), livestock, and credit services.

**The poor asset base of the rural households**: In countries like Ethiopia where the agricultural sector employed 85% of the labor force and contributed 41% of GDP and 80 % of export earnings (EEP, 2012), the land is an indispensable resource. Given the level of agricultural technology, a certain minimum landholding size is required to produce sufficient production. Yared (1999) in his study in Wagda concluded that household landholdings play the most fundamental role in determining grain and animal production in the rural economy. He added that in Wagda, access to drought power and labor participation is influenced by the size of the land people owned. Farm equipment and basic infrastructure are among the physical capitals that influence the day-to-day activities of rural households as producers and consumers. Dulla(2007) stated that ownership of machinery and equipment enables households to raise labor and land productivity and is especially helpful for households with relatively high opportunity costs for labor, such as those pursuing off-farm employments. Fertilizer use is used by most studies as a proxy for technology. Literature on the roles of fertilizer in agricultural productivity found that fertilization of farmland can boost agricultural production and Influence the food security status of a household. The study by Kidaneet al. (2005) concluded that the shift from non-fertilizer user to fertilizer user increased the probability of food security from 33.8% to 44.3 %, but in the country, those who apply fertilizer are insignificant due to their limited purchasing power.

**Socio-cultural factors**: Education has a tremendous influence on the food security status of households. Educational attainment by the household head could lead to awareness of the possible advantages of modernizing agriculture using technological inputs; enable them to read instructions on fertilizer packs and diversification of household incomes which, in turn, would enhance household‟s food supply (Kidaneet al., 2005). Socio-cultural events such as eating habits and food preferences, cultural ceremonies, and festivals also influence the food security status of the given communities and way of saving or expenditure, also directly or indirectly affects the food security situation of that particular community.

**Economic Factors:** Productive assets (resources) are consist of farm size, farm oxen, skill (knowledge), family labor, remittance, farm implements, and farm and off-farm income venture (Meskerem, 2011). Many studies conducted in different parts of Ethiopia showed that farm land, credit, livestock holding, and access to different productive assets are affecting the food security status of rural households in Ethiopia. According to Yenesew(2015), the livelihood of rural people in general and food insecurity situation, in particular, are dependent on the ownership of key productive factors including farm, draught animals, breeding cattle, family labor, farm implements, which determine the seasonal or annual production and income of rural households. In his studyDessalegn (1997), as cited by Mesay (2008), the major constraint of agricultural production is oxen possession in farm HH. Lack of oxen or no oxen possession in this regard means potentially a cause of household food insecurity in the context of rural HH where cultivation is impossible without draft power.

Moreover; agricultural inputs such as improved seeds, fertilizers, herbicides, and farm implements are also vital to increase production. But, peasants cannot access these inputs due to the high cost of chemical fertilizers and improved seeds, the poor performance of the market, monopolization of input supply in the hands of the government, lack of access to credit facilities, and low market values of agricultural products are also causes of household food insecurity in rural areas of Ethiopia (Mesay, 2008).

**Access to infrastructure**: Access to infrastructures such as market centers and roads promotes livelihood diversification and agriculture intensification. Adequate infrastructure, especially main and feeder roads that improve access to necessary input-fertilizer, seed, pesticide chemicals, and other agricultural implements are very indispensable (Osman, 2003). Although the current government has made significant progress particularly in road development, the sector is still weak even compared with the African average. World Bank (2007) reported that due to lack of proper and on-time transportation facilities post-harvest total production loss reached up to 30%.

**Environmental Factor:** Environmental factors include land, water, vegetation, soil, and climate upon which agricultural activities (crop production, livestock rearing, fishery, forestry, horticulture, etc.) are based. Any hazard such as, erratic rainfall distribution, recurrent drought, soil erosion, poor soil fertility, crop pest and disease, livestock disease, etc., which are against these resources can affect the food security situation of a given community (Meskerem, 2011). Natural disasters have obvious negative impacts on food production and even on the economic performance of a country and thereby bringing food insecurity (Vadala, 2009), but the degree of environmental influence on food security varies depending on the level of development and the situation of subsistence farmers (small holder farmers). In general developing regions are regarded as more vulnerable to those environmental shocks. In explaining the effect of environmental changes on the livelihood of farmers in Ethiopia (Mesay, 2008) argued that the traditional farming systems (poor land management practices) of the Ethiopian peasants consume and exploit the natural resource base, hence, resource degradation, depletion, and environmental problems are inevitable. In addition, natural catastrophes including flood, drought, water logging, excessive heating, rainfall variability, degraded soil, insufficient vegetation cover, and the like are the immediate and intermediate causes of food insecurity and famine in Ethiopia. Moreover; among all factors, recurrent drought and erratic rainfall distribution are the major cause for the loss of food production in areas where agricultural activity has been overwhelmingly dependent on rainfall.

## 2.3. Food security in Ethiopia

According to the Humanitarian Requirement Document (GoE and Partners, December 2015), the El Niño-driven drought has greatly expanded food insecurity and malnutrition, and devastated livelihoods of the poorest and vulnerable people across the country, including those areas that normally produce surplus food. That is why the government of Ethiopia has appealed to its international partners for emergency food assistance to feed 10.2 million people and for special nutritional programs for more than 2.1 million, including 800,000 severely malnourished children. In addition, over 8 million vulnerable and food-insecure people receive support under the Productive Safety Net Programme (PSNP, 2012).

### 2.3.1. Policy Options to Minimize Food Insecurity in Ethiopia:

To address the difficult situation of food insecurity, the Ethiopian Government has endorsed some policies including a free-market system and macroeconomic targeted policies. The policy measures have been taken because of mitigating food insecurity problems in the country. Among these are, the Food Security Strategy, the National Policy for Disaster Prevention and Management, the Population Policy and Environmental Policy, etc.

The country's development policies and strategies are now geared towards the eradication of poverty and in particular food, insecurity to meet the MDGs. The revised food insecurity policies also aimed to make contributions to the GTP and the achievement of four key government policies (The Social Protection Policy; The National Policy and Strategy on Disaster Risk Management (NPSDRM); The National Nutrition Programme (NNP) and The Climate Resilient Green Economy (CRGE), strategies and programs. Hence, based on the essence of alleviating food Insecurity problems in particular; related policy options of the country are presented briefly as follows:

### 2.3.2 The Food Security Strategy (FSS)

In 1996, the Ethiopian government developed a draft Food Security Strategy and in 1998, a Regional Food Security Program, which was targeted to tackle the problem of food insecurity in the four major regions namely, Tigray, Amhara, Oromia, and SNNPR, was developed. The strategy was improved and updated in 2002 to make it compatible with the Poverty Reduction Strategy Program (PRSP-1, 2002).

The revised strategy targeted mainly at the chronic food insecure moisture stressed and pastoral areas. It is also characterized by a clear focus on environmental rehabilitation as a measure to reverse the current land degradation and at the same time the focus on biological measures as a source of income generation for food-insecure households that differentiates it from the previous strategy. In addition, it encompasses water harvesting and the introduction of high-value crops, livestock, agroforestry, and forestry development activities that are new elements in the revised strategy. Having recognized that food insecurity is a long-term and multi-sector challenge, institutional strengthening and capacity building are also included as sectoral elements and synergy of the strategy (PRSP-2, 2002)..

### 2.3.3. Ethiopian GTP II and (ADLI)

Ethiopia's Growth and Transformation Plan II (GTP II) aims to spur economic structural transformation and sustain accelerated growth towards the realization of the national vision to become a low middle-income country by 2025. GTP II focuses on ensuring rapid, sustainable, andbroad-basedgrowthbyenhancingthe productivity of the [agriculture](http://www.greengrowthknowledge.org/sector/agriculture) and [manufacturing](http://www.greengrowthknowledge.org/sector/manufacturing) sectors, improving the quality of production, and stimulating competition within the economy to eradicate serious poverty and achivie food security. The Growth and Transformation Plan (GTP), launched in late 2010, is the GoE response to these challenges and it is borne out of the government‘s vision to propel Ethiopia into a middle-income country by 2025.

According to FDRE (2002), the Ethiopian economy largely depends on agriculture; “Agriculture is found to be the starting point for initiating the structural transformation of the economy”. Hence, Agricultural Development Led Industrialization (ADLI) was deep-rooted in the development of the rural economy. The strategy was intended to address both supply and demand sides of the food availability and entitlement, respectively within the framework of National Agricultural and Rural Development Strategies. This could be affected from the perspective of ensuring both food securities at national and household levels taking into consideration of the diverse nature of the country’s economy.

**Increasing Domestic Production:** According to the strategy, the availability of food is going to be increased by farming intensification and opening up new lands for cultivation, as well as diffusion of simple technology packages and agricultural inputs to small landholder farmers in areas where there is reliable rainfall. These include the introduction of irrigation in areas with less reliable rainfall; and enhancement of livestock products through improved livestock breeds, better nutritious animal feeds, and better animal services as the main ingredients to stimulate an increase in food production. Moreover, to promote food production, the strategy anticipates to create a stable macroeconomic environment, encourage the private sector to invest in agricultural production, processing, and marketing, intensify agricultural research and training programs, strengthen the security of access to land and improve small farmers’ access to better rural roads to promote the expansion of rural enterprises that generate non-farm incomes capabilities (FDRE, 2002).

**Enhancing Access to Food:** Food insecure farming HHs, as well as the non-farming community, get some and or all of their food from the market. Hence, households need sufficient income that can cover at least their minimum food and non-food requirements. However, according to (FDRE, 2002), many households in the drought-prone and moisture-stressed areas lack sufficient income to meet their basic needs**.** Hence the revised strategy has indicated FS measures aimed at addressing demand-side problems within the framework of the Rural Development Policies and Strategies. These could be achieved by functioning and strengthen the micro and small-scale enterprises, improving the food marketing system, supplementing employment and income-generating schemes, and transfer resources to support vulnerable groups through target programs.

**Emergency Capabilities:** In addressing the risks of household food security, the strategy focuses on strengthening emergency capabilities such as monitoring, surveillance, and early warning arrangements, the capacity for food and relief distribution, strategic reserves of food grains, and analysis of the international food trade and aid situation. Strengthening such capabilities is noted to be based on successful experiences and a focus on developing decentralized distributive arrangements (Dagnew, 2000, cited in Mesay, 2008).

### 2.3.4. Productive Safety Net Program (PSNP)

PSNP is redesigned to address HH's food insecurity and it focuses on protecting asset depletion at the HH level and asset creation at the community level. The objective of the Program is to “provide transfers to the food insecure population is chronically food insecure woredas in a way that prevents asset depletion at the household level and creates assets at the community level” (MoARD, 2006). Whereas the ultimate goal of PSNP is resilience to shocks and livelihoods enhanced, and food security and nutrition improved for rural HHs vulnerable to food insecurity (MoA, 2014).

The implementation of PSNP started in 2005 in 262 woredas targeting 5 million chronic food insecure people (MoARD 2006). The beneficiaries of the program were resource-poor and vulnerable to shocks, and often fail to produce enough food even at times of normal rains in the country. The program continuous again passing through two crucial revision and extending periods: a) From 2011 to 2015 being one of the fourth components among(PSNP, HABP, CCI & Resettlement) of FS and b) From 2016 to2020 by merging with other programs as PSNP4 to that consists only two components ( namely, PSNP and Livelihood) . The new PSNP4 PIM emanated out of the four complementary pillars of policy objectives (such as Social Protection Policy /SPP; Disaster Risk Management /DRM Policy; National Nutrition /NNP Policy and Climate Resilience Green Economy /CRGE Policy) that contributes to the overall achievements of the GTP of the country (MoA, 2014).

PSNP has two components; Public Works (PWs) and Direct Support (DS). Public Works beneficiaries participate in labor-intensive community activities that are designed to employ able-bodied members in chronically food-insecure HHs to create community assets. Whereas DS are those households who are, elderly and disabled persons and would be provided with resources without any pre-condition by the program. The PSNP beneficiary households are expected to build their assets and ultimately become self-supporting and graduate within five years from the program. To enable them to graduate, PSNP beneficiary households need to be supported by other Food Security Programs. However, the Direct Support beneficiary households, who are benefiting from the Direct Support component, are not expected to be graduated (MoA, 2014).

On the other hand, the Livelihood component has an objective of enhancing PNSP beneficiaries to cope with and recover from stresses and shocks to maintain or enhance their capabilities and productive asset base through sustainable livelihood opportunities that can last to the next generation. The lively hood component has three major pathways; Crop and livestock pathway; the Off-farm pathway and the Employment linkage pathway. These pathways pass a series of steps and procedural activities to select beneficiaries that are supposed to be participating in income-generating activities (IGA). After all, credits are available from MFIs and RUSACCOs accordingly to those targeted households including free transfer for those households who are; pro-poor, landless, and female beneficiaries of the program (MoA, 2014).

## 2.4. Empirical Literature Review

A research conducted by Hamda (2018), in Hargeisa city, Somaliland to identify the determinants and dimensions of household food insecurity. The headcount index shows that 53.2 % of the total households are below the food insecurity line. The food insecurity gap and severity were 18.9 % and 6.4 %, respectively. The result of the logistic regression model estimate indicates that out of the 11 factors included, 5 were found to have a significant influence on the probability of being food insecure at less than 1 % significance level. The variables considered were household size, owning a saving account, household head education, and access to remittance and gifts, and average monthly income of households. He indicated that Efforts should be made to improve the income earning capacity of households, their education level with particular focus on vocational training, reduce the household size to reduce their dependency ratio, and access of financial services to the needy and trained people needs to be provided with proper targeting standard.

According to the study conducted by Mebratu (2018), in Woliso district, southwestern Ethiopia, with the main objectives to identify the determinants of food insecurity among rural
households in the study area. To attain this objective the study survey data collected from 122 sampled participants were selected. Calorie acquisition by households was used to categorize the sample households into food secure and food insecure. Accordingly, the results of the descriptive analysis show that about 25.4 % and 74.6 % of the sample households were found to be food insecure and food secure, respectively. Comparison of percentage of food insecurity was also conducted between two groups for some discrete variables, and results revealed that food insecurity significantly varies between the two groups. Results of the logit model showed that the household’s education level, dependency ratio, amount of land, and amount of fertilizing have significantly influenced the level of food insecurity in the study area.

According to the study conducted Selshi et al. (2016) in the case of East Gojjiam, determinants of household food insecurity and employed probit model, the outcome of the research shows that each of these categories, households’ rural dwelling, age, land size and access to credit significantly increase food insecurity whilst maize crop output and marital status decrease food insecurity. This study reveals that food insecurity is a rural and productivity problem and not a poverty issue or inadequate credit.

Particularly in Amhara regional state has appealed to many scholars and researchers to undertake studies on the issue. For instance; the survey study by Arega (2013) in Lay Gayint District, South Gondar Zone showed that the majority (74%) of the sampled households experienced food insecurity among which 86% are female-headed households.

Another study condacted by Yilebes (2015), in Libo Kemikem District, South Gondar Zone revealed that 50.7% of households were found to be food insecure in the district. Poor soil fertility, small landholding size, occasional droughts, degradation of farmlands, frost attack of crops, and chronic shortage of cash income, poor farming technologies, weak extension services, high labor wastage, poor infrastructural & institutional arrangements were the causes leading to the loss of ownership of key productive factors including farm, crop, live stack, family labor, farm implements and other economic values in the Region.

In addition a study by Tibebu & Sisay (2017), in North Wollo Zone, Amhara Region revealed that about 42 % of the sampled households were measured to be food insecure in the area. The combinations of factors particularly, recurrent drought have resulted in a serious and growing problem of food insecurity in Ethiopia at the household level (Mequanent et al, 2014).

Those, the researcher incorporate some important variables from their model which could affect the food security situation of rural households that are not examined previously by researchers and as to the best of the researcher knowledge, no published study is conducted in the study area dealing with determinates of food security situation of rural households Therefore this study was attempted to fill this gap for existing problem in this study area.

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# CHAPTER THREE

# RESEARCH METHODOLOGY

This chapter presents a brief description of the study area, research approach, data type, data source and data collection method, sample design and procedures and methods of data analysis, Model specification, the definition of variables and a working hypothesis, and variable measurements that have been articulated by the researcher and used as a basis to examine the determinants of household food insecurity in Sekota woreda.

## 3.1. Description of the Study Area

The study area is located in Amhara national regional state (ANRS), Waghimira zone, Sekota woreda is bordered in the South Abergelie Woreda, in the North Ziquala Woreda in North West and Dehana Woreda in the West. The Woreda capital, which is also the capital of the zone, Sekota, is situated 430 km from Bahir Dar and 720 km from Addis Ababa (BoFED, 2013). The woreda contains 25 rural and 4 urban kebeles.

**Climate****:** The climate of Sekota Woreda ranges from cool to warm. The average temperature is 12-26°C. The annual rainfall is around 760 mm. The climate conditions of the Woreda are 6 %Weina-Degas, 67 % Dega, and 27 % Kola. In addition, the geographical setup of the area is 28 % flat, 36 % mountainous, 36 % undulate (Sekota Woreda Agricultural Development office, 2019).

**Population**:Based on the 2019 Waghimra zone Finance and Economic Development department (WZDFED), the woreda’s total inhabitants are 100,829 of whom 50,525 are men and 50,305 women; The majority of the population follows Ethiopian Orthodox Christianity, with 95.5 % reporting it as their religion, while 3.8 % of the population said they were Muslim.

Figure 2: Location of the Study Area (Sekota Wereda) in Amhara National Regional State. Sekota wereda

## 3.2 Research Design

To achieve the research objectives, the researcher was used a mixed approach which is a combination of quantitative and qualitative approaches. This approach had better importance than the other single approach. (Creswell, 2009) stated mixed approach importance over others the first is used either quantitative and qualitative approach by themselves is inadequate to address the research objective, second, there is more insight to be gain from the combination of both quantitative and qualitative approach than either from by itself, finally enable the researcher utilizing the strength of both qualitative and qualitative approaches and can gain an expanded understanding of research problems. Based on the above Creswell recommendations, it appears that the main reason for the researcher to adopt a mixed-method approach is to enable one approach to inform another approach in the interpretation of the overall results.

## 3.3 Sampling Techniques

The sampling frame for this particular study was rural households who were found in twenty-five kebeles living in Sekota District of Wagmihira zone. The district is selected purposely based on the consideration of intensity of rural household vulnerability to seasonal and chronic food shortages, and inaccessibility of the area to social services as well as limited infrastructures that aggravate household food insecurity problem. Besides, the strong familiarity of the researcher to the district which facilitated accessibility of getting data from respondents is the major factor to select the study site. A two-stage sampling technique was used to select the representative sample households out of the total 25 rural kebeles.

At the first stage, out of 25 food in secured kebeles found in the rural area of study woreda, four kebeles were selected randomly. In the second stage using a simple random sampling technique 282 respondent households were selected to present the total population at a confidence level of 95% and a level of precision of 5%, as derived from Yamane’s formula (yeman, 1967). Random probability sampling is the one in which every sampling unit in the population has an equal and independent chance of being included or selected for the sample. Finally by using a probability proportional to size sampling technique was employed to draw 282 sampled households from the selected sampled kebeles.

## 3.4. Sample Size Determination

The appropriate sample size was determined by using the following formula. A sample size that represents the total population at a 5 percent precision level derived from Yamane’s formula (1967), presented as follows.



Where, n= Sample size

N= Size of population

= desired significance level (Sampling error) = 5 percent (0.05).

Thus, using the above formula from the target population N= 948;

The appropriate sample size was:

 n= 948

 1+948(0.05)2

 n= 282

Hence, based on this result 282 rural household heads have been selected by using simple random probability sampling (lottery method). After the determination of the sample size from 948 total populations, 282 samples were selected. To determine the number of food secured and in secured participants stratified proportionate (balanced) sampling methods are employed.

From 02 kebele 221

From 08 kebele 247

From 14 kebele 140

From 23 kebele 340

Finally, simple random probability sampling is the one in which every sampling unit in the population has an equal and independent chance of being included or selected for the sample.

##  3.5. Data Sources and Data collection

Both primary and secondary sources of data collection were employed strategically.

### 3.5.1. Primary data Collection Methods

Primary data was generated through a survey questionnaire and observations.

#### A. House Hold Survey

It was developed to generate primary quantitative data. The questionnaire was consists of some main parts that contain specific questions. The objective was to collect the necessary data from the sampled population about the food security status and its determinants that rural households to becoming food secured one. The questionnaire has consisted of both closed and open-ended type of questions. The survey was conducted on the selected 282 rural households. In addition in conducting the survey, there were 4 enumerators from development agents based on their experience and communication skill in each kebele. The enumerators have been briefed about the objective of the research, the content of the survey, and the method of filling the survey to generate actual data.

#### B. Observation

Observation includes the full range of monitoring behavioral and non-behavioral activities events of the sampled households. This type of data collection was provided an opportunity to get an in-depth understanding of the different situations and the food security conditions while undertaking this research in the study area. In addition, the frequent field trip to kebeles has enabled to observe the bio-physical and environment situation and helped also to understand the livelihood of the community and the intrahousehold dynamics at large.

### 3.5.2. Secondary Data Sources

A secondary source of information was reviewed to supplement and ascertain the primary sources of information. Secondary sources, such as books, journal articles, websites, internet resources were systematically reviewed to understand the concept of food insecurity &` its determinants. Moreover, different GOs and NGOs’ documents, publications, academic researches, Policy documents, unpublished reports, and statistical information at a different level were assessed systematically to promote the study about the status of rural household food insecurity in the district.

## 3.6. Data Analysis and Interpretation

After the qualitative and quantitative data collected, edited, coded, and checked to have the required quality, accuracy, and completeness, then the data were analyzed using STATA software programs version 13 which provide descriptive outputs and econometrics results. Qualitative data that was obtained by observation, focus group discussion and the key informant was organized and described on the process in the field. Quantitative data analysis was conducted using descriptive statistics such as tabulation, mean, standard deviation, percentage, to compare and contrast the status of rural households’ food insecurity, and also the binary logit regression, t-test, and econometric model which best fits the analysis for determinants to food insecurity rural households in the study woreda.

### 3.6.1. Descriptive Statistics

Descriptive statistics was one of the techniques which have been used to summarize data collected from the respondents. By applying descriptive statistics such as percentages, mean, standard deviation, frequency distribution, maximum and minimum, one can compare and contrast different categories of sample household characteristics, such as demographic relation, expenditure, asset holding, and other relevant characteristics to draw some important conclusions concerning the desired characters. In addition, t-test and Chi-square test statistics have been employed to check for statistical significances of determinants for food insecurity status of households concerning some explanatory variables.

### 3.6.2. Econometric Analysis

Economic model is precise in assessing the relationship between the regressed and explanatory variables and predicts its significance. The policy implication of any study very much depends upon how close accurate is the specified model in this regard. This brings us to the issue of econometric modeling. For this particular study, the logit model was selected over other models. However, if the independent variables are not normal, the discriminate-analysis estimator is not consistent, whereas the logit is consistent and therefore more robust (Maddala, 1983). In addition, in the analysis of studies involving qualitative choices where a choice has to be made between logit and probit models. According to Amemiya (1984), the statistical similarities between logit and probit models make the choice between them difficult. The justification for using logit is its simplicity of calculation and that its probability lies between 0 and 1. That means its probability approaches zero at a slower rate as the value of the explanatory variable gets smaller and smaller, and the probability approaches 1 at a slower and slower rate as the value of the explanatory variable gets larger and larger.

Therefore, because of its mathematical convenience, the logistic distribution is used and the model is called binary which is derived as follows:

……………(1)

 For ease of exposition, can be rewrite equation (1) as

 Where, zi = α + βiXj

If Pi, be the probability of a household being food secure, as given by equation (1), then (1- Pi), will be the probability of a household being food insecure(not being food secure), as

……………..……(2)
 Therefore, we can write

 ………………… (3)

The above equation is called the odds ratio. The odds ratio gives the change in the odds of being food secure as opposed to not being food insecure, in response to one unit increase in the independent variables. Now if we take the natural log of equation (3), we get a result as:

 But, zi = α + βiXj

This is called a logit model and if the disturbance (error) term (ei) is taken into account, the logit model becomes:

 Y= α + βiXj + ε

Where, i = 1, 2, 3….n, and j = 1, 2, 3…n

 Y = the probability of a household being food secure

 α= the intercept/constant term (regression parameter to be estimated)

βi= Coefficients of the explanatory's (regression parameter to be estimated)

Xj= Explanatory variables

ε= stochastic/ disturbance /error term

In practice Y is unobserved and ε is symmetrically distributed with zero mean and has cumulative distribution function (CDF) defined as F (ε). What we observe is a dummy variable y, a realization of a binomial process defined as Y = 1 if a household is food secure and 0 otherwise.

## 3.7. Variable Definition, Hypothesis, and Measurement

In this study two main variables have been identified; the dependent (regressed) and the independent (explanatory) one. The regressed variable is the probability of a rural household being food secures or vice versa; whereas the explanatory variables are the determinants of food security in the rural household context in the study area. It should be noted that several explanatory variables could influence the status of rural household food security/insecurity directly or indirectly. Thus, only selected independent variables which are believed to have a significant role in determining household food security status, and the dependent variable are briefly explained as follows.

### 3.7.1. Dependent Variable

The dependent variable for the logit analysis is dichotomous representing the observed status food security of rural households in the studying area. The measurement tool used in this study was consumption-based; sampled rural households whose consumption calories found to be greater than calorie requirement was regarded as food secure and have been assigned a value of 1, otherwise 0.

**Measuring Food Insecurity Status:** The households’ food insecurity status has been measured by a direct survey of consumption. Household caloric acquisition is a measure of the number of calories, or nutrients available for consumption by household members over a defined period. The principal person responsible for preparing meals has been asked how much food was prepared for consumption over some time. Data on available food for consumption, from home production, purchase, and /or gift/loan/wage in kind for the last seven days before the survey day to the household was collected. This seven days recall period was selected because it is appropriate for the exact recall of the food items served for the household in a week.

After data was collected using seven days recall method, and then converted to kilocalories using the food composition table manual (EHNRI, 1997) and (WFP FAIS, 2017). The converted data were divided by household Adult Equivalent (AE). Then the results have been compared with the minimum subsistence requirement of per AE per day (i.e. 2100 kcal) in Ethiopia. This means that the value of the minimum amount of energy (2100kcal/AE/day) was used as a threshold and above which the household said to be food secure and if below, food insecure.

### 3.7.2. Explanatory Variables

A range of household-demographic characteristics, economic resources, agricultural inputs use, access to different infrastructural services, and other variables are expected to influence household food insecurity status in the study area and are defined below.

**Age of Household Head (AGE):** Age is a continuous explanatory variable and when the age of a household increases, it is assumed that the household heads could acquire more knowledge and experience. They are more risk averter and their chance to become more food insecure decreases with age.

 In addition, older household heads are expected to have better access to land than younger heads, because younger men either have to wait for land redistribution or have to share the land with their families. On the other hand, people with productive age groups are believed to be stronger and earn more income than the unproductive (old age) ones. Thus, the age of the household heads and food insecurity are positively or negatively correlated.

**Sex of Household Head (SEXHH):** It refers to the sex of the head of the household. Households headed by women are expected to be food insecure or male-headed households are expected to have higher income compared to female headed-household. This is because, in female-headed households, there is a lack of better labor inputs subject to rent their land on a share-cropping basis; need a long adjustment period to diversify their income sources, gender discrimination in the society, etc.

Thus, male-headed households are more likely to be food secure than female-headed households and it takes a binary value (i. e. if the household is male, it takes the value of 1, 0 otherwise).

**Family size of Household (FAMSHH):** Household size refers to the total number of household members who live and consume from the same household. An increase in household size implies more people to be feed from the limited resources and households with a large number of children or economically dependent family members will face food insecurity because of the high dependency burden. Hence, it was hypothesized that household family numbers have a negative association with food insecurity.

**Number of dependents (NUDHH):** This is a continuous variable that shows the number of dependents in the household. In this study number of dependents, consists number of children, older and other relatives who depend on a given household for their livelihood, and their age is below 15 and above 65 who is unable to participate in any job activity.

It is hypothesized that the household with a higher number of dependents is likely to be food insecure and also would have the lowest welfare status because a household with many dependents tends to exert more pressure on household resources and likely to have less consumption. Therefore, it was hypothesized that the dependency ratio and food security have a negative association.

**Land Holding Size (LANDHS):** Total cultivated land owned by households is an important resource for food production. The size of cultivated land is a continuous variable measured in hectares. As the cultivated land size increases, the possibility that the household to get more output is high provided that other associated production factors remain the same. Thus, it was hypothesized that a household that has a larger farm or landholding would have less probability to be food insecure.

**Livestock Ownership (LISHH):** It is a continuous variable and number of livestock excluding oxen. They are prominent sources of wealth to farm households and supply manure to improve soil fertility. Households with large livestock sizes were expected to be less vulnerable to food insecurity especially in times of drought when crops fail to yield (Little et al., 2006. Hence, the hypothesis was that possession of large size of livestock increases the likelihood of the household not being food insecure that show a negative correlation, and vice-versa.

**The number of ox/oxen owned/ (NUOXEN):** Oxen power is the main source of traditional means to cultivate land to have sustainable crop production in Ethiopia. It allows effective utilization of land and labor resources to carry out both farm and non-farm activities. Households with a relatively larger number of oxen can perform better on their farm and achieve sustainable food security. Thus, the number of oxen available to the household increases the probability of the household not being food insecure.

**Off-farm Income (OFI):** This is measured by whether or not a household head is involved in diversified income sources for both consumption and investment purpose. This includes selling firewood, working on other’s farms and non-farm activities as daily laborers, running petty trade, pottery, weaving carpentry works, etc. Households who do not engage in off-farm activities are more likely to be food insecure if farm income is not enough. Thus, the expected impact of off-farm on household food security status was assumed to be positive and vice-versa.

**Education Level of Household Head (ELHH):** It is a dummy variable defined as whether the household head is literate or illiterate. It is likely to be that a literate household head often tends to adopt new skills and ideas which in turn have positive effects on food security. Whereas households led by the non-literate head are less likely to understand modern farming technologies provided to them through any media like extension workers, radio, and others. Hence, the level of education was assumed to have a binary value and it is positively related to household food security status.

**Access To Nearest Market (ANMKT):** Closeness to market centers creates access to additional income via off-farm/non-farm employment opportunities, easy access to information on inputs and outputs, marketing facilitation and transportation, etc. According to SWADO/EWCP (2017) basic data analysis, it was categorized that those rural HHs who get market after 10 km walk are relatively considered not to have market access and those who can get market up to 10 km walk were relatively considered to have market assess. It is a continuous variable that is measured in km or hours of walk. Therefore, it was hypothesized that there is a positive association between access to the nearest market center and household food security.

**Fertilizer Utilization Status (FUSHH):** The use of fertilizer improves productivity per unit of cultivated area. Households using fertilizer were expected to have a better food production capacity and more food security than non-users. Fertilizer use is a dummy variable taking the value of 1 if a farmer uses fertilizers and 0 otherwise and has an inverse relationship with that of food insecurity status of the rural household.

Table 1: Explanatory variables and direction of influence on dependent variables

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | Description of the variable | Type | Expected sign | Measurement value |
| dependent variable  |
| Fsstatus | Household food security statues  | Dummy |  | 1=if food secured 0=for not secured |
| Explanatory variables |
| Age | Age of the household head | Continuous/categorical  | +/- | number of years (1= up to 30 2=31-40 3=41-50 4= >51) |
| Sexhh | Sex of household head | Dummy | - | 1= If the household head is male 0= otherwise  |
| Famshh | Family size of household | Continuous  | - | Members of the household living together  |
| Nudhh | Number of dependents | Continuous | - | Number of peoples whose age below 15 and above 65 and disabled |
| Landhs | Landholding size | Continuous | + | Size of cultivated land in hector |
| Lisshh | Livestock ownership | Continuous | + | Number of livestock excluding oxen |
| Nuoxen | Number of oxen | Continuous | + | Number of oxen owned by the household  |
| Ofi | Off-farm income | Continuous | + | Income earned from off-farm activities  |
| Elhh | The educational level of household head | Dummy | + | If the household head literate =1 otherwise 0  |
| Anmkt | Access to the nearest market | Continuous | + | Distance in kilometer from the nearest market |
| Fushh | Fertilizer utilization statues  | Dummy | + | 1= fertilizer user 0= non fertilizer user |

#

# CHAPTER FOUR

# RESULTS AND DISCUSSIONS

This chapter deals with the findings of the study and discussion them. The chapter contains a discussion of the descriptive part and the results of the econometric binary logit model. Descriptive analysis is used to present the demographic, socioeconomic, and institutional factors of the respondents and other comparing variables of food secured and insecure participants included in the study. The binary logit regression model is used to identify the most important factors that affecting farmers to be food secured and to measure the relative importance of significant explanatory variables on household food security statutes.

## 4.1. Descriptive Analysis

### 4.1.1 Age of the Respondents

From the total of 250 sample respondents, 162(64.8%) food unsecured and 88(35.2%) participants were food secured for the study. As a result of the study showed that from the total respondents 42(16.80%) of the respondents are within the age range of below 30 years, 85(34%) are between 31 to 40 years with high frequency, 44(17.60%) are between the age of 41-50, 31(12.40%) are between 51-60 and the remaining 48(19.20%) are above the age of 61 years. The minimum and maximum age of the respondents is 25 and 80 years respectively. Thus, a higher proportion of food in secured and food secured is also found in the age group of 31 to 40 and above 61 years old. A higher percentage of food unsecured was found in the age range of 31 – 40 which accounts for 68(41.95%) from food in secured respondents. As the finding shows that high food insecure households are young farmers under the age of 31 – 40 in other words, On the other hand from food secured households the higher percentage is above 61 years old which is 31(35.22) this figure indicates when respondents age increase their vulnerability for food shortage also decrease and vice-versa.

Table 2: Age group of respondents

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Age group | Food secured |  | Food insecure |  | Total |  |
|  | Frequency | % | frequency | % | frequency | % |
| Age up to 30 | 5 | 5.68 | 37 | 22.83 | 42 | 16.8 |
| 31-40 | 17 | 19.31 | 68 | 41.97 | 85 | 34 |
| 41-50 | 17 | 19.31 | 27 | 16.66 | 44 | 17.6 |
| 51- 60 | 18 | 20.45 | 13 | 8.02 | 31 | 12.4 |
| above 60 | 31 | 35.22 | 17 | 10.49 | 48 | 19.2 |
| Total | 88 | 100 | 162 | 100 | 250 | 100 |
|  |  |  |  |  |  |  |

Source: own survey (2021)

### 4.1.2. Size of the household

It was hypothesized that family size has a negative relationship with the food insecurity status of the household. The survey result revealed that from 88(35.20%) of food secure households have family size of 0-2 whereas 75(85.22%) with high frequency, 3-5 were 4(4.54%), 6-7 were 3(3.40) and above 7 was 6(6.81%) on the other hand from 162(64.8%) food insecure households their family size was rage from 0-2 whereas (0.62%), 3-5 where 12(7.40%), 6-7 where 34(20.98) and above 7 was 115(70.98%) with high frequency. Households with large family sizes are more likely to be at risk of becoming food insecure and households with less family size were food secured. The minimum and maximum family size of sampled households is 0 to 8 persons

Table 3: The family size of respondents

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Household size | Food secured |  | Food insecure |  | Total |  |
|  | Frequency | % | frequency | % | frequency | % |
| 1-2 | 75 | 85.22 | 1 | 0.62 | 76 | 30.40 |
| 3-5 | 4 | 4.54 | 12 | 7.40 | 16 | 6.40 |
| 6-7 | 3 | 3.40 | 34 | 20.98 | 37 | 14.80 |
| Above 7 | 6 | 6.81 | 115 | 70.98 | 121 | 48.40 |
| Total | 88 | 100 | 162 | 100 | 250 | 100 |
|  |  |  |  |  |  |  |

Source: own survey (2021)

### 4.1.3. Sex of Household Head

Concerning the sex of the household head, table (4.4) shows that from the total sample of 250 respondents (69.60%) were male-headed respondents where as (30.4%) were female-headed household respondents. Of the total food-insecure households, (14.82%) were female-headed and (85.18%) were found male-headed households. On the other hand, the study has revealed that from the total female-headed sample households (14.82%) were found to be food insecure whereas from male-headed households (85.18%) were found to be food insecure. The result matches the hypothesis that female-headed households are more likely to be food insecure than male-headed households. Because female-headed households have less working experience and a shortage of labor force that leads them to provide their lands for rent on a share-cropping basis. The mean test result for the sex of the household head was insignificant in determining household food security status.

Table 4: Distribution of Sex of the households

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sex of the households | Food secured |  | Food insecure |  | Total |  |
|  | Frequency | % | frequency | % | frequency | % |
| Male | 36 | 40.9 | 137 | 85.18 | 174 | 69.6 |
| Female | 52 | 59.1 | 24 | 14.82 | 76 | 30.4 |
| Total | 88 | 100 | 162 | 100 | 250 | 100 |
|  |  |  |  |  |  |  |

Source: own survey ( 2021)

### 4.1.4. Number of Household Dependents

It was hypothesized that the household with a higher number of dependents is likely to be food insecure and also would have the lowest welfare status because a household with many dependents tends to exert more pressure on household resources and likely to have less consumption. Therefore As the survey result showed that the average number of dependents for the food secured and insecure is 0.33 and 0.67 respectively. The mean difference between secured and insecure is 0.34 numbers of dependents, this shows that food secured households have fewer dependents than those insured. And therefore it is possible to look that food in secured households find additional income source to support and assure their family survival the reason why they have inactive family members than the secured respondents whose ages below 15 and above 65 years old who can’t involve in any source of livelihood job activities. Due to a large number of dependents in the household, the family members need extra income to cover costs associated with those dependents unable to work done. Therefore, it can be concluded that food-insecure households carry more burden than food secured respondents with a high number of dependents have a high probability of being food insecure.

### 4.1.5 Cultivated Land Holding Size of the Household:

It was hypothesized that farmers who have larger cultivated land are more likely to be food secure than those with smaller cultivated land. The survey result revealed that the mean for those households who were food secure and food insecure was 1.81 and 0.3 ha respectively. The test result showed statistically a positive significant difference at less than 5 percent probability level between the two groups. The overall average landholding size of the household was found to be 0.7 ha. However, there was variation among the sample households about landholding size, which ranges from 0 to 4 ha.

Moreover, 19.6% of the respondents own less than or equal to 0.25 ha, 15.6% own 0.251 to 0.05 ha, 11.6% own 0.51-0.99 ha, 42.4% own 1-1.5ha and the rest 10.8% own greater than or equal to1.51 hectare of cultivated land (Table 4.5). It was also observed that 14.77% of the total foods secure households and 64.19% of food-insecure households own less than 1 hectares of cultivated land. In other words, the proportion of food insecure household owns less than 1 hectare of cultivated land were greater than that of food secure households in the same category. Therefore based on the result we can conclude that as the cultivated land size increases, the possibility that the household gets more output is high provided that other associated production factors remain the same. Thus, the household that has a larger farm or landholding would have less probability to be food insecure.

Table 5: Comparison of cultivated land and food security status of the household.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Cultivated Land in ha | Food secured | Food insecure | Total |  |
|  | Number | Percent | Number | Percent | Number | Percent |
| ≤0.25 | 0 | 0 | 49 | 30.24 | 49 | 19.6 |
| 0.251-0.5 | 1 | 1.13 | 38 | 23.45 | 39 | 15.6 |
| 0.51-0.99 | 12 | 13..63 | 17 | 10.49 | 29 | 11.6 |
| 1-1.5 | 56 | 63.63 | 50 | 30.86 | 106 | 42.40 |
| ≥1.51 | 19 | 21.59 | 8 | 4.90 | 27 | 10.80 |
| Total | 88 | 100 | 162 | 100 | 250 | 100 |
| Mean | 1.81 |  | 0.3 |  | 1.056 |  |
| Minimum | 0.5 |  | 0.25 |  | 0 |  |
| Maximum | 4 |  | 0.75 |  | 0 |  |

Source: Own Survey Result (2021)

### 4.1.6 Livestock Ownership Holdings in TLU

Livestock is the most important economic asset and a means to assured food security for the rural households in the study area. The study showed that the mean livestock population owned by the total sampled households was 1.96 TLU. Similarly, the average livestock owned by food secure and food insecure households were 3.38 and 0.55 TLU respectively. There was a variation among the respondents which ranged from 0 to 6 TLU per household for all respondents concerning TLU owned. From the total food-secure households, 29.55% of them have 3 and above TLU while it was only 50.61 % of food-insecure households in the same category. In addition, 51(31.5%) of food-insecure respondents had also reported that they have no type of livestock. As the survey revealed, there was a significant difference at a 1% probability level between food secure and food insecure households in livestock holding in terms. Therefore, the survey matched with the prior hypothesis which explained higher possession of livestock increases the probability to be food secure and has a negative relationship for food insecurity status.

Table 6: Households’ livestock ownership

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Number of livestock  | Food secure | Food insecure | t- value | Total |
| Number | Percent | Number | Percent |  | Number | percent |
| Have no Livestock | 0 | 0.00 | 51 | 31.48 |   | 51 | 20.4 |
| <1.5 | 4 | 4.55 | 80 | 49.38 |   | 84 | 33.6 |
| 1.5-3.0 | 22 | 25.00 | 29 | 17.90 |   | 51 | 20.4 |
| 3.01-5 | 56 | 63.64 | 2 | 1.23 |   | 58 | 23.2 |
| >5 | 6 | 6.82 | 0 | 0.00 |   | 6 | 2.4 |
| Total | 88 | 100.00 | 162 | 100.00 |  4.94\* | 250 | 100 |
| Mean | 3.38 | 0.55 |  | 1.96 |
| Minimum | 1 | 0 |  | 0 |
| Maximum | 6 | 4 |  | 6 |

\* Significant at less than 1% probability level

 Source: Own survey result (2021)

### 4.1.7. Number of Oxen and Household Food Security Status

Households who own more oxen were expected to have a better chance to be food secure than others. The total oxen owned by all respondents were 274. The survey showed that the oxen ownership per household had ranged from 0 to 3, while the average oxen holding per household was 1.09. The mean ox holding for food-insecure households was 0.53, whereas that of food secure was 1.51. About 47.73% of food secure households possessed two oxen, while 24.07% of food-insecure households possessed the same oxen. On the other hand, 3.41% of food secure households have got three oxen; while about 1.85% of food-insecure households had the same number of oxen. In addition, about 3.41% of food security, 40.74% of food-insecure households, and 27.6 % of all of the respondents got no ox at all. The mean difference was tested to check whether or not oxen ownership makes a significant difference between the food secure and insecure household groups. The result was contrary to the prior expectation as mean ownership of ox or oxen was found to be a statistically insignificant difference between the two groups of respondents.

Table 7: Distribution of oxen ownership and food security status

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Ownership of oxen | Food secure | Food insecure | t-value | Total |
| Number | Percent | Number | Percent |  | **Number** | **Percent** |
| Have no oxen | 3 | 3.41 | 66 | 40.74 |   | 69 | 27.6 |
| One oxen | 40 | 45.45 | 54 | 33.33 |   | 94 | 37.6 |
| A pair of oxen | 42 | 47.73 | 39 | 24.07 |   | 81 | 32.4 |
| >Two oxen | 3 | 3.41 | 3 | 1.85 |   | 6 | 2.4 |
| Total | 88 | 100.00 | 162 | 100.00 | 1.14 | 250 | 100 |
| Mean | 1.5 |  0.53 |  | 1.096 |
| Max | 3 | 3 |  | 3 |
| Min | 0 | 0 |  | 0 |

Source: Own Survey Result (2021)

### 4.1.8. Off-Farm Income and Food Security Statues of Household

Participation in off-farm income-generating activities was measured by whether or not a household head involved in diversified income sources such as selling local alcohol, carpentry work, traditional weaving, baking & cooking service, engaging in church service, traditional metalwork, sand collecting & selling, working on farms as daily laborers and running petty trades and the like. It was hypothesized that households who did not engage in off-farm activities are more likely to face a food deficit if farm income is not enough. Thus, the mean of off-farm income of the entire sample household was found to be 242.2 ETB and the mean for a food-secure household was 89.2 ETB while it was 201.45 ETB for food-insecure households. The survey revealed that the proportion of food-insecure households was 92% while that of food secure households was 73% among households who did not participate in off-farm income-earning activities. In light of this, the statistical analysis showed an insignificant difference between food secure and food insecure farmers.

Table 8: Distribution of off-farm income and food security status of households.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| amount of incomefrom off-farm income  | Food secure  | Food insecure  | Total | t- value |
| Number | Percent | Number | Percent | Number | percent |
| non participated | 73 | 82.95 | 92 | 56.79 | 165 | 66.00 |   |
| 1-100 | 3 | 3.41 | 0 | 0.00 | 3 | 1.20 |   |
| 101-500 | 2 | 2.27 | 28 | 17.28 | 30 | 12.00 |   |
| 501-1000 | 10 | 11.36 | 25 | 15.43 | 35 | 14.00 |   |
| 1001-1500 | 0 | 0.00 | 17 | 10.49 | 17 | 6.80 |   |
| >1501 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |   |
| Total | 88 | 100.00 | 162 | 100.00 | 250 | 100.00 | 0.216 |
| Mean | 89.2 | 201.45 | 242.2 |   |
| Sd |   |   | 424.06 |   |
| Minimum | 0 | 0 | 0 |   |
| Maximum | 800 | 1500 | 1500 |   |

Source: Own Survey Result (2021)

### 4.1.9. Educational Level of the Household Head

It was hypothesized that a literate household head often tends to adopt new skills and ideas which in turn have positive effects on food security. Whereas households led by the non-literate head are less likely to understand modern farming technologies provided to them through any media like extension workers, radio, and others. Hence, the level of education was assumed to have a binary value and it is positively related to household food security status.

For the level of education of the household head, table (4.9) below shows that from the total sample of 250 respondents 91(36.4%) were literate respondents whereas 159(63.6%) were illiterate household respondents. From the total food insecure households, 14(8.64%) were literate household heads and 148 (91.36%) were illiterate-headed households. On the other hand, the study has revealed that from the total 88 food secured sample households 77(87.5%) were literate household heads and 11(12.5%) were illiterate. The result matches with the hypothesis that educated household heads are more likely to be food secured than uneducated household heads. Because It is likely to be that a literate household head often tends to adopt new skills and ideas which in turn have positive effects on food security. Whereas households led by the non-literate head are less likely to understand modern farming technologies provided to them through any media like extension workers, radio, and others.

Table 9: household level of education and food security status

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Education level of the household | Food secured |  | Food insecure |  | Total |   |
|  | Frequency | % | frequency | % | frequency | % |
| Read and Wright | 77 | 87.5 | 14 | 8.64 | 91 | 36.4 |
| Not Read and Wright | 11 | 12.5 | 148 | 91.36 | 159 | 63.6 |
| Total | 88 | 100 | 162 | 100 | 250 | 100 |

Source: Own survey result (2021)

### 4.1.10. Market Access and Food Security Status of Households

The market is an important institution for rural households from a food security point of view. In this study, the mean distance taken to travel from home to the nearest marketplace was 4.1 and 2.02 km for food secure and food insecure respondents respectively. The study has indicated that all the respondents have to walk an averagely of 3.56 km to get to the nearest market from their home which ranged from 1 to 8 km within the study area. As the result shows that, from food secured respondents about 28 (31.82%) have a distance of less than 2km, 20 (22.73) of 2.1-4 km distance, 16(18.18%) of the respondents have a distance of 4.1-6, 5 (5.68%) respondent have 6.1-7 km distance and 19(21.59%) respondents distance was greater than 7km. on the other hand, from food-insecure respondents about 63(38.89%) have a distance of less than 2km, 50(30.86) of 2.1-4 km distance, 31(19.14%) of the respondents have a distance of 4.1-6, 7(4.32%) respondent have 6.1-7 km distance and 11(6.79%) respondents distance was greater than 7km. This statistical analysis showed that the variable was insignificance between food secure and food insecure sample households.

Table 10: Market accessibility and food security status of households.

|  |  |  |  |
| --- | --- | --- | --- |
| Market access in km | Food secure | Food insecure | Total |
| Number | % | Number | % | Number | % |
| <2 | 28 | 31.82 | 63 | 38.89 | 91 | 36.40 |
| 2-4 | 20 | 22.73 | 50 | 30.86 | 70 | 28.00 |
| 4.1-6 | 16 | 18.18 |  31 | 19.14 | 47 | 18.80 |
| 6.1-7 | 5 | 5.68 | 7 | 4.32 | 12 | 4.80 |
| >7 | 19 | 21.59 | 11 | 6.79 | 30 | 12.00 |
| Total | 88 | 100.00 | 162 | 100.00 | 250 | 100.00 |
| Mean | 4.1 | 2.02 | 3.56 |
| Max | 8 | 8 | 8 |
| Min | 1 | 1 | 1 |

Source: Own survey result (2021)

### 4.1.11. Use of Fertilizer:

The prior hypothesis was that households using fertilizer is expected to have the better food production capacity and more food security than the non-users and is positively
associated with household food security status. As the analysis revealed the difference between the food secure and food insecure farmers in terms of using natural and chemical fertilizer was significant and the prior hypothesis was maintained.

Accordingly, about 79.2% of the sampled households, 96.59% food secured households, and 69.75% of food-insecure households reported that they used chemical and natural fertilizers for crop production. In addition, from the total respondents, 20.8% were not users of any type of fertilizer, 3% were food secured and the rest 32.25% were food insured households. As the survey results showed the main reasons for households not using fertilizer input were, lack of financial capital and the high price of inputs, lack of access to credit for input purchase, lack of technical know-how, and shortage of labor force to prepare natural fertilizer.

Table 11: Fertilizer utilization and food security status of households.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Fertilizer utilization status | Food secure | Food insecure | Total | t-value |
| Frequency | % | Frequency | % | frequency | % |
| Fertilizer users | 85 | 96.59 | 113 | 69.75 | 198 | 79.2 |  |
| Fertilizer non users | 3 | 3.41 | 49 | 30.25 | 52 | 20.8 |  |
| **Total** | 88 | 100 | 162 | 100 | 250 | 100 | 2.00 |

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

Source: Own survey result (2021)

## 4.2 Econometric Model Analysis

### 4.2.1. Regression diagnostic tests

Before proceeding to the estimation of the parameters from which individual level of efficiencies are estimated, it is essential to examine various assumptions related to the model specification. The log likelihood for the fitted model was -69.822228 and the LR chi2(11) was 184.69 09 with Prob> chi2= 0.0000 and its strongly significant at 1% level. Thus the overall model was significant and the explanatory variables used in the model were collectively able to explain the variations in food insecurity. From the maximum likelihood estimates of the model, the Pseudo R2 was 0.57 which implies that about 57% of the likelihood of a household being food secure is explained by the independent variables.

**Multicollinearity test:** Multicollinearity is not a problem and always exists. But it is a matter of degree. Even extreme multicollinearity does not violate OLS assumptions. OLS estimates are still unbiased and BLUE (Best Linear Unbiased Estimators) (Williams, 2015). Even if there is no a formal test for multicollinearity, its degree can be detected. VIF and MVIF are the most familiar method of detecting the problem of multicollinearity among the explanatory variables. However, due to the presence of many dummy explanatory variables VIF or MVIF may not be appropriate to detect the presence of multicollinearity problem. But the correlation matrix of explanatory variables used in probit regression model showed that multicollinearity is not a serious problem in those regression models (Appendix A Table 1). As explained in the research methodology section, the binary logit regression model was selected to identify food security statuses that were estimated by the maximum likelihood estimation technique using STATA software. Multi co-linearity for continuous explanatory variables checked by using the variance-inflation factor (VIF), see Appendix 2 which is 3.93 VIF endicat that no multicillinarity and similarly Contingency Coefficient for discrete variables have checked, before running the logit model. Value of VIF less than 10 is an indicator for no existence of the serious problem of multi co-linearity and similarly, contingency coefficient lays ranges between 0 and 1 Value of contingency coefficient less than 0.5 assumes weak association between the variables.

Table 12: Contingency coefficients for discrete/dummy explanatory variables

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dummy variables  | Sexhh |  | Elhh | Fushh | fsstatus |  |
| Sexhh  | 1.0000 |  |  |  |  |  |
| Elhh | -0.41 |  | 1.0000 |  |  |  |
| Fushh | -0.17 |  | 0.24 | 1.0000 |  |  |
| Fsstatus | -0.46 |  | 0.78 | 0.32 | 1.0000 |  |

**Hetroscedasticity test:-**Breusch-pagan/ cook Weisberg test for hetrokedasticity was used to test the presence of hetroscedasticity. The higher the P-value is the higher the probably of accepting null hypothesis (Ho: The model has constant variance). And as we can observe from Table Appendix A, the null hypothesis (constant variance) of all regression models are not rejected even at 10% level of significant. Hence, there is no problem of hetroscedasticity on explanatory variables used to identify factors affecting food insequrity farmers (Appendix A Table 1).

**Omitted variable (specification error) test:** null hypothesis (model has no omitted variables) is not rejected at 10% level of significant. This verified that the model has no omitted variable or specification error (Appendix A. Table 1).

Source; own survey (2021)

### 4.2.2. Results of Logit Model on Determinants Households Food Security Statues

Using the logit model, the results of the maximum likelihood estimation indicate that out of 11 explanatory variables which were considered in the econometric model nine variables were found to significantly influence the probability of being household food secured or insecure. Those are, age of household, sex of household, family size, the number of dependents in the household, land holding size of the household, livestock ownership of the household, number of oxen owned by the household, educational level, and fertilizer utilization status of the households are factors identified that determine the food security status of households. Whereas the remaining two explanatory variables were not statistically significant influence on the food security status of households in study areas.

Table 13: Maximum likelihood estimates of the logit model on the determinants of household’s food security statues.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Logistic regression Model |  |  |  Number of obs = 250 |  |
|  |  |  | LR chi2(11) = 184.69 |  |
|  |  |  |  Prob > chi2 = 0.0000 |  |
| Log likelihood = -69.822228  |  |  |  Pseudo R2 = 0.5694 |  |
| **Variavbels**  | **Coefficients** | **Std. Err.** |  **z**  |  **P>|z|** |
|  age  | -0.23\*\*\* | 0.061 | -3.53 | 0.000 |
|  sexhh  | 1.30\*\* | 0.65 | 2.00 | 0.045 |
| famshh  | 3.10\*\*\* | 0.69 | 4.5 | 0.000 |
| nudhh  | -3.13\*\*\* | 0.76 | -4.1 | 0.000 |
|  Landhs | 2.95\*\*\* | 0.92 | 3.19 | 0.001 |
| Lisshh | -0.67\*\*\* | 0.26 | -2.55 | 0.011 |
|  nuoxen  | 2.63\*\*\* | 0.67 | 3.89 | 0.000 |
| Ofi | -0.0001 | 0.0005 | -0.27 | 0.785 |
|  elhh  | 1.93\*\* | 0.77 | 2.52 | 0.012 |
|  Anmkt | 0.032 | 0.04 | 0.85 | 0.396 |
|  fushh  | 2.19\*\*\* | 0.65 | 3.38 | 0.001 |
|  cons  | -9.06\*\*\* | 1.78 | -5.08 | 0.000 |

\*\*\* and \*\* shows significance at 1% and 5% significance level, respectively.

Source: Own survey (2021)

Table 14: Odds Ratio coefficients of explanatory variables on women participation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Logistic regression Model |  |  |  Number of obs = 250 |  |
|  |  |  | LR chi2(11) = 184.69 |  |
|  |  |  |  Prob > chi2 = 0.0000 |  |
| Log likelihood = -69.822228  |  |  |  Pseudo R2 = 0.5694 |  |
| **Variavbels**  | **Odds Ratio coefficients** | **Std. Err.** |  **z**  |  **P>|z|** |
|  age  | .805 \*\*\* | .0494169 | -3.53 | 0.000 |
|  sexhh  | 3.680\*\* | 2.396979 | 2.00 | 0.045 |
| famshh  | 22.30\*\*\* | 15.3707 | 4.5 | 0.000 |
| nudhh  | .0438\*\*\* | .0334456 | -4.1 | 0.000 |
|  Landhs | 19.10\*\*\* | 17.64328  | 3.19 | 0.001 |
| Lisshh | .5137\*\*\* | .1344509 | -2.55 | 0.011 |
|  nuoxen  | 13.82\*\*\* | 9.324237  | 3.89 | 0.000 |
| Ofi | .9996  | .0005273 | -0.27 | 0.785 |
|  elhh  | 7.023\*\* | 5.440007 | 2.52 | 0.012 |
|  Anmkt | 1.039  | .0393581 | 0.85 | 0.396 |
|  fushh  | 8.95\*\*\* | 5.811238 | 3.38 | 0.001 |
|  cons  | .00012\*\*\* | .0002068 | -5.08 | 0.000 |

\*\*\* and \*\* shows significance at 1% and 5% significance level, respectively.

Source own survey (2021)

### 4.2.2. Significant Explanatory Variables Explanation

**Age of the household heads (age):** The result of the liklhold estimation analysis for the household head age was found to be statistically significant at 1% level. As it was expected, it affected household’s level of energy intake negatively (extent of food insecurity positively) in the study area. It is negatively associated with food security status of the rural household. Implis that, negative association can be explained by the fact that older farmers are less likely to be food secure. It may be due to the fact that older farmers do not have the required labor force to produce more food crops than their counterparts.

As expected, it affected household’s level of energy intake negatively (extent of food insecurity positively) and significantly at 5% significance level in the study area. The marginal effect, from of the model result, indicated that a one year increase in the age, within food insecure households, increased the likelihood of household’s extent of food insecurity by 448%.

**Sex of Household(sexhh ):** The maximum likelihood estimate shows that, the variab sex of household male head is positive and statistically significant at 1% level. The odd ratio in favor of a household being vulnerable to food insecurity decreases by a factor of 3.680 unit as the household has male-headed. This implies female headed households are more vulnerable to food insecurity as compared male headed households. This difference is associated with customary rules and practices that often have restrictive effects for women through limiting their access to resources and their roles in food production, preparation, processing, distribution, and marketing activities, which generally affects women’s food security and nutrition. Male-headed households are more food secure than femal head. This finding is consistent with the result of study conducted by Mesfin **(**2014),

**Family Size (famshh):** had a positive and significant relationship with food insecurity at the 1% significant level, implying that food security decreases with increase in household size. The odds ratio in favor of food security increases by the factor 22.30 as the household size is increased by one member. This is consistent with the hypothesis; the result shows positive and significant influence of household size on food insecurity of a household. This means that each additional member of a household increases household food insecurity.

 **Number of Dependents of the Household (NUDHH):** The variable was hypothesized that the household with the higher number of dependents is likely to be food insecure and also would have the lowest welfare status since a household with many dependents tends to exert more pressure on household resources and likely to have less consumption compared with that of food secured. In a household where adults or productive age groups are higher than the non-productive age groups, the probability of the household being in shortage of food would be less. In light of this, the number of dependents in the household was found to be significant at 1% and has a negative association with the household food security situation. The model result showed that odds ratioof food insecure increases by a factor of .0438 as the number of dependents in the household increases by one and vice-versa provided that other factors are constant. Therefore, the higher the number of non-productive age groups that means, individuals whose ages are less than 15 and greater than 64 years as compared to the number of productive age groups in the household, the higher the probability of the household to be food insecure. Thus the result of the model agrees with the hypothesis and the result matches with Meseret (2012).

**Landholding size of the household (LANDS):** According to the research finding, landholding/ farm size was positively and Farm size is significant at 1% related to the probability of a household being food secure. The odds ratio in favour of food security increases by the factor 19.10 when the area under cultivation is increased by one acre. This outcome is consistent with the finding from a research conducted by Bogale (2009) in Ethiopia. The possible explanation for this is that total cultivated land owned by households is an important resource for food production. As the cultivated land size increases, the possibility that the household to get more output is high provided that other associated production factors remain the same. Thus, it was hypothesized that a household that has a larger farm or landholding would have less probability to be food insecure, thus the result of the research agrees with the hypothesis made.

**Livestock ownership of the household (LISSHH):** Households with large livestock sizes were expected to be less vulnerable to food insecurity especially in times of drought when crops fail to yield. Hence, the hypothesis was that possession of large size of livestock increases the likelihood of the household not being food insecure that show a negative correlation, and vice-versa. According to the research finding, livestock size was significantly related at less than 1% probability level, and the odd effect in favor of being food secure increase by a factor of 0.5137 when other factors remain constant and are vice-versa to food insecurity of the household.

The relationship has implied that households who possess large livestock sizes had higher probabilities of being food secure since they could earn more income from livestock production and get the opportunity to consume animal products. Moreover, larger livestock ownership besides its contribution to the subsistence need in nutritional requirement enhances crop production by the provision of manure and also serves as accumulations of wealth. This in turn has enabled them to purchase food when they are in short of their stock, and invest in the purchase of farm inputs that increase food production, and thus better positioned in ensuring food security status at the household level.

**Number of household Oxen ( nuoxen):** Oxen ownership was found to have a significant at 1% level and positive relationship with household food security. According to the study result, a unit increase in ox ownership, computed at average oxen owned by sampled households, increases the odd ratio of food security by13.82 averagely. It implies that, oxen serve as a source of traction in many developing countries, thereby significantly affecting households’ crop production. Animal traction power enables households to cultivate greater areas of land and to execute agricultural operations timely and will more agricultural production.

**Educational Level of the Household Head (ELHH):** Based on the hypothesis, the level of education likely to be that a literate household head often tends to adopt new skills and ideas which in turn have positive contribution on food security. Whereas households led by the non-literate head are less likely to understand modern farming technologies provided to them through any media like extension workers, radio, and others. Hence, the level of education was assumed to have a binary value and it is positively related to household food security status. Thus the result indicated that household head educational status that is literate was significant and has a positive impact in reducing the food insecurity situation of rural households. The survey has revealed that other things being constant, the odd ratio in favor of a household being vulnerable to food insecurity decreases by a factor of 7.023 units as the household has literate. This indicates that households with relatively better educated household heads are more likely to be food secure than those headed by uneducated household heads.

The result is also agreed with the prior hypothesis and the finding by Mesfin (2014). The possible explanation for this is that the effect of education on food security works indirectly by influencing the actions of the person in how to make a better living. Because literate households are very alert to get information and are very conscious to accept agricultural or livestock extension services, soil and water conservation practices, input and technology adoption trend, and motivation to involve in other income-generating activities.**Fertilizer Utilization Statues of the Household (FUSHH):** The result of the model revealed a strong positive relationship at 1% significance probability level between household fertilizer utilization statues and food insecurity status of a household other things remaining constant, the marginal effect in favor of the probability of a household being food insecure increase with the increase in household fertilizer utilization statues or the probability of a household to be food insecure increases by a factor of 8.95 unit as household size increases by one. This is due to the fact the use of fertilizer improves productivity per unit of cultivated area. Households using fertilizer were expected to have a better food production capacity and more food security than non-user

# CHAPTER FIVE

# CONCLUSION AND RECOMMENDATIONS

The previous chapter presented the results and analysis of the study about determinants of the household of food security in sekota woreda. This chapter provides the conclusions and recommendations in line with the findings of the study. The chapter is structured in two sections. The first section deals with its major findings and conclusions and the second section presents some recommendations suggested as a solution to problems that have been identified in the study.

## 5.1. Conclusion

The studying woreda is one of the chronically and seasonally food-insecure areas of the Amhara National Regional State. The area is vulnerable to frequent drought and is prone to food shortages and famine for the last few years. The prevalence of lack of institutional and infrastructural arrangements, environmental, socio-economic, cultural, demographic, and other factors aggravated the food gap and seasonal food insecurity problem in the district.

Hence, the specific objectives of this study were to identify the determinant factors of rural household’s food insecurity. For this study, both primary and secondary data types were collected. The primary data were gathered from sample households through survey questionnaires and on the other hand, books, journal articles, websites, internet resources, and other research findings, published and unpublished materials which are considered to be relevant to the research were visited to extract secondary data. A probability sampling method (randomly selected) with a multistage technique was used to select 250 respondents for the interview.

Based on this, the collected data were analyzed using both descriptive and econometric methods of analysis, and econometric software, STATA version 14, was used to estimate the logit model beta coefficients. To determine the current status of household food insecurity, household consumption per adult equivalent was used to classify into food secure and food insecure groups based on kcal that consumed (either through own harvests or purchase) by the households during the 7 days of the survey. Thus, the results of the descriptive statistics showed that 88 (35.2%) and 162 (64.8%) of the sampled households were found to be food secure and food insecure respectively during the period in which the investigation was undertaken. The average age of a food secure household was 52.75 years, whereas that of food insecure was 65.85 years. Taking the AE measurement of a household, on average 3.24 persons were living in a food secure household while it was 3.94 persons for food-insecure one. The number of dependents for the food-secure household was 0.33(33%), whereas that of food insecure was 0.67(67%) on average. This implies that every 100 persons within the economically active population groups are expected to support not only themselves but also supporting an extra 33 (for food security) and 67 (for food insecure) dependent household members with all necessities in the study area.

The survey also revealed that 87.5% of foods secure and only 8.64% of food-insecure households can read and write Amharic and other languages. The mean farm size per household was found to be 1.81 and 0.29 hectares for food secure and food insecure households respectively. The average number of oxen for food-secure households was 1.5 and for the food insecure were 0.53 oxen per household. Average income from off-farm activities was 89.2 and 201.45 ETB for food secure and food insecure households respectively. Average livestock ownership was 3.38 and .55 for food secure and food insecure households respectively. On the other hand, the proportions of food secure households that have use fertilizer were 96.59% & that of food insecure ones was 82.09%.

Eleven explanatory variables are included in the model. Those are, age of household, sex of household, family size, the number of dependents in the household, land holding size of the household, livestock ownership of the household, number of oxen owned by the household, educational level, and fertilizer utilization status of the households are factors identified that determine the food security status of households. The other two variables income earned from off-farm activities and access to nearest market are not statistically significant.

As coefficients of the maximum likelihood estimates, a one increase in units of sex of household male hade, family size, land holding size of the household, number of oxen owned by the household, educational, and fertilizer utilization status of the households would increase food security by (3.68), (22.3), (19.10), (13.82), (1.93), or (8.95) unit respectively and also age of household, the number of dependents in the household, livestock ownership of the household would decrease food security by (0.805), (0.038) or (0.5137) unit respectively.

## 5.2. Recommendations

Based on the findings of the research, the following recommendations are suggested to improve rural household’s food security status sekota woreda in particular and the country in general.

* The age of household and number of dependencies in the household and food security were strongly and negatively related. Having more dependence (age under 15 and above 65 and unable to work) aggravates the challenge of meeting food consumption as far as there are no other means of income-generating activities in the area. Thus the government and other developmental partners should create adequate awareness at the household level to enhance effective family planning to reduce birth rate and increase in length of birth spacing to have an acceptable number of children. It is also important to strengthen the capacities of the active labor force by taking measures to alleviate the problem of dependency such as, undertake proper health care service to reduce early retirement of the adult labor forces, introducing appropriate farm technology that can reduce the burden on the active labor force.
* Productive resources especially number of oxen and farmland size are important as the model result showed that farmland size and food security have an direct relationship, tackling the problem of food security through increasing farmland size is mandatory. Land as especial resources should be utilized in term of using it.
* Education of household head show significant on household food security, we need to focus much on education for the betterment of living condition. The more the household head is educated, the higher will be the probability of educating family members and familiar with modern lifestyle or technology. This should be done by strengthening both formal and informal or adult education and vocational and skill training to rural households to reduce food insecurity status.
* The number of oxen livestock owned by households was found as significant for the improvement of rural households’ food security status in the study area. Livestock is the source of income as well as food consumption directly and at the same time, they are also major contributors to the effective production of agriculture in the other way. Hence, necessary efforts should be made to improve the production and productivity of the sector that can sustainably enhance the livelihoods of households. This can be done through the provision of adequate veterinary services, improved water supply points, the introduction of timely and effective artificial insemination services to upgrade the already existing breeds, launching sustainable and effective forage development sources, provision of training for the livestock holders. Capacity-building should target how to develop market-based production and improve the marketing conditions based on value chain function with infrastructure and financial institutions expansion.

## 5.3. Future research

This study tried to cover issues on determinants of household food insecurity in Sekota District, WagHimira Zone. Moreover, it was observed that the literature available on what is the food insecurity status of households and demographic socioeconomic determinants of household food insecurity in the study area?

 Therefore, future research should consider measuring not only general determinants of household food insecurity status, but also envaromental factor of food insecurity so as to give accurate policy recommendations.

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# 7. APPENDIX.

## 7.1.Appendix A. The fact of data result; descriptive statistics and econometrics result



Table 3: Multicollinearity, Heteroskedasticity, and Omitted variable (specification error) test for variables entered into the model.









## 7.2. Appendix B. Research household questionnaires

**BAHIR DAR UNIVERSITY**

**Institute of Disaster Risk Management and Food Security Studies**

**Disaster Risk Management & Sustainable Development Department Livelihood and Food Security Program**

**Post Graduate**

Topic: Determinants Of Household Food Insecurity In Sekota District, Wag Himira Zone

Household Questionnaire (HHQ)

This questionnaire is prepared for the partial fulfillment of the degree of Master of Science in the Department of Disaster Risk Management & Sustainable Development and the main aim of this questionnaire is to understand the main determinants of household food insecurity in the sekota woreda, waghimira zone.

 The researcher assures you all that your response provides here is strictly confidential and will be used exclusively for the research purpose only. Your honesty in responding to the right answer is vital for the research outcome to be reliable. Therefore the researcher request you to provide correct and full information and the researcher will be approved, your response is taken secret. Finally, the researcher would like to appreciate your participation and thanks in advance for your precious time.

‹‹Thank you in advance for your cooperation››

**Part 1: General Information**

* 1. Kebele \_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. Village \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. Name of head of the household \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	4. Code given to the household\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	5. Name of the enumerator\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	6. Date of interview\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Signature\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Part 2: Household Demography**

**2.1. Household characteristics**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 01 | 02 | 03 | 04 | 05 | 06 | 07 |
| No | Household | Marital | Sex | Age | Education | Currently going to |
|  | Members | Status | M =1 |  | level |  School |
|  |  |  | F =2 |  |  |  |
| 1 |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |

2.2. Has any member of your family ever migrated out during food crises? \_\_\_\_\_\_\_\_

 1) Yes 2) No

**Part 3: Land Use Information**

**3.1. Cultivated Land**

|  |  |  |  |
| --- | --- | --- | --- |
| Plot number | Site of the plot | Total plot size in Timad | Types of crops grown |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**Part 4: Crop Production**

**4.1 How much do you produce during…?**

 **4.1.1. In regular harvesting season:**

 Good harvest year? ------------ In k/Timad.

Normal harvest year? --------------in k/Timad

 Poor harvest year? ---------------- In k/Timad.

 **4.1.2. In small Sale irrigation system:**

 Good harvest year? ------------ In k/Timad.

Normal harvest year? --------------In k/Timad.

 Poor harvest year? ---------------- In k/timad.

4.2. Do you produce enough for your family to eat throughout the year? \_\_\_\_\_ 1) Yes 2) No

4.3. If no, what are the constraints in order of importance that prevent you from doing so? ----

 1) Minimum rainfall 2) Lack of early maturing variety 3) Lack of plow oxen 4) Lack of

Family labor 5) Lack of different inputs 6) others specify

4.4. Were there any damage to your crop last year? -------------- 1) Yes 2) No

**Part 5: Input Use**

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

5.2. If yes, which ones? \_\_\_\_\_\_\_\_ 1) Inorganic (DAP &/or Urea, NPS) 2) Organic (manure, compost)

5.3. How much do you pay for the input in birr? \_\_\_\_\_\_\_\_

5.4. What other inputs do you use? \_\_\_\_ 1) Improved seed 2) Improved breeds 3) pesticide chemicals 4) Early maturing variety seeds 5) Others specify

5.5. How much do you pay for it in birr? \_\_\_\_\_

**Part 6: Livestock Ownership**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Type | Of | No. | Average | No | Born | No | died | Sold | During | last 3 | How many |
| Livestock | Owned | price in | During | During | Months |  | slaughtered |
|  |  |  | (Birr) | Last | 3 | last | 3 |  |  |  |  |  |
|  |  |  | No | Total |  | Reasons |  |
|  |  |  |  | Months | Months |  | Sales |  | for sale | (code \*) |  |
|  |  |  |  |  |  |  |  |  | Value |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
| Oxen/bull |  |  |  |  |  |  |  |  |  |  |  |
| Young bull |  |  |  |  |  |  |  |  |  |  |  |
| Cows | (Milking) |  |  |  |  |  |  |  |  |  |  |  |
| Cows (Non-milking) |  |  |  |  |  |  |  |  |  |  |  |
| Sheep |  |  |  |  |  |  |  |  |  |  |  |
| Goat |  |  |  |  |  |  |  |  |  |  |  |  |
| Donkey |  |  |  |  |  |  |  |  |  |  |  |
| Horse |  |  |  |  |  |  |  |  |  |  |  |
| Mule |  |  |  |  |  |  |  |  |  |  |  |
| Others Specify |  |  |  |  |  |  |  |  |  |  |  |
| Code \* : 01 = To buy some food items for family consumption 02 = To pay a loan 03 = To buy other animals04 = Others, specify |

 **7.1. Household food consumption expenditure**

 **Food items consumed in the last 7 days**

|  |  |
| --- | --- |
| Food items consumed  | Sources and quantities of food consumed  |
| Home produced | Purchased | Gift/loan/wage in kind |
| Unit | Quantity | Quantity | Unit Price | Total Expenditure | Quantity | Sources |
| Teff |  |  |  |  |  |  |  |
| Sorghum |  |  |  |  |  |  |  |
| Maize |  |  |  |  |  |  |  |
| Wheat |  |  |  |  |  |  |  |
| Barley |  |  |  |  |  |  |  |
| Millet |  |  |  |  |  |  |  |
| Rice |  |  |  |  |  |  |  |
| Bean |  |  |  |  |  |  |  |
| Chickpea |  |  |  |  |  |  |  |
| Haricot bean |  |  |  |  |  |  |  |
| ‘Guaya’ |  |  |  |  |  |  |  |
| ‘Nug’ |  |  |  |  |  |  |  |
| ‘Telba’ |  |  |  |  |  |  |  |
| Lintels |  |  |  |  |  |  |  |
| Sunflower |  |  |  |  |  |  |  |
| Cow milk |  |  |  |  |  |  |  |
| Cattle meat |  |  |  |  |  |  |  |
| Goat meat |  |  |  |  |  |  |  |
| Ship meat |  |  |  |  |  |  |  |
| Egg |  |  |  |  |  |  |  |
| Butter |  |  |  |  |  |  |  |
| Poultry meat |  |  |  |  |  |  |  |
| Etc. |  |  |  |  |  |  |  |
| Tea |  |  |  |  |  |  |  |
| Cigarettes |  |  |  |  |  |  |  |
| Coffees |  |  |  |  |  |  |  |
| Soft drinks |  |  |  |  |  |  |  |
| Alcohol drinks |  |  |  |  |  |  |  |
| Sugar |  |  |  |  |  |  |  |
| Edible oil |  |  |  |  |  |  |  |
| Salt |  |  |  |  |  |  |  |
| Floor |  |  |  |  |  |  |  |
| Others |  |  |  |  |  |  |  |
| Potato |  |  |  |  |  |  |  |
| Onion |  |  |  |  |  |  |  |
| Banana |  |  |  |  |  |  |  |
| Orange |  |  |  |  |  |  |  |
| Tomato |  |  |  |  |  |  |  |
| Carrot |  |  |  |  |  |  |  |
| Red paper |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

Quantity measurement unit: Kg, gram, liter, number, ???

**Part 8: Marketing**

**8.1.** Which market (s) does your household use? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8.2. What means of transportation do you use to take your produce to the market

 1) Pack animals 2) vehicles 3) Human 4) Others, specify

8.3. What is the average market distance you traveled to the nearest market from your home,

Measured in hours of walk? ----------- 1) ½ 2) 1 3) 1 ½ 4) 2 5) 2 ½ 6) 3 7) 3 ½ 8) 4 9) 4 ½ 10) 5 11) > 5 ½

**8.4. Amount of food grain purchased and sold by the HHs during the last three months.**

|  |  |  |  |
| --- | --- | --- | --- |
| S.N | Types of grain | Purchased in | Sold in |
| Quintal | Birr | Quintal | Birr |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

**Part 9: Credit Services**

9.1. Have you received any type of credit last year? \_\_\_\_\_ **1**) Yes2) No

9.2. If yes, how much in birr? \_\_\_\_\_\_

9.3. If yes for 9.1, from where do you get the credit? \_\_\_\_ 1) Local money lender 2) friends and relatives 3) NGOs 4) Commercial bank of Ethiopia 5) ACSI 6) Other private banks 7) others, specify \_\_

**Part 10: Non-Farm Employment and Wage Earnings**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ID code\* of the HH member | Kind of work | If it is Permanent =1 Temporary =2 | Does it need qualification | Location of employment | Total days of work | Total Earning (Birr) |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

**Part 11: Labor Market Information Status**

12.1. Do you get information about the different farm & no-farm activity works to get extra income?

 1) Yes 2) No

12.2. If yes, from which institution do you get the information?

 1) Radio stations 2) Local government institutions 3) Employer organizations 4)

 Social institutions 5) If others, specify

12.3. Who used the labor market information among your family?

 1) Head 2) Wife 3) Son 4) Daughter 5) Relative 6) others, specify

**Part 12: Social Capital**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 1. Traditional

Organization | Member-only | Committee | 1. Formal
 | Member | Committee |
| Member | Organization |  | Member |
| Equb |  |  | PA |  |  |
| Debo |  |  | Cooperatives |  |  |
| Edir |  |  |  |  |  |
| Others, Specify |  |  | Others, Specify |  |  |

Appendix 2

4.3 1: Multi co-linearity test for continuous variables

|  |  |  |
| --- | --- | --- |
| **Variable** | **VIF** | **1/VIF** |
|  |  |  |
| Nuoxen | 4.51 | 0.221957 |
| Lisshh | 3.78 | 0.264228 |
| Age | 3.76 | 0.265853 |
| Nudhh | 3.50 | 0.285853 |
| Landhs | 3.21 | 0.311256 |
| Famshh | 1.88 | 0.531419 |
| Anmkt | 1.23 | 0.815709 |
| Ofi | 1.20 | 0.836770 |
| Mean VIF | 2.61 |  |

Source; own survey (2021)