



**College of Development Studies**

**Center for Population Studies**

**Demographic and Socio- Economic Determinants of  
Household Food Poverty in Addis Ababa, the Case of Akaki  
- Kaliti Sub-City**

**By**

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**July, 2019**

**Addis Ababa, Ethiopia**

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Food Poverty in Addis Ababa, the Case of Akaki - Kaliti Sub-City**

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**A Thesis Submitted to the School of Graduate Studies of Addis Ababa  
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Master's of Science in Population Studies**

**Advisor: Terefe Degefa (PhD)**

**July, 2019**

**Addis Ababa, Ethiopia**

## **Declaration**

I, declared that this thesis (**Demographic and Socio- economic Determinants of Household Food Poverty in Addis Ababa, The case of Akaki - kaliti Sub-city**) is my own work and I have dully acknowledged the sources of material I have used.

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## **Acronyms and Abbreviations**

FDRE	Federal Democratic Republic of Ethiopia
FGT	Foster, Greer and Thorbeck
HCE	Household Consumption & Expenditure
UN	United Nations
UNDP	United Nations Development Programme
IFPRI	International food policy Research Institute
FAO	Food and Agricultural Organization
WHO	World Health Organization
ENHRI	Ethiopian Health & Nutrition Research Institute
IFAD	International Fund for Agricultural Development
PSNP	Productive Safety Net Program
DEFRA	Department for Environment, Food and Rural Affairs
EDHS	Ethiopia Mini Demographic and Health Survey
CSA	Central Statistical Agency
AE	Adult Equivalent

## **Abstract**

*High rates of unemployment resulting from sluggish economic growth and low level of investment in urban centers combined with high population growth has negatively affected income earning potentials of urban residents. Even though there is long-held belief that urban population is better off, or even favored than rural populations, recent food and financial crises have highlighted the problem of urban food poverty in developing countries. Hence, the overall objective of this study was to assess the demographic and socio-economic determinants of food poverty among households in Akaki-kality Sub-city. To do so, socio- economic and demographic data obtained from Akaki- kality Sub-city Productive Safety Net Program (PSNP) office were used. Foster, Greer and Thorbeck distributional measure of food poverty was employed to estimate head count ratio (food poverty situation) , food poverty gap and to assess the severity of household food poverty while econometric analysis was used to identify determinates factors of food poverty in within Sub-city. Several explanatory variables were considered including household size, dependency ratio, age of household head, sex of household head, marital status, education of household head, access to credit, health of household head and household food expenditure and food poverty as dependent variable. As the head count index shows 20.30 % of the total households are below the food poverty line. The food poverty gap and severity were 5 % and 1.9 %, respectively. The result of the regression model estimate indicates that out of the 9 factors included, five were found to have significant influence on the probability of being food poor at less than 5 % significance level. Urban population will continue to grow with its associated problems unless meaningful development interventions backed by research findings are undertaken. Further, efforts need to be made to improve the income earning capacity of households, education level with particular focus on vocational training, reduce family size with a view to reducing their dependency ratio and saving and credit access to enable them cope with food poverty.*

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background

Food is essential in human being's life. Enough food in terms of quantity and quality for all people is an important factor for a nation to continue its development. Lack of food leads to hunger and starvation that can cause death and hence enough food is a necessary condition to be well nourished (Sila and and Pellokila, 2013).

Food poverty here refers to household-level hunger. Households in food poverty do not have enough food to meet the energy and nutrient needs of all of their members. Depending on patterns of intra-household distribution, at least one member of a food-poor household is always hungry but, potentially, all members are hungry. Food poverty and economic poverty are often linked. Rent, tax and debts are fixed costs; food is 'flexible' budget item, and families and individuals pay the price (Food Ethics Council, 2013).

However, the world is home to over one billion under nourished people, over 98% of which lives in the developing world (FAO, 2008). The population of the developing world is becoming more urban, with the urban population projected to double from 1.7 billion in 1995 to 3.4 billion by 2020. These countries are not capable enough to provide sufficient food for their expanding urban population. This leads to increased food poverty and prevalence of poverty in urban areas (IFPRI, 2002).

Sub-Saharan Africa (SSA) is a region with the highest incidence of food poverty in the world. Ethiopia is among the poorest and most food poor countries of the world, where 24.8% of the population lives below the poverty line (FDRE, 2017) and many people died of drought than other problems particularly in the periods of the registered and documented recurrent drought epidemics. The country has been facing challenging problems ranging from those induced by environmental crisis to those caused by demographic and socioeconomic constraints that adversely affect people's production system (World Bank, 2008).

Another demonstration for the prevalence of severe food poverty problem in Ethiopia could be through looking at the level of stunting, wasting and underweight of children less than five years of age. The 2014 Mini Demographic and Health Survey of Ethiopia reveals that nationally 40 % of children under age five were stunted (i.e., they are considered as short, or chronically malnourished), 9 % were wasted (i.e., they are thin, or acutely malnourished), and 25 % were classified as underweight. Under-nutrition is predominantly rural in the country: stunting and underweight rates are (42 and 27 % respectively) in rural areas, significantly higher compared to (24 and 13 %) in urban areas (EDHS, 2014).

It is also stated that “household food poverty is increasingly being recognized as a serious public health problem in low income countries (Loopstra & Tarasu, 2013: 1316). A high level of inflation on essential goods and services, coupled with lower disposable income has increased pressure upon households in achieving an adequate diet. Businesses and charities such as Kellogg’s, Tesco, Oxfam and Red Cross, have identified the problem and responded proactively by engaging in research, providing support and partnering with food distribution schemes (HC Deb, 2013).

## **1.2 Statement of the problem**

Food poverty is a major public health problem in both developing and developed nations (Worku *et al*, 2014). Based on Food and Agricultural Organization 11.3% of the global population (805 million) was unable to meet its dietary energy requirements in 2012–14. In developing countries, 791 million people live in hunger that makes 13.5 % of the overall population that remain chronically underfed (FAO, IFAD and WFP, 2014). Achieving food security for all people at all times remains a huge challenge for several developing countries including Ethiopia.

Ethiopia is one of the world’s poorest countries with indicators suggesting low levels of development and it has been plagued with food poverty for decades. Food security assessments in Ethiopia have traditionally focused on rural areas while urban food security problems have got little attention (Habtamu , 2013).

According to the Interim Report on Poverty Analysis Study in Ethiopia (FDRE 2017), the proportion of the population below the poverty line in urban area was 14.8%, while the

proportion of food poor people (people who could not purchase the consumption items that generate 2,200 kilo calories) in urban area was estimated to be 15.2% that means; more than one in seven Ethiopians fell below the food poverty line in urban areas. Likewise, the proportion of food poor people in Addis Ababa was estimated to be 19.1% (FDRE, 2017).

Though Ethiopia has abundant natural resources, most of its socioeconomic indicators are extremely low. In Ethiopia food shortage has aggravated the already poor economy of the country. Both chronic and transitory problems of food poverty are widespread and severe in both rural and urban areas of the country (FDRE, 2012). A significant proportion of household expenditure in Ethiopia goes to spending on food. Food expenditure on average accounted for about 49 % of household's budget (WFP, 2014),

In general, factors affecting food poverty in urban areas like Addis Ababa are serious; for instance in Akaki Kality Sub-city, which is one of the 10 Sub-cities of Addis Ababa, the population is very poor living in slum area. According to urban inequality report, though households depend on self-employment for income generation, they have the lowest capacity to make any savings from their incomes. This exacerbates food poverty and hence people seek immediate government intervention (Urban Inequality Report, 2013). According to household income and food expenditure survey (2016), average household food consumption expenditure in Akaki- kality sub-city was found to be 45.93%. That means more than half of their income were allocated for non- food expenditure (HCE, 2016).

Therefore, understanding the level and incidence of food poverty can enable policy makers or decision makers and development actors to make informed decisions and actions. Area specific identification of major demographic and socio- economic determinants of food poverty will simplify and strengthen the implementation of different development projects in the study area.

In light of this fact, this study attempted to address the following research questions related to food poverty in AkakiKality Sub- city. It also aimed at providing an insight in to the factors that affect food poverty, in ways that can assist policy makers and programme administrators to act in a more effective manner so as to reduce food poverty in urban areas of Ethiopia.

### **1.3 General objectives**

The general objective of the study is to assess the demographic and socio economic determinants of households' food poverty in Akaki -Kaliti Sub-city.

#### **1.3.1 Specific objectives**

This study has the following specific objectives.

- 1) To identify food poor and non- poor households
- 2) To examine food poverty situation of households
- 3) To estimate household food poverty gap and severity of food poverty
- 4) To identify policy options for minimizing urban household food poverty in the study area

### **1.4 Research questions**

This study attempted to answer the following research questions at house hold level

1. What are the characteristics of food poor and non-poor households in Akaki - Kaliti Sub-city?
2. What are the demographic and socio – economic determinants of food poverty of the households in the study Sub-city?
3. To what extent is the level/severity of households' food poverty within Akaki-Kaliti Sub-city?
4. What potential interventions and policy options are needed to mitigate the problem of food poverty?

### **1.5 Significance of the study**

Urban population will continue to grow, and problems will also grow with them unless action is taken now. Meaningful development interventions should be based on informed decisions backed by research findings. Understanding the level and incidence of food poverty can enable policy makers or decision makers and development actors to make informed decisions and actions.

## **1.6 Scope and limitations of the study**

The scope is limited to demographical and socio economic determinants only. It does not cover other political and wider environment dimension. The study specifically focused on identifying major determinants of food poverty at household level by comparing food expenditure per day per adult equivalent with the minimum requirement to classify sample households as food poor and non-poor and then looking at the extent of food poverty in Akaki- Kality Sub-city.

The major constraint has been shortage of financial resources and shortage of time; as a result, it could not venture to investigate the wider social and environmental dimensions of food poverty. Only Demographic and socio- economic determinants of food poverty in terms of incidence and severity were investigated. The survey sample did not include urban residents who are classified as street children and homeless population. Moreover, since the study is income based food poverty study, it did not include those household who got direct food aid support.

Another constraint is that PSNP data was broad across all Woredas and collected in Amharic, therefore, due to time limitation, it was found so difficult to interpret and encode all socio-economic and demographic data. For this reason, Woreda 02, 06, 07 and 10 were selected using lottery system and a total of 390 sample population was taken, which is almost equal with sample size determination formula by Yamane (1967) at 95% confidence interval.

## **1.7 Organization of the thesis**

The rest part of this thesis is organized in to five chapters. The second chapter deals with the review of literature that includes theoretical framework of food poverty and empirical studies made in the country and elsewhere in the world. The third chapter touches the brief description of the study area and discusses methodology employed in data collection and analysis method. Chapter four goes on dealing with the results and discussions of descriptive and model results of the research and the last chapter presents summary and recommendations based on the findings of the research.

## CHAPTER TWO

### REVIEW OF LITERATURE AND CONCEPTUAL FRAMEWORK

#### 2.1 Concepts of food poverty and food insecurity

A number of widely utilized definitions were examined to distinguish areas of weakness and compatibility and to enable creation of an appropriate definition. These definitions display similarities between food poverty and food security in the corresponding principles to the pillars of food security (see table 1) below: access, availability, utilization (affordability and quality and nutrition) and stability.

Generally, Food poor mean having nothing to eat and if attention is not given, it leads to household drought and hence requires urgent intervention. Similarly food non poor mean having something to exist but not enough so that the household become food in secured. Food insecurity is food poverty when it occurs in the earlier two pillars; availability and access, but food insecurity could exist without food poverty, meaning that the household may be food in secured without becoming food poor, if it occurs in latter stages, utilization and stability. Food insecurity happens in the last two pillars means having something to eat but not enough to make household food secured. O'Connor, Farag and Baines also noted that food insecurity can exist without food poverty however food poverty cannot exist without food insecurity, Furthermore it is possible for food insecurity to develop as a result of pressures to an individual pillar, while food poverty is driven by a combination of the pillars. (O'Connor *et al*, 2013). Food insecurity study usually focus on whether the household is food secured or not satisfying all food security pillars meaning that, 2200 kilocalorie per adult per day was used as a minimum calorie requirement. In line with this, a household whose per calorie intake was found to be greater than this 2200kcal were regarded as food secure and while households experiencing a deficit were regarded as food insecure (Ejigayehu, 2012). But, food poverty study focus on whether the household has something to eat or not satisfying earlier two stages that means food insecure household here may not be food poor since they have something to eat. In general food poor household do not access food and exposed to hunger while food insecure can access food but not sufficient to live healthy.

Furthermore Coe (2013, p.332) stated that “food poverty does not simply occur due to a lack of money but also develops as a result of a number of other factors, such as a lack of knowledge, skills or equipment to prepare healthy foods”. The positioning of food poverty within food insecurity is attributed to the role of the individual pillars wherein economic access was determined to be the predominant influence. Table below shows key themes emerging from the definition and discussion around food poverty (Christina et al , 2013).

**Table 2.1 Theme emerging form definition and discussion related to food poverty**

Availability	Is there sufficient food Can we depend on supplies? Where does our food come from?
Access	Can everyone in the population obtain food? Do they have skill and facilities to make best use of available food?
Affordability	Can low –income individual and family afford to buy healthy food?
Nutrition and quality	Do people consume the right type of food , in the right quality ,for their physical need
Sustainability (stability)	Can we rely on continued access to food? Will everyone always be able to afford food?

## **2.2 Definition of food poverty**

Food security is defined as “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). This definition was expanded by FAO (2002) to incorporate social access, acknowledging its vital role within the concept. Due to a lack of consensus for a food poverty definition, a range of definitions were investigated to identify and illustrate the diversity of terminology, definitions identified within Maslen, *et al.* (2013) were explored, in addition to

definitions by authors including; Anderson (1990), Moore (2012) and Food Ethics Council (2013).

**Table 2.2 below shows various food poverty definitions.**

Definition	Source
“in ability to afford, or to have access to, food to make up a healthy diet”	(Department of Health, 2005, p.7)
“In ability to access a nutritionally adequate diet and the related impacts on health, culture and social participation”	(Friel& Conlon, 2004, p.120)
“in ability to obtain quality of food as well as quantity – it is not just about hunger, but also being appropriately nourished to obtain and maintain health	”.(Christiana Maslen <i>et al</i> ,2013)
“in ability when individual or household is unable to obtain healthy, nutritious food, or can’t access the food they would like to eat”	(Food Ethics Council, 2013)
“ in ability of individuals and households to obtain an adequate and nutritious diet, often because they cannot afford healthy food or there is a lack of shops in their area that are easy to reach”	(Food Standards Agency, 2014)

The following common features were identified in the majority of the terminology; economic access, quality, quantity, duration and social dimension. Based upon these elements the proposed concise definition was constructed as; Food poverty is the insufficient economic access to an adequate quantity and quality of food to maintain a nutritionally satisfactory and socially acceptable diet (O’Connor *et al*, 2016).

## **2.3 Causes of global food poverty**

Some households live under conditions of chronic or seasonal food poverty. Other households are pushed into food poverty due to different reasons (Concern worldwide, 2018 and UN, 2000 and WFP, 2014).

### **2.3.1 Food shortage**

Food availability in a region is one of the key determinants of the existence and extent of food poverty. In food-short regions, at least some households are food poor. But widespread food poverty persists in the absence of shortage, and many households escape food poverty despite severe food shortage. Given no shortage of food on the global level, all incidence of food poverty can be attributed to mal distribution rather than underproduction. "Distribution" in this context includes transportation and storage.

### **2.3.2 Access to land**

Land, especially land ownership, is perhaps the most critical entitlement for preventing a household's food poverty in rural area. In addition to providing food in ordinary times, access to land can safeguard against household hunger in situations where food supply is limited by non-environmental factors such as changes in food prices brought about by trade policy. It also provides an asset in protecting against food poverty if production is limited by factors such as widespread drought.

### **2.3.3 Poor infrastructure facility**

Infrastructure in terms of adequate energy and water/irrigation supplies, high-speed communications and transportation systems connecting areas of high production with centers of high consumption, all play a crucial role in safeguarding food security. But much of that food loss occurs during or after harvest in developing countries due to inadequate infrastructure, lack of proper storage facilities, lack of education on grain storage and lack of efficient markets to ensure grains move through the supply chain. This food loss reduces incomes of smallholder

farmers, raises food prices and contributes to hunger and malnutrition. Some regions, for instance, produce surplus, while people in other regions face famine threats. There are of course infrastructural problems in the country to link the surplus producing regions to the food-deficit ones (Alexander, 2009).

### **2.3.4 Lack of investment in agriculture**

Investments in improving land management, using water more efficiently and making more resistant seed types available can bring big improvements (WFP, 2013). A lack of adoption of more productive technologies for agriculture in lower-middle-income countries contributes to large differences in amount of crops produced when compared with upper income countries (FAO, 2017).

### **2.3.5 Prices and wages**

The degree of food security depends on prices as well as labor productivity and income. Although increased agricultural productivity usually leads to higher incomes and better food security among households that have access to modern inputs and methods. Small-scale farmers often consume a share of their own produce, but it is increasingly rare for household food needs to be met entirely by subsistence production. More advantageously, higher agricultural production that lowers food prices improves the access to food in non-landed households. Increases in the prices of essential non-food items, such as fuel and housing, also aggravate food poverty in low-income households, regardless of income source. Households may try to minimize the impacts of rising prices by shifting their consumption patterns, but lack of fuel poses an impossible barrier to food preparation. (Concern worldwide, 2018)

### **2.3.6 Unstable markets**

In recent years, the price of food products has been very unstable. Food prices make it difficult for the poorest people to get nutritious food consistently - which is exactly what they need to do. Families need access to adequate food all year round. Price spikes, on the other hand, may temporarily put food out of reach, which can have lasting consequences for small children. When

prices rise, consumers often shift to cheaper, less-nutritious foods, heightening the risks of micronutrient deficiencies and other forms of malnutrition.

### **2.3.7 War & conflict**

War and conflict are also among the leading destroyers of food security. Food shortage is violent conflict that reduces food availability and changes patterns of food distribution in affected countries. Food imports during times of violence are often restricted by embargoes. During both national and international conflict, governments put a high priority on provisioning the military, which tends to decrease civilian access to food. It is much more common for internal food production to decrease, because land has been abandoned and livestock sold by agriculturists seeking to avoid being plundered. It is also quite difficult to expand production when economic and human resources are being devoted to the conflict. Commerce restrictions also have effects on food poverty that do not operate through shortage. Households whose livelihoods depend on wages from industries that specialize in export goods may be especially vulnerable to food poverty if embargoes lead to unemployment or underemployment for workers in those industries. In South Sudan, civil war has led to mass displacement and abandoned fields. The resulting crop failure, combined with a soaring inflation rate that puts imported food out of reach, has left 3.5 million people hungry (Concern worldwide, 2018).

### **2.3.8 Climate and weather**

Natural disasters such as floods, tropical storms and long periods of drought are on the increase - with calamitous consequences for the hungry poor in developing countries. Drought is already one of the most common causes of food shortages in the world. In many countries, climate change is exacerbating already tough conditions. The world's fertile farmland is under threat from erosion and desertification. Meanwhile, deforestation by human hands accelerates the erosion of land which could be used for growing food. Some countries, such as Zambia, enjoy relative peace and stability, yet are often plagued by hunger due to droughts or floods. Too much or too little rainfall can destroy harvests or substantially reduce the amount of animal pasture available. Unfortunately these fluctuations which are made worse by the El Niño weather system and are likely to increase due to changes in climate often affect the poorest regions of the world the most (Concern worldwide, 2018).

### **2.3.9 Poor nutrition**

When we talk about hunger, we're not just talking about access to food, but also access to the right nutrients. In order to thrive, humans need a range of foods providing a variety of essential health benefits. Poor families often rely on just one or two staple foods like corn or wheat which means they're not getting enough of critical macronutrients like protein, and they're also missing out on lots of important vitamins and minerals. The less nourished and balanced a person's diet, the poorer their health will be. This results in less energy, meaning that these families will be less likely to break the poverty-hunger cycle. This is especially important for women and young children: Nutrition support during pregnancy and up to the age of five can help protect children for their entire lives, reducing the likelihood of disease, poor health, and cognitive impairment (UN, 2000).

### **2.3.10 Structural adjustment**

Even if structural-adjustment programmes would be tremendously successful in the long run, their short-term effects are often devastating. One of the most common macroeconomic policy changes made by adjusting countries is the devaluation of foreign exchange rates. Having an overvalued currency keeps imports artificially cheap, and, after devaluation, less food can be imported, given the same amount of foreign exchange. This particular cause of food shortage is most likely to lead to food poverty for the urban poor. Urban households usually have less flexibility and resources to produce their own food and are therefore likely to rely on markets. Since devaluation is often accompanied by wage freezes in both the private and the public sectors, food prices rise while incomes do not. The World Bank has tried to limit the impact of adjustment on income distribution. Their Social Dimensions of Adjustment project and other poverty-alleviation programmes include interventions intended to increase access to employment and food for the urban poor and access to land and credit for the rural poor (UN, 2000).

## **2.4 Cause of food poverty in Ethiopia**

The causes of the existing food poverty problem in Ethiopia are numerous and interrelated (ATA, 2010). Based on the reviewed document, this study points out the following major causes of food poverty. These are:

### **2.4.1 Backward agriculture**

Agricultural technology can contribute to increased food production (food availability), increased agricultural and rural incomes (better access to food), and entails positive spillovers to other sectors and contributes to economy wide growth. But in Ethiopia smallholder farming is the dominant livelihood activity and the source of vulnerability to food poverty (Kidane *et al.*, 2006).

The performance of agriculture, the sector that makes livelihood for 85% of the country's population, has been poor over the last few decades, to the extent that the country could not adequately feed its population from domestic production. This has been manifested in the prevailing chronic and transitory food insecurity. Similarly, Ethiopia is currently facing challenging problems that are induced by environmental crises, demographic and socio-economic constraints, which adversely affect people's production system. This has resulted in agriculture being poor for several years to the extent that the country could not adequately feed its population from domestic production and prevailing both chronic and transitory food poverty (Degefa, 2002).

### **2.4.2 Land degradation**

Land degradation and food poverty are pervasive and interconnected problems in Ethiopia (Stein and Bekele, 2004). Land degradation coupled with erratic rainfall, drought and poverty problems pose a serious threat on households' food poverty in Ethiopia. Among the various forms of land degradation, soil erosion is the most serious problem, which results in soil nutrient depletion and loss of fertility of farm land. Loss of soil nutrient and its productive capacity due to soil erosion leads to low productivity of land, which in turn brings loss in crop yields and results in a vicious cycle of food poverty (Genene and Wagayehu, 2010).

### **2.4.3 Drought**

The Eastern part of African Continent was hit by recurrent drought during 1997 –2000. Around 12 million people were suffering from starvation in the Horn of Africa (Somalia, Ethiopia, northeastern Kenya), stricken by the worst drought in the past 60 years (Albert, 2012). Ethiopia, in addition to existing economic problem, as part of the region, experienced prolonged drought

and famine that caused considerable crop failure and livestock damage resulting in severe food shortage (Abraham, 2003). Furthermore, the problem of food poverty 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. Drought and famine have become an everyday reality in Ethiopia. The country has faced three major famines and numerous famines like situations in the past three decades that significantly affected the country's food production. During the period between 1958 and 1977 over 25 million people were directly affected by famine and drought (Berhanu, 2001).

#### **2.4.4 Population pressure**

Ethiopia is the second-most populous country in sub-Saharan Africa. Food poverty is a major and ever worsening problem. Rapidly increasing population pressure is one of the underlying cause food poverty (USAID, 2012). Population pressure coupled with droughts and other unfavorable weather conditions is a challenge to famine prevention in Ethiopia (Alexander, 2009). Most of the countries with the highest numbers of people facing food poverty also have high fertility rates and rapid population growth. This increases the challenge of adequately meeting nutritional needs. Sub-Saharan Africa has the highest population growth rate in the world (United Nations Population Division, 2009). Large population reduces income per head, expenditure per head and per capita food consumption. The likely explanation is that in an area where households depend on less productive agricultural land, increasing population results in increased demand for food. This demand, however, cannot be matched with the existing food supply from own production and this ultimately end up with the household becoming food poor (Robert *et al.*, 2013).

#### **2.4.5 Poor infrastructure facility**

Poor infrastructure is also one cause of food poverty in Ethiopia. As it was discussed in previous section, poor infrastructure problem in the country obstructs to link the surplus producing regions to the food-deficit ones (Alexander, 2009) and exacerbate urban food poverty.

## 2.5 Determinants of household food poverty

Food poverty as defined above is composed of availability of food, access to food, and risks related to either availability or access. National, regional or local availability of food is determined primarily by food production, stockholding, and trade at any of these levels. Variation in any of these can contribute to food poverty. Fluctuations in a country's capacity to import food also contribute to food poverty by affecting the local availability of food, although it may be available globally (Von Braun *et al*, 1992).

A household ability to overcome food poverty is derived from the household's human, material, and institutional resource base, which are often collectively referred in the literature as "food security factors." These factors include the educational and employment status, household demographics, urban agriculture, assets, saving and access to clean water and sanitation and cost of living (Gezimu, 2014).

The same source indicates that lower educational level and illiteracy are directly related to food poverty. This is usually measured just for the head of household, but the educational status of other household members, especially income earners, is also important. The possession of assets especially liquid assets is negatively correlated with food poverty.

The recent concept of food poverty has given more attention to households and individuals than its availability at international, national and regional levels. This is because of increasing food production, supply and sufficiency at broader levels does not necessarily ensure that each and every individual is food non-poor. This is why, as reported by the WFP (2014), over 1 billion people throughout the world have been suffering from hunger and malnutrition despite the fact that there is more than sufficient food supply at global level at present. Factors affecting household food poverty will be explained as follows (Bonnard, 2000).

**Household demographics:** The size of the household and the dependency ratio are positively associated with food poverty. Exception to this would include very small households comprised of one or two elderly people or a solitary widow. Child headed households are nearly always food poor (Bonnard, 2000).

**Educational level:** Lower educational level and illiteracy are directly related to food poverty. This is usually measured just for the head of household, but the education status of other household members, especially income earners, is also important.

**Employment status:** Urban households' livelihoods are generally heavily dependent on employment outside the home, and much more so than rural households. This is particularly true of large industrialized or capital cities with constrained land access and more profitable non-farm employment opportunities. Source of income and; employment are more diverse in urban areas. Household members tend to have education and training and are, therefore, able to collectively undertake a wider range of unskilled, semi-skilled and skilled jobs. The more complex urban economy offers a greater variation in employment option. In general households with more diversified income are more inclined to be food non poor and able to better cope with shocks. When unemployment of young adult men is high, young adult male household members can be a drain on household resources. Besides constituting an extra mouth to feed, unemployed males have a tendency to drink, take drugs, and become involved in gangs, crime, and other deviant activities that cause stress within the household unit.

**Urban agriculture:** It is difficult to generalize about urban agriculture. The opportunities for, and the role of, urban agriculture in urban food security varies across cities. For households an expansion in production or rise in producer prices represent an increase in income and an improvement in food poverty.

**Assets:** Urban dwellers tend to possess more consumer items such as televisions, radios, refrigerators, bicycle and furniture than rural residents. The possession of assets particularly liquid assets is positively correlated with food security. The greater the store of wealth and the more diverse the store of wealth, the less vulnerable a household is to food poverty.

**Savings and access to credit:** More households save, maintain bank accounts, and belongs to saving and microfinance clubs than rural households. This is not to say rural households do not save, but rather that is more common for urban households in the majority of country scenarios reviewed. While urban households save in the form of cash, rural households can also stock grain and accumulate livestock as a store of wealth. Households with either form of savings tend to be more food secure than those without convertible assets.

**Access to clean water and adequate sanitation:** The quality of water and sanitation affect food security through food utilization. Disease inhibits the proper utilization of ingested foods and results in inadequate nutrition.

## **2.6 Empirical evidences**

A number of studies have been conducted to measure urban household food poverty in different context (Craig and Scanlan, 2001; Gani and Prasad, 2007 , Vasco .M, 2006 ). A study by Wilfred *et al.* (2010) reveals the age of household head and household size are the most important factors influencing positively food poverty among urban households. Also the same authors disclosed age of household heads, education level attained by household heads and households' income level are the most important factors determining food poverty status among urban households.

Another study by (as cited by Kumbi, 2005) Ashimogo and Hella, 2000 in Iringa, Tanzania) revealed that household food security was positively influenced by total household asset possession and income. Bergeron (2002) studied Food security in Madagascar, a situational analysis, the study reveals although urban agriculture is common in cities, food access for urban household depends more on households' purchasing capacity than on their agricultural production— although the latter remains important. Purchasing capacity is determined by prices and by income levels.

Different researchers have adopted the FGT Model to analyze the extent of food insecurity. The study by Abrham et al , 2015) in Sodo town used binary logit model (logistic regression model , showed out of ten explanatory variables, five variables namely single household heads, dependent member in households, daily laborers of household heads, monthly income of households and monthly food expenditure retained their significance in influencing food security status. The head count ratio revealed that 37.6 percent of sampled households are found to be food insecure.

Another study carried out by Aschalew (2006) in Dire Dawa also used binary logit model, out of nine explanatory variables, seven were found to be statistically significant. These variables include family size, daily income per adult equivalent, educational level, sex, marital status,

access to credit and proportion of food expenditure. The head count ratio revealed that 43 percent of sampled households are found to be food insecure. The gap and severity of food insecurity were estimated to be 13 and 5.9 percent respectively.

Study carried out by Ejigayehu (2011) in Addis Abeba also using multiple regression model, out of eleven independent variables that are hypothesized to have influence on household food, six of them namely educational status, household size, age of household head, household income, remittance and gift and ownership of bank account were also found to be significant ( $p < 0.05$ ). The remaining variables, namely, overall dependency ratio (DEPNDRTO), sex of household head, accesses to credit, and involvement in urban agriculture were not found statistically significant. The head count ratio revealed that 47 percent of sample households were food insecure. The food insecurity gap and severity were 16.83 and 6.9 percent respectively.

Girma (2012) in his study also used logistic regression model, out of the 10 factors, 6 variables were found to have a significant influence on the probability of being food insecure. These variables include household size, household head age, household head education, and asset possession, access to credit service and access to employment. The head count index shows that 58.16 % of the total households are below the food insecurity line. The food insecurity gap and severity were 20 % and 9.4 %, respectively.

On the other hand, the study by Muche *et al* (2014) demonstrated that 42.9% were living below minimum requirement; 4.4% were far from minimum requirement; and 0.4% were under severe food insecurity situation. Food poverty study conducted by Muhammed (2012) in Punjab province of Pakistan also showed the proportion of food poor people, head count index was estimated to be 19%.

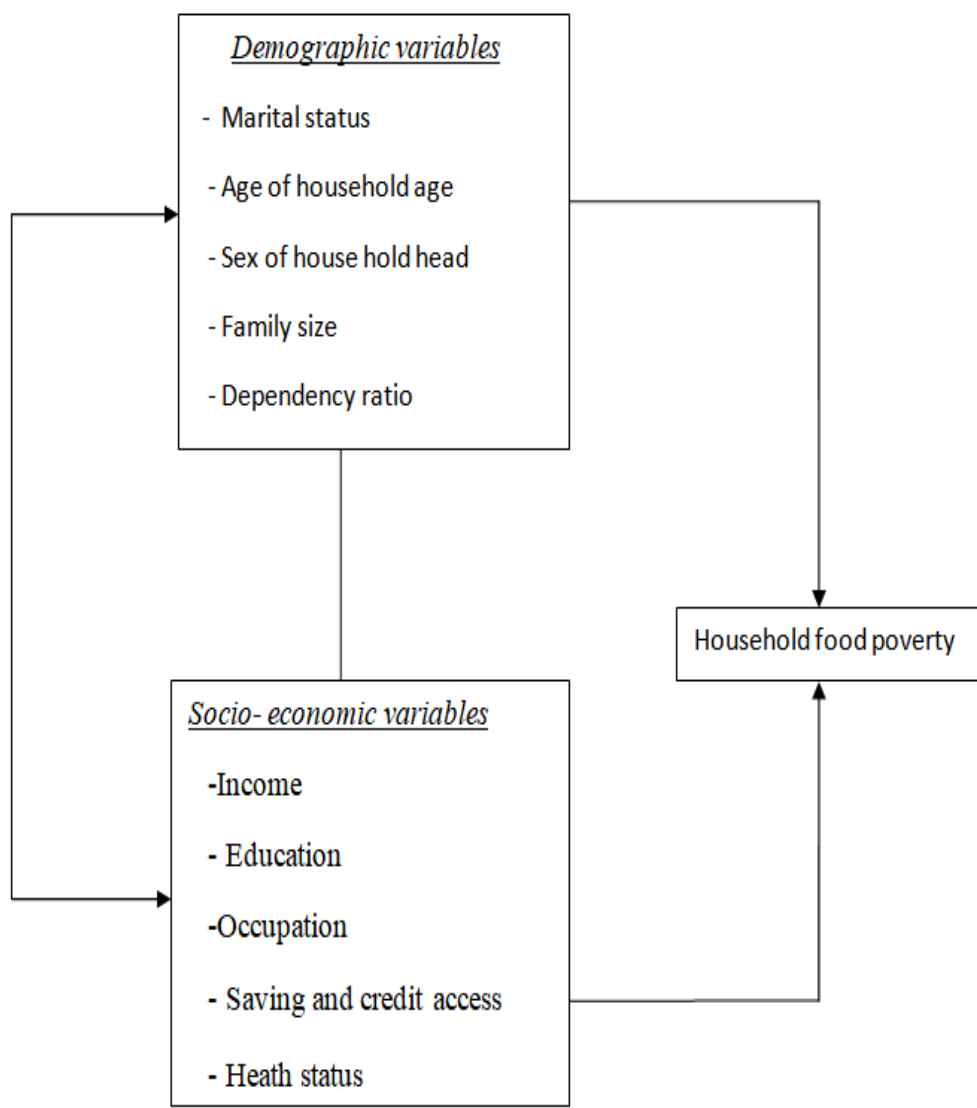
According to FDRE, interim poverty report (2017), urban food poverty, the head count index was estimated to be 15.2% where as food poverty gap and severity were 3.6 % and 1.4 %, respectively. The proportion of food poor people in Addis Ababa was also estimated to be 19.1%

Depending on the empirical evidences reviewed above in the literature most of the studies undertaken on the issues of determinate and dimensions of food poverty use similar model.

Therefore both, FGT and regression model is employed to identify the factors influencing food poverty among the food poor part of population.

## 2.7 Conceptual framework

The conceptual framework that guide this study is illustrated as follows



**Figure 2.1: Conceptual framework of urban food poverty developed by researcher**

## **2.8 Status of food poverty in Ethiopia**

Achieving national food security is one of the main objectives of the Government of Ethiopia as expressed in its Growth and Transformation Plans and Rural Development Policies and Strategies, which is also in line with the SDGs goal of eradicating poverty in all its forms and dimensions. To that effect, to estimate the proportion of food-poor people that fall below the food poverty line, different measures of aggregate poverty are computed for food poverty. Food poverty head count index is found to be 24.8% in 2015/16, but with a marked disparity between urban and rural areas (27.1% in rural versus 15.2% in urban areas). The food poverty gap index is also estimated to be 6.7%, with rural food poverty gap index (7.4%) much higher than that of urban food poverty gap index (3.6%). The national food poverty severity index is estimated to be 0.027 with rural food poverty severity index (0.03) being markedly higher than that of urban areas (0.014) (FDRE, 2017).

The overall results show that all forms of food poverty indices are found to be higher than the aggregate poverty indices throughout the report. This may signify that much of the persistent poverty in Ethiopia is triggered by lack of sufficient food at household level.

### **2.8.1 Trend in food poverty**

Clear improvement is observed regarding the historical trend of food poverty over time. The national food poverty index was about 42% in 1990/00 but it declined to about 33.6% in 2010/11 and further to 24.8% in 2015/16. This implies the national food poverty index declined by 9% over the period of 1999/00-2004/05 and by 12% from 2004/05 to 2010/11. Similarly, it is declined by 26% between 2010/11 and 2015/16 which is much higher than reduction experienced in the previous surveys (FDRE, 2017).

Looking at poverty levels by rural and urban dimensions makes it apparent that there have been huge decline in rural food poverty across all measures: head count, depth and severity indices. But between 2010/11 and 2015/16 the decline in urban poverty head count index (by 46%) was much higher than the decline in rural poverty index (by 22%) (FDRE,2017).

On the whole what is important to remark here is that it is encouraging to witness a reduction in food poverty indices in both urban and rural areas. The decline can be explained by the fact that households are becoming vibrant and resilient to economic shocks which maybe the result of broad based economic growth recorded over recent years and Government's commitment to

pursue pro- active policies in managing economic crisis by redistributing resources and providing emergency food aid in time of drought incidence in any part of the country (FDRE, 2017).

## **2.9 Methods of measuring food poverty and poverty line**

### **2.9.1 Methods of food poverty measurement**

The most widely used poverty indices are the percentage of the poor below the poverty line (headcount index), the aggregate poverty gap (poverty gap index), and the distribution of income among the poor (poverty severity index). The poverty measure itself is a statistical function that translates the comparison of the indicator of household well-being and the chosen poverty line into one aggregate number for the population as a whole or a population subgroup. Many alternative measures exist, but the three measures described below are the ones most commonly used (FDRE, 2017).

**Incidence of poverty (headcount index):** Head count index, the share of the population whose income or consumption is below the poverty line; that is, the share of the population that cannot afford to buy a basic basket of goods.

**Depth of poverty (poverty gap index):** Poverty gap index provides information regarding how far households are from the poverty line. This measure captures the mean aggregate income or consumption shortfall relative to the poverty line across the whole population. It is obtained by adding up all the shortfalls of the poor (assuming that the non-poor have a shortfall of zero) and dividing the total by the population. In other words, it estimates the total resources needed to bring all the poor to the level of the poverty line.

**Poverty severity (squared poverty gap):** Poverty severity index measures not only the distance separating the poor from the poverty line (the poverty gap), but also the inequality among the poor, that is, a higher weight is placed on those households further away from the poverty line.

## 2.9.2 Food poverty line

The food poverty line is determined by choosing a bundle of food typically consumed by the poor. The quantity of the bundle of food is determined in such a way that the bundle meets the predetermined level of minimum caloric requirement (2200 kilocalorie). This bundle is valued at local prices or at national average prices if the objective is to get a consistent poverty line across regions and socio economic groups. Then a specific allowance for the non-food goods consistent with the spending pattern of the poor is added to the food poverty line.

Using the standard methodology set forth by the CSA, households are classified as above or below the absolute poverty line and food poverty line. The food poor are those who spend less on food than is required to consume the minimum level of calories for a healthy, active life (based on the types of foods purchased and consumed by the poor, calculated at local costs). Prices are based on local market prices, and on the cost of the minimum basic food basket in the areas where the household is located. Because this measure utilizes more quantifiable units of measure, it provides a more robust picture of food poverty, particularly in urban areas where most food is purchased, compared with other measures (CSA and WFP, 2014).

**Setting poverty line:** The poverty line based on the 2015/16 Household Income and Consumption Expenditure Survey was set using the consumption groups (basket of goods). These basket of goods which provides 2200 kilo calories are valued at 2015/16 national average prices in order to obtain food poverty line. Similar to food poverty, absolute the poverty line measure includes not only the cost of the minimum calories required by the household, but also a specific allowance for non-food goods consistent with the spending pattern of the poor added. This measure is highly correlated with food poverty, as it is based on the same data with additional non-food expenditure data. The food poverty line for 2015/16 is computed to be Birr 3772 Birr per year per adult person and the absolute poverty line is Birr 7184 per year per adult person (see table 2.2).

**Table 2.3 Absolute poverty and food poverty lines**

	1995/96	2010/11	2015/16
Kilocalorie per day per adult	2200	2200	2200
Food poverty line (Birr)	648	1985	3772
Absolute poverty line (Birr)	1075	3781	7184

Source: Computed using HICE survey 1995/96, 2010/11 and 2015/16 and MoFEC (2015)

## 2.10 Intra - household food distribution

Individual food access depends on intra-households food distribution and gender parity in practice meaning that the consumption pattern is not uniform, Children, females and older household members consume less food compared to those male adult (Rafael *et al* 2010).

Per capita or adult person estimates is obtained by dividing total daily/monthly income to all family members. Though household food poverty study is conducted with per adult person estimation, such a strategy leads to a gap between these estimates and real family food consumption since they fail to consider the presence of family members with distinct energy needs, like children. Thus, adult-equivalent scales should be noticed for narrowing the difference between such estimates and real food consumption and allowing the comparison of data for families with different compositions. This tool allows identifying the contribution of various family members to the overall household food consumption pattern, unlike per capita measurements. Adult equivalent conversion factor is shown in appendix 1.

## CHAPTER THREE

### DESCRIPTION OF STUDY AREA AND RESEARCH METHODOLOGY

#### 3.1 Description of study area

Akaki-Kality Sub-city is one of the largest sub-cities located in South Eastern part of Addis Ababa between  $8^{\circ}53'40.92''$  and  $9^{\circ} 8.8947000''$  North latitude and between  $38^{\circ} 46' 23.52''$  and  $38.7732000''$  East longitudes. Sub- city shares boundary with Bole Sub-city in the North, Kirkos and Nifas Silk Lafto Subcities in the North West and Oromia regional state in the South. The lowest point 2,050 meters in the Southern periphery and the maximum elevation is 2,331 meters above sea level. The Sub-city has 11 Woredas and covers total area of  $156 \text{ km}^2$ . Currently the total population size of the sub city is 181,202 out of which 88,676 are male and 92,526 are female. The total area of the sub city is also 12347.70 hectare. Since its establishment the old Town (Akaki) has been the hub of industries of the city in particular and the nation in general (Addis Ababa City Land Information Center, 2014).

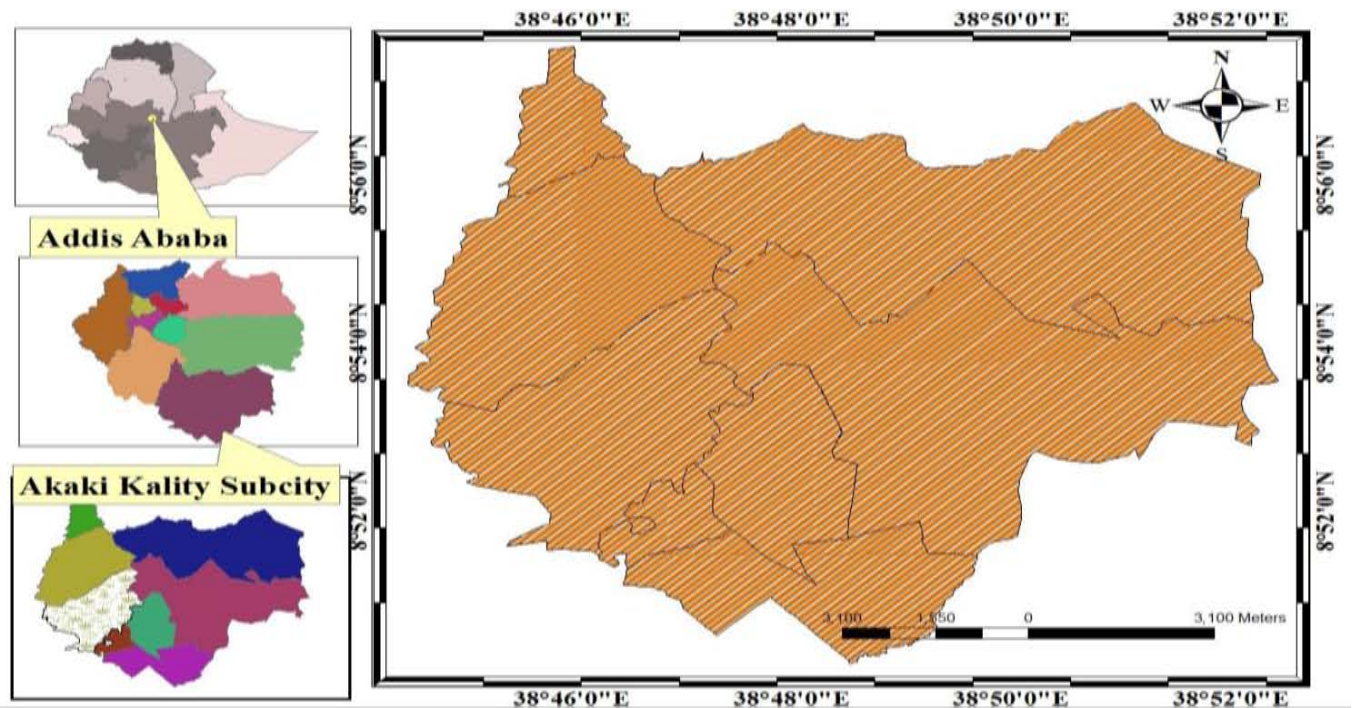


Figure 3.1: Location Map of Akaki- Kality Sub-city ; Source: CSA (2014)

### 3.11 Demographic characteristics of study population

#### Population size

Addis Ababa had a total population of about 3,195,000 and an annual growth rate of 3.8 % according to the 2014 population projection (CSA, 2007). The same report shows that 47.4% of the City’s populations are males and the rest 52.6% are females (Figure 3.2).

Table 3.1 population size by sex and total household

Total Population	Sex		Total household
	Male	Female	
181,202	88,676	92,526	47,021

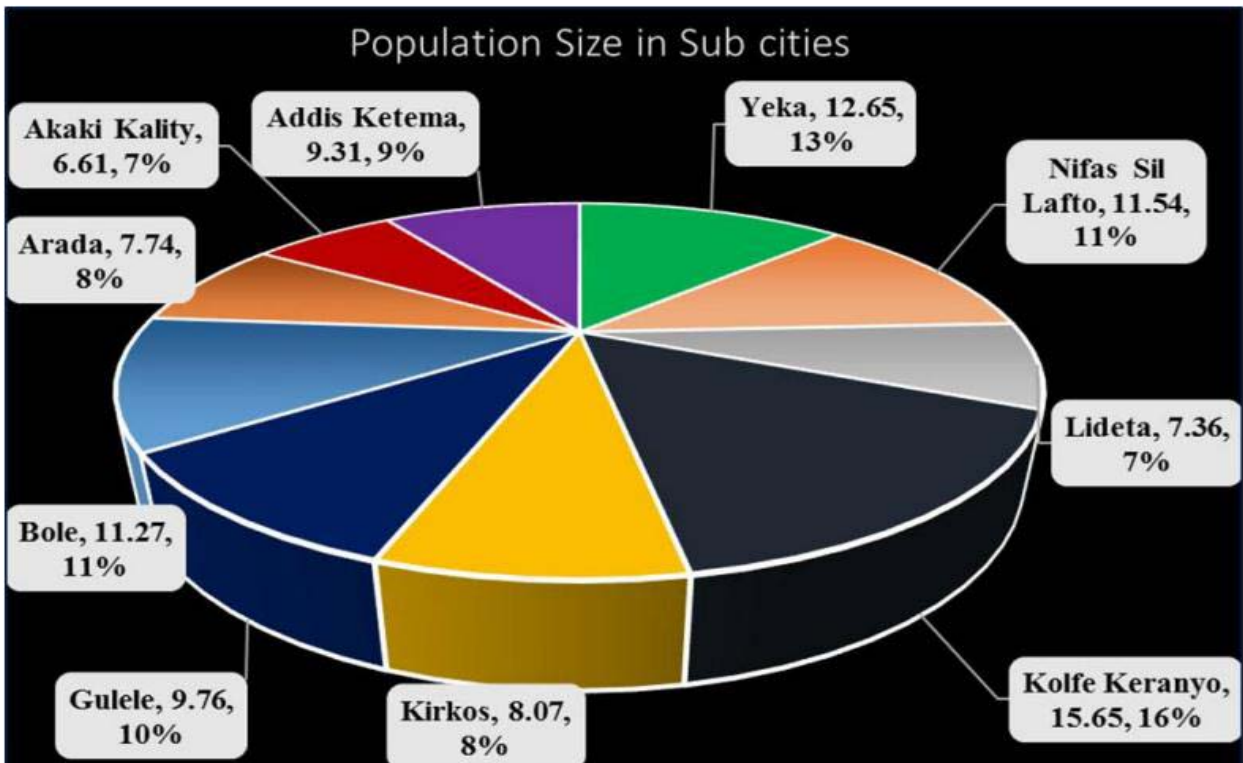


Figure 3.2 Population distributions by sub-cities

Source:- (Addis Ababa City Land Information Center, (2014)

According to the 2007 census, the total population of Akaki-Kality Sub-city is 181,202 which is 6.62% of the entire population of the city. From the total population of 88,676 are male and 92,526 are female. Table below briefly shows the population number and density.

**Table 3.2 Population size and density per Woreda , Akaki-Kality Sub-city**

<b>Woreda</b>	<b>Area of the Woreda/ha</b>	<b>Number of population</b>	<b>Population Density ( Pop/ha)</b>
01	603.92	25460	42
02	1323.61	13972	10
03	235.96	17567	74
04	1325.63	21149	16
05	735.46	22540	31
06	309.54	27080	87
07	780.34	22540	29
08	596.18	21149	35
09	2847.61	5119	2
10	1279.49	1951	1
11	2309.96	1951	1
Total	1247.70	181,202	14.62

Source :- (CSA , (2007)

### **3.12 Research methodology**

The research methodology section covers data source, research approach, and research design and sampling selection. Finally, it discusses the method of analysis and selected models.

### **3.2.1 Data source, research type and design**

#### **Data source**

Productive safety Net Program (PSNP) socio- economic and demographic survey data (2017) was used. PSNP data was broad across all eleven Woredas and collected in Amharic, therefore, it was found so difficult to interpret and encode all socio-economic and demographic data. For this reason, researcher had selected Woreda 02, 06, 07 and 10 using lottery system and a total of 390 samples were taken. This sample size is enough and almost equal with sample size determination formula by Yamane (1967) at 95% confidence interval.

1. Either Interview or FGD with key informants and experts
  - a. Family planning experts
  - b. Gender experts
  - c. Finance and economy experts and so on etc
2. Content analysis was used to develop
  - a. Introduction , Review literature and problem statement , etc

#### **Research design**

Descriptive research design:- It describes the situation and attempts to investigate/examine household food poverty in depth and finally gives recommendation and possible solution to alleviate the stated problem .

#### **Research approach**

Mixed method research: - This approach has both qualitative and quantitative nature. Quantitative means anything that exists in a certain quantity and can be measured. The methodology has a quantitative nature because there are quantifiable measures of variables were formulated and conclusions were drawn from samples to populations therefore, it is quantitative dominants. But some of the data are not inherently quantitative and do not necessarily have to be expressed in numbers therefore, it has also a qualitative nature. Qualitative data required for the study were collected from key informants, supervisor, employee and managers as well. These methods have been used to strengthen quantitative analysis also.

## 3.2.2 Data reliability measurement and validation techniques

### 3.2.2.1 Measurement of quantitative data reliability

The goal of reliability theory is to estimate errors in measurement and to suggest ways of improving test so that errors are minimized. Data will be checked for reliability using cronbach or coefficient alpha reliability estimation techniques (Endalework, 2016).

1. **Cronbach or Coefficient alpha**:- was used to measure reliability of data . It is the measure of internal consistency that is how data are closely related.

$$\alpha = \frac{k}{k-1} \left(1 - \frac{\sum s^2_i}{s^2_x}\right)$$

#### Where

K= Total number of questions

S<sup>2</sup>i = variance for each Q

S<sup>2</sup>x = total for all variance Q

## 3.2.3 Method of analysis

### Quantitative method

1. **Foster, Greer and Thorbeck (FGT)**:-is a model used to determine different household food poverty incidence gap and severity characteristics.

The FGT model can be expressed as follows

$$F(\alpha) = 1/n \sum_{i=1}^q \left[ \frac{(m - y_i)}{m} \right]^\alpha$$

#### Where

**n** = number of sample households;

**Y<sub>i</sub>** = Available household income/kilocalories of the *i*th household;

**m** = the cut-off between food non –poor and food poor (expressed in terms of needed income/caloric requirement);

**q** = is the number of food-poor households; and

**α** =is the weight attached to the severity of food poverty.

Foods that provide 2200 kilo calories ,which is the minimum calorie requirement to enable an adult to live a healthy and moderately active life, as suggested by WHO, are valued at 2015/16 national average prices in order to obtain food poverty line. According to interim poverty report (2017), this food poverty line is determined to have the cost of 3772Birr per year per adult person. To use these poverty lines and compute poverty indices, per adult consumption expenditure has been updated by deflating all food and nonfood consumption items by spatial price indices (disaggregated at the regional level relative to national average prices). The cost of one kilo calories has been known also to be 0.0047 birr (FDRE 2017).

Food poverty line determines whether the household is able to get enough daily income per adult person for this daily caloric requirement or not. Therefore those who cannot afford money or unable to purchase consumption items for this daily caloric requirement are assumed to be food poor.

Simple Mathematical Relationship between daily caloric requirement and daily income per adult person has been derived to obtain food poverty line.

For daily 2200kcal x 365days = 803000 kcal per adult person per year = 3372Birr per year per adult person. This shows that the cost for 2200kcal is 10.34 birr

Though this 10.34birr/2200kcal is used as standard cutting line, it cannot be used as threshold to identify food poor household from sampled population. Because such a strategy leads to a gap between adult -person estimates and real family food consumption since they fail to consider the presence of family members with distinct energy needs, like children. Thus, adult-equivalent scales should be used.

### **FGT model explanation**

As far as the weight to  $\alpha$  is concerned, Hoddinot (2001) explained that giving no weight to the severity of food poverty is equivalent to assuming that  $\alpha = 0$ . Then, the formula will be to  $F(0) = \frac{q/n}{n}$ , this is called the head count ratio. It simply measures the proportion of the population that is counted as food poor,

Giving equal weight to the severity of food poverty among all food poor households is equivalent to assuming that  $\alpha = 1$ . That is  $(m-y_i)/m$ . This index  $F(1)$  will provide the possibility to estimate resources required to eliminate food poverty through proper targeting.  $\sum F(1) / q$  gives

the total financial/income requirement to bring the food poor households to the given daily income requirement level (Poverty Measures Manual , 2005).

Further giving weight to the severity of food poverty among the most food poor households is equivalent to assuming that  $\alpha > 1$ . The most common approach in poverty literature is to set  $\alpha = 2$ .

Hence  $F(0)$  = is percentage of food poor households

$F(1)$  = is food poverty gap

$F(2)$  = is the severity of food poverty.

The FGT model has been summarized, after minor customization had been made, (table 3.3).

Table 3.3 FGT model components and summarization

<b>FGT model components</b>		
<p><b>Identification of food poor and food secured</b></p> <p>If household daily income per adult equivalent is less than the needed requirement , it is counted as food poor otherwise non poor. i.e If <math>(m &gt; y_i)</math> , food poor , but if <math>(m &lt; y_i)</math>, food non-poor where <math>y_i</math> = income per adult equivalent of the <math>i^{th}</math> household; <b>m:-</b> is the cut-off between food poor and non-poor (expressed in terms of needed income/kcal requirement);</p>	<p><b>Food poverty Gap at household level</b></p> <p>It measures the gap for every food poor household</p> $G = \frac{[m - y_i]}{m}$ <p>where <math>y_i</math> = income per adult equivalent of the <math>i^{th}</math> household; <b>m:-</b> is the cut-off between food poor and non-poor (expressed in terms of needed income/kcal requirement);</p>	<p><b>Severity at household level</b></p> <p>It measures the severity in each household</p> $G_i = \left( \frac{m - y_i}{m} \right)^2$ <p>Where <math>G_i</math> = severity at household level <b>m:-</b> is the cut-off between food poor and non-poor (expressed in terms of needed income/kcal requirement);</p>
<p><b>Head count</b></p> <p>Head count ratio measures the proportion of sample population counted as food poor</p> $\text{Head count} = \frac{NP}{N} \times 100$ <p>where NP = number of poor population N = sample population</p>	<p><b>Gap index</b></p> <p>Measures the total gap of food poor households at community level or for all poor households.</p> $\text{Gap index} = \frac{\sum G}{N}$ <p>Where G is gap at household level N = sample population</p>	<p><b>Severity index</b></p> <p>It measures severity of food poor households' at community level</p> $SI = \frac{\sum G_i}{N}$ <p>Where SI = severity index N = sample population</p>

**2. Econometric tests and descriptive statistics:** identify the socio economic characteristics that are correlated with the food poverty. In light of this, it was hypothesized that there are some household characteristics like household size, income, household head educational level, etc--, that have got relative importance in determining the state of food security at household level. The dependent variable in this case is dummy variable, which takes a value of zero or one depending on whether or not a household is food poor or not.

Descriptive statistics and econometric methods were employed for analysis purpose to meet the stated objectives. Econometrics test (F-test) measures how good the model fit with quantitative data (explanatory variable). Before estimation of the model, in order to check the severity of multicollinearity among explanatory variables, the Variance Inflation Factor (VIF) was computed. Following Gujarati (1995), the VIF<sub>j</sub> is given as:

$$VIF_j = \frac{1}{1-R_j^2}$$

Where R<sub>j</sub> is special coefficient of determination that results when the explanatory variable (x<sub>j</sub>) is regressed against all other explanatory variables (R<sub>j</sub> = (X<sub>j</sub>|X<sub>i</sub>...X<sub>k</sub>)). VIF shows how the variance of an estimator is magnified by the presence of multicollinearity. As R<sub>j</sub> increases toward unity, i.e., as the collinearity of the j<sup>th</sup> explanatory variable with the other regressors increases, the VIF also increases and in the limit it can be infinity.

Contingency coefficients were calculated to see the degree of association between the dummy variables. They were calculated for each pair of dummy variables using contingency coefficient procedure available in SPSS. Contingency coefficient is a chi-square based measure of association. A value of 0.31 or more indicates a stronger relationship where less than 0.31 shows weak association between the qualitative variables (Zelalem, 2014).

$$C = \sqrt{\frac{\chi^2}{N+\chi^2}}$$

**Where**

C= Contingency coefficient

X<sup>2</sup>= Chi-square test

N= Total sample size

**3. Regressions model:** This model was adopted and estimated. It was used to examine and establish statistical relationships between the dependent variable (i.e., food poverty) and independent variables (demographic and socioeconomic variables) that are expected factors to influence food poverty at household levels. Logistic regression models will be specified to identify the determinants of food poverty and to assess their relative importance in determining the probability of being in a food poverty situation at household level (Girma, 2014).

$$L_i = \ln \left[ \frac{P_i}{1-P} \right] = Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n$$

**Where**

Z<sub>i</sub> = is a function of n explanatory variables (x) which is also expressed as:-

P = P is the predicted probability of the event which is food poor coded with 1 and 0 otherwise.

B<sub>0</sub>= is an intercept

B<sub>1</sub> B<sub>2</sub> -----B<sub>n</sub>:- are slopes of the equations in the model

X<sub>1</sub> X<sub>2</sub>----X<sub>n</sub> = are relevant household characteristics (explanatory variables)

**Table 3.4 Dependent and independent variable**

Code	Definition of variables
V004	Household size
V002	Sex of household head
V003	Age of the household head
V006	Health of household head
V005	Education level of household head
V010	Owning saving account and any credit access
V007	Household income
V008	Income source
V012	Marital status of household head
V018	Dependency ratio
V014	Death of household member
HFPSTAT	Food poverty status
HHAG	House hold age group
HHSG	Household family size group
HHFEXP	Household food expenditure
HHFEXPG	Food expenditure group
HHFEPAE	Household food expenditure per adult equivalent
HHFEPAEG	Household food expenditure per adult equivalent group
DRG	Dependency ratio group

### 3.2.4 Definition of variables and hypothesis

Dependent and independent variables have been identified by different researchers, international and national development organizations. This section describes the variables used in the econometric analysis.

Food poverty line is used as a proxy to measure household food poverty status. Household consume a variety of food, mainly from purchase are converted in to their calories using ENHRI food composition table for use in Ethiopia (1998). For the study here, this minimum daily calorie

intake 2200kcal per adult equivalent per day is converted in to equivalent 10.34 Birr per adult equivalent per day to calculate food poverty status (FDRE, 2017).

### **Dependent variable**

Household food poverty (HFPSTAT): is a dichotomous dependent variable in the model taking value of 1 if a household is food poor and 0 otherwise. Food poverty status of a household is identified by comparing daily income expenditure per adult equivalent per day with minimum income or caloric requirement. Those getting higher than the needed requirement income/caloric requirement are counted as food non poor and otherwise counted as food poor.

### **Independent variables**

Household demographic and socio-economic characteristics such as household size, sex of household head, marital status of head, household dependency ratio (the ratio of economically inactive members to economically active members), death of household head, educational status of household head health status of household head and access to credit, ownership of saving account, daily income expenditure per adult equivalent are selected variables for the model analysis.

**Household size (V004):** An increase in household size implies more mouth to be fed from the limited resources and especially in males dominant household the situation becomes more than this due to high possibility of accustoming to bad habits. *As a result in this study, the household size and household food poverty are hypothesized to be related positively.*

**Dependency ratio (V018):-** The expectation is that household with large number of children or economically non-active family members will face food poverty because of high dependency burden. The existence of large number of children under age of 15 and old age of 65 and above in the family could affect the food poverty status of the household (Girma, 2014). This is due to the fact that the working age population (i.e., 15-64 years) supports not only themselves, but also additional dependent persons in the family. *Thus, it is hypothesized that the family with relatively large number of dependent family members (high dependency ratio) are likely to face food poverty.* Therefore, it is positively related.

**Sex of household head (V002):-** is a dummy variable taking a value of 1 if male and 0 otherwise. Household head is a person who economically supports or manages the household or for some reason of age or respect is considered as head by other members of the household. It could be male or a female. There is no generally accepted relationship between sex of household head and level of food poverty. In the study area where females are actively engaged in various activities as compared to males, *it is hypothesized that households with female head and household food poverty are related negatively.*

**Marital status of household head (V012):** Marriage is biological and social engagement to support each other both socially and economically. Marriage is established with a view of helping each other and married people pool their resources and also reduce cost that would have been spent separately. Moreover, married households put aside some of resources for unforeseen circumstances to smoothen their life. *In this study, marriage and household food poverty are hypothesized to be related negatively.*

**Age of the household head (V003):** Age matters in any occupation. It was argued that as the age of the household head increases he/she will acquires more knowledge and experiences with possible negative impact on food poverty. In other ways, it was expected that young household head are more likely to be food poor than the older household head, the older ones is due to better possession of resources accumulation. *In light of this, it is hypothesized that ages of the household heads and household food poverty are negatively correlated.*

**Health of household head (V006):-** is a categorical variable taking a value of 0 if household is healthy and 1 if medium health and 2 if not healthily. The health status of household heads is important for household food security since it highly affects income generating activities therefore, *it is hypothesized that the health of the household heads and household food poverty are negatively correlated.*

**Education level of household head (V005):** Education level is important for gauging income earning potential of a household which has significant influence on consumption behavior of the

household. Education is a categorical variable taking a value of 0 to 5. ***Educational level of household head and household food poverty are negatively hypothesized.*** The higher the level the lesser the likelihood of household become food poor.

**Saving and access to credit (V010):** is a dummy variable taking a value of 1 if a household maintain credit and saving association or any other credit access and 0 otherwise. Unlike rural households, urban residents usually maintain bank account and liquidate when faced with difficult circumstances. ***Credit access is hypothesized to be negatively related to household food poverty.***

**Household income and food expenditure (V007):-** One of the major determinants of household food poverty is income and expenditure of a household. Total amount of monthly income in Birr from different source will be computed and the higher the level the lesser the likelihood of household become food poor. ***Income is hypothesized to be negatively related with food poverty status of the household.***

## **CHAPTER FOUR**

### **DATA ANALYSIS AND PRESENTATION**

#### **4.1 Introductions**

Study results are presented in two categories as a descriptive and econometric model analysis of the survey data. Descriptive statistics such as mean, standard deviation, percentage and frequency distribution were employed and multiple regressions, econometric model were used to identify determinants of food poverty at household level. Status of household food poverty, in terms of extent and severity, were computed by using FGT model. Before the data has been analyzed, it was checked for internal consistency or reliability using the most widely used method called Cronbach or Coefficient alpha. The SPSS Package has shown that the data has no any internal consistency problem (see Appendix 3).

#### **4.2 Measuring food poverty status of the respondent**

For the purpose of this study, the concept of food non-poor is defined as the extent to which a total household expenditure per adult equivalent per day to meet its subsistence income/caloric requirement. The following data and techniques were used as threshold to identify food poor from all sample households.

Available Data

1. Sample PSNP data
2. Adult equivalent Conversion factor (Appendix 1)
3. Cutting point is 10.34Birr/2200kcal
4. Household food consumption expenditure in Akaki-Kality sub- city is 45.93% (HCE, 2016).

Table 4.1 Sample PSNP data

ከተማ:		ክፍለ ከተማ: አቃ/ቃ										ቀበሌ: 10	
ተ/ቁ	የቤተሰብ አባላት ስም ከነአያት	የቤተሰብ አባላት ሁኔታ					መስራት የሚችሉ		መስራት የማይችሉ		የቤተሰብ አባላት	የቤተሰብ	
		የቤተሰብ ስብሰታ	ዕድሜ	ፆታ	የትምህርት ደረጃ	የቤተሰብ ሁኔታ	ዕድሜ ከ18-35	ዕድሜ ከ36-60	በዕድሜ ምክንያት	በቤተሰብ ምክንያት		ወርሀዊ የገቢ	ዋነኛ የቤተሰብ
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	ሹሬ ዋቄ ጨንገሬ	እማ	70	ሴ	የለም	ጤንኛ			√		ያልሆነ	1660	ግብር
1.1	ደምስ ከተማ አባዳ	ልጅ	16	ወ	ጽኑ	ጤንኛ			√		ያልሆነ		
2	ቶሎሳ አቤቤ ዳዲ	አባ	32	ወ	5ኛ	ጤንኛ	√					5000	ግብር
2.1	አጻገት ታቱ ማሞ	ሚስት	25	ሴ	10ኛ	ጤንኛ	√				ያልሆነች		
2.2	ጥርዳዎስ ቶሎሳ ዳዲ	ልጅ	6	ሴ	ኬጃ	ጤንኛ	√		√		ያልሆነች		
2.3	አርሴማ ቶሎሳ ዳዲ	ልጅ	1	ሴ	የለም	ጤንኛ	√		√		ያልሆነች		
3	ቢቲላ አቤቤ ዳዲ	አባ	27	ወ	12ኛ	ጤንኛ	√				ያልሆነ	1600	
3.1	ቢሪቱ ባትሩ ከበደ	አጻገት	20	ሴ	ጽኑ	ጤንኛ	√				ያልሆነች		
4	ረጋሳ ያኪ ደባሌ	አባ	46	ወ	መ/ት	ጤንኛ		√			ያልሆነ	4000	ከመን
4.1	አበራሽ ገርጌት በዳኔ	አጻገት	35	ሴ	የለም	ጤንኛ	√				ያልሆነች		
4.2	አጻገት ረጋሳ ያኪ	ልጅ	20	ወ	ጽኑ	ጤንኛ	√				ያልሆነ		
4.3	ፋግሴ ረጋሳ ያኪ	ልጅ	15	ሴ	7ኛ	ጤንኛ			√		ያልሆነች		
4.4	ምትኩ ረጋሳ ያኪ	ልጅ	1	ወ	የለም	ጤንኛ			√		ያልሆነ		
4.5	አገደበት ሃይሌ ጥላሁን	ልጅ	14	ወ	የለም	ጤንኛ			√		ያልሆነ		
5	በቀለ መኮንን ዲባባ	አባ ወረ	20	ወ	8ኛ	ጤንኛ	√				ያልሆነ	1000	ግብር

Let see for household no 4. “Ato Regasa YaE Debele”

Members(1)	Responsibility (2)	Age (3)	Sex (4)	Conversion factor (5)	Income/month (6)	Food Expenditure Per month (6)*.459	Food Expenditure per day (7)	Income expenditure per Adult equivalent per day(9) Column (5)*(cut-point) Column (5)*10.34/2200kcal
Ato Regassa YaE	Head	46	M	1.14	3100Birr	1422Birr	47.4Birr	11.78birr/2508kcal
Aberash Chernet	Mother	35	F	0.86	900birr	413	13.7 birr	8.89birr/1892kcal
Adane regasa	Son	20	M	1.14	-		-	11.78birr/2508kcal
Fanose regasa	Daughter	15	F	0.86	-		-	8.89birr/1892kcal
Mitiku regasa	Son	1	M	0.29	-		-	2.99birr/638kcal
Andebet haile	Son	14	M	0.98	-		-	10.13birr/2156kcal
Total					4000birr	1835Birr	61.1Birr	54.3birr/11,594kcal

As the table shows, Ato Regassa family needs minimum of 54.3birr /11,594kcal per day to meet daily income/caloric requirement and become food non-poor. But, Ato Regassa has enough daily

income, more than this 54.3birr /11,594 kcal per day, which is 61.1/13,000 kcal per day. Therefore, household no 4 (Ato Regassa family) is **food non- poor**.

**Note: If total food expenditure per day had been less than 54.3 birr, Ato Regassa family would have been counted as food poor.**

Let see for household no 1 “ Wro Shure Waqe Chengera” again

Members (1)	Responsibility (2)	Age (3)	Sex (4)	Conversion factor (5)	Income per month (6)	Food Expenditure per month(6)*0.459	Food Expenditure per day (7)	Income expenditure per Adult equivalent per day(9) Column (5)*(cut-point) Column (5)*10.34/2200kcal
Wro shure waqe	Head	70	F	0.75	1600Birr	737Birr	24.8Birr	7.75birr/1650kcal
Demise Ketema	Son	16	M	1.18	-	-	-	12.2birr/2596kcal
Total					1600birr		24.8Birr	19.95birr/4246kcal

As the table shows, Wro shure family needs minimum of 19.95birr /4246 kcal per day to meet daily income/caloric requirement and become food non-poor. But, Wro shure has enough daily income, more than this 19.95birr /4,246 kcal per day, which is 24.8birr/5,276 kcal per day. Therefore, household no 1(Wro shure family) is **food non- poor**.

Therefore, Based on the above threshold households were identified as food poor and food non-poor. Productive Safety Net Program (PSNP) socio- economic and demographic survey resulted that out of sampled 390 households 79 which is 20.3% of households were found to be food poor and the remaining 311 households (79.7%) were food non poor (see table 4.2).

**Table 4.2: Distribution of Sample Households by food poverty status**

FPSTAT(food poverty status )	Frequency	%
Food non-poor (0)	311	79.7
Food poor(1)	79	20.3
Total	390	100.0

Source: PSNP socio- economic and demographic survey data

### **4.3 Characteristics of the survey respondents and bi-variate analysis**

The PSNP data has collected a wide range of information which is crucial for further explanation of the findings in the study of demographic and socio-economic determinants of household food poverty. These include the demographic and socio-economic backgrounds of the respondents. The demographic characteristics include age of household, marital status, sex of household, family size and dependency ratio. The socio-economic characteristics include education level of household head, health status of household head, household income expenditure and its source, saving and credit to credit

The bi-variate analysis, based on the Pearson's chi -square statistic, provides a preliminary insight into the association or relationship between all selected independent variables and dependent variable. For all independent variable taking one-at-a-time, a test of association was carried out using the Pearson chi -square. High values of Pearson's chi-square test for a given independent variables indicates that there is strong association between each of the given independent variables and the dependent variable keeping the effect of the other factors constant.

#### **4.3.1 Demographic Characteristics of Respondents and Bi-variate analysis**

##### **1. Characteristics of households by headship**

Female as household head comprise 27.7% of sample households while, the majority that is 72.3 % were male headed household (Table 4.5). Mean number of household size, age of household head and dependency ratio were found to be 3.61, 43.20, and 83.59% respectively. Mean family size were found to be higher in male headed households whereas mean household head age were higher in female headed households.

**Table 4.3 Some demographic characteristics of respondent by mean and standard deviation**

Variables	Mean				
	Male	Female	Both	Poor	Non-poor
Age of HH	42.24	43.96	43.20	45.21	41.01
family size	3.91	3.31	3.61	4.12	3.12
Dependency ratio%	74.95	92.24	83.59	151.1	43.02

Source: PSNP socio- economic and demographic survey data

Sex of household head was hypothesized to be one of the variables that make a difference on the level of food poverty. But, the survey result indicated that 40.9 % of food poor households were female headed whereas, the corresponding figure for male headed households was 18.79 %. Male headed households comprise 81.2 % of food non-poor and the remaining 66.6 % food non-poor are female headed households. The chi-square showed that there is lower association between sex of household head and household food poverty at ( $X^2 = 9.57$ ,  $p < 0.060$ ).

### **2. Household food poverty status and family size**

It is hypothesized that family size has positive relationship with food poverty status of a household. The survey result revealed that 82.3 % of non-poor households have family size of 1 – 3 persons whereas only 17.34% of food poor households have the same family size. About 33.2 % of food poor and 66.6 % of non-poor households have family size of more than six persons. Households with larger family size were more likely to be at risk of becoming food poor (Table 4.5). The mean household size for food poor and non-poor households was found to be 4.12 and 3.12 respectively. The bi-variate analysis showed that there is lower association between sex of household head and household food poverty at ( $X^2 = 6.09$ ,  $p < 0.183$ ).

### **3. Food poverty status and dependency ratio**

The overall size of the sample household members is 1461 (of which 54.17% and 45.83% constitutes male and female population respectively). According to the survey result, the overall young and old population dependency ratio, i.e., the proportion of economically non active persons to economically active person within the family (the proportion of age group 0-14 to 15-64 years multiplied by 100) in the study area was 70.04%. This means, every 3- person within

the economically active population groups support not only themselves, but also supporting additional more than 2- dependent (non-productive) persons with all basic necessities. This clearly shows a high dependency burden in the study area. The distribution of sample household members by different demographic variables (age group and sex) is given in Table 4.4.

**Table 4.4: Distribution of sample households by age dependency ratio**

Total number of household members		Aged between 0 to 14 and above 65		Aged 15 to 65	
1459		601		858	
790(male)	669(female)	331(male)	270(female)	604(male)	254(female)
54.17%	45.83%	55.2%	44.8%	70.4%	29.6%
		Dependency ratio		70.04%	

Source: PSNP socio- economic and demographic survey data (2018)

With respect to the specific characteristics of food non poor and food poor households, dependency ratio was hypothesized to have a positive impact in determining the state of food poverty, in such a way that a household with high dependency burden tends to be food poor than those with small burden. The mean dependency ratio for food poor and non poor households was found also to be 151.1% and 43.02 respectively (Table 4.3). The chi-square result confirmed the existence of statistically significant association between dependency ratio and household food poverty at ( $X^2 = 148.31, p < 0.001$ ).

#### **4. Food poverty status and household heads' marital Status**

The married households accounted for 69.7 % of the whole sampled households. Accordingly, the single households including widowed and divorced accounted for 30.2 %. The Out of 272 married households 82.4 % were found to be food non- poor whereas only 3.0 % were food poor. Out of 118 single households head 73.3 % were found to be food non-poor whereas only 26.7% were food poor (Table 4.5). The bi-variate analysis showed that there is lower association between sex of household head and household food poverty at ( $X^2 = 11.14, p < 0.506$ ).

## 5. Distribution of sample household heads by age

Age of the household head is also regarded as an important variable with an impact on household food poverty status; i.e. older households are usually better than younger in terms of resource endowment. Thus, it was hypothesized that younger households are more likely to be food poor than older households. Thus, results revealed that there is significant difference in mean age of the household heads between households, which are food poor and those which are not. The mean age of household head for food poor and non poor households was found also to be 45.21 and 41.01 respectively (Table 4.3). These results tell that there is a positive relationship between food poverty and older household head. Therefore, the result disproof the hypothesis which says as the age of household head increase the food poverty will decrease.

The survey result revealed out of 99 households aged between 19 and 30 94.9% were found food-non poor where as 5.15 were found food poor. Out of 115 household head aged between 31 and 40, 79.1 % were found to be food non-poor where as 20.9 % were food poor. Out of 52 household head aged greater than 60, 32(61.5%) were found to be food non-poor whereas 20(38.5%) were food poor. Household food poverty appears to show a increasing trend as the age of household increases (Table 4.5) This showed a statistically significant association at ( $X^2 = 21.19, p < 0.04$ ).

**Table 4.5 Determinants of household food poverty by some demographic Variables**

Characteristics	Household grouping	Poor	Non- Poor	Total	X <sup>2</sup>	p-value
Sex of household	male	43(18.79%)	239(81.2%)	282(72.3%)	9.57	0.060
	Female	36(45.5%)	72(66.6%)	108(27.7%)		
Marital status	Single	31(26.3%)	87(73.7%)	118(30.2%)	11.14	0.506
	married	48(17.6%)	224(82.4%)	272(69.7%)		
Family size group	1-3	33(17.34%)	153(82.3%)	186(47.6%)	6.09	0.183
	4-6	38(20.9%)	144(79.1%)	182(46.6%)		
	7-9	3(33.2%)	14(66.6%)	21(5.3%)		
	>9	1(100%)	0(0%)	1(0.2%)		
Age of household head	19-30	5(5.1%)	94(94.9%)	99(25.3%)	21.19	0.04
	31-40	24(20.9%)	91(79.1%)	115(29.4%)		
	41-50	15(21.8%)	54(78.2%)	69(17.6%)		
	51-60	21(38.2%)	34(61.8%)	55(14.1%)		
	>60	20(38.5%)	32(61.5%)	52(13.3%)		
Dependency ratio	0-50%	6(2.9%)	200(97.1)	206(52.8%)	148.31	0.00
	50%-100%	29(27.7%)	76(72.3%)	105(26.9%)		
	100.01%-150%	11(47.9%)	12(52.1%)	23(5.8%)		
	150.01%-200%	21(60.0%)	14(40.0%)	35(8.9%)		
	>200%	12(57.2%)	9(42.8%)	21(5.3%)		

Source: PSNP socio- economic and demographic survey data

#### **4.3.2 Socio- economic characteristics of Respondents and bi-variate analysis**

##### **1. Health of the household head with food poverty status**

Health matters in any occupation. It was argued that as the health of the household head become good he/she will have more energy and engage in income generating activity. In other ways, it was expected that un healthy household head are more likely to be food poor than the healthy household head since the healthy ones will have better dedication as well as energy to accumulate resource. Most household heads in the survey were found to be healthy (72.1%) followed by somewhat healthy with 12.3% (Table 4.6). The bi-variate analysis showed that there

is lower association between health of household head and household food poverty at ( $X^2 = 10.1$ ,  $p < 0.501$ ).

## 2. Household food poverty and education of household head

Most household heads in the survey were found to be in primary education (32.6%) followed by secondary education and illiterate with 26.7% and 17.7% respectively. There was a specific pattern that indicated the higher the level of education of the household head, the more food non-poor a household will be. It was revealed that households headed by illiterate persons were more vulnerable to food poverty followed by primary and secondary school. Household head's educational status could determine food poverty status of the entire household. Among other things, household heads play a pivotal role in shaping family members towards educational attainment thus reducing the probability of being food poor. The survey result showed that there is significant negative (inverse) relationship among education status and household food poverty. Among 69 illiterate households 50.7 % were found to be food non-poor where as 49.3 % were found food poor (Table 4.7). The chi-square result confirmed the existence of statistically significant association between education level and household food poverty at ( $X^2 = 195.22$ ,  $p < 0.001$ ).

## 3. Household food poverty and income expenditure

Living in a city means living in a monetized economy, where cash must be generated to survive. Income is a determinant of household expenditure since it serves as the budget constraints to the amount that can be spent within a period, there is also a clear correlation between income and food poverty status of a household, all other things being equal (Ejigayehu, 2011).

**Table 4.6 Some socio-economic characteristics of respondent by mean and standard deviation**

Variables	Mean				
	Male	Female	Both	poor	Non-poor
Food expenditure	2528	1830	2334	909.1	1942.1
Food Expenditure per AE	20.41	18.24	19.32	13.21	32.98

Source: PSNP socio- economic and demographic survey data

The group statistics also showed that there is significant difference in income expenditure of household between the food poor and food non-poor household groups. The gap between the two groups is highly substantial. More than 55 % of the food poor sample households earn a monthly average income for food

expenditure less than and equal to Birr 1200, whereas the corresponding proportion for the food non-poor households is about 50 %. Household food poverty appears to show a declining trend as the household income expenditure increases (Table 4.7). This showed a statistically significant association at ( $X^2 = 21.19, p < 0.04$ ).

#### **4. Household food poverty and daily food expenditure per adult equivalent**

Household income has a paramount importance in achieving household food security especially in urban situation where people largely depend on earning capacity rather than on natural resources like rural areas. Households with daily income per adult equivalent of Birr 0-15, 15.01 – 30, 30.01 – 45, 45.01 – 60 and above 60 comprised 1.0%, 16.2%, 14.6%, 12.1% and 56.2% respectively. Out of 390 households more than 67(17.2%) were found to earn a daily income per adult equivalent of Birr 30 or less. Out of 79 food poor households 63(69.6%) earn a daily income per adult equivalent between ranges 15.01 to 30 .Hence, as daily income per adult equivalent increases, the percentage of food poor households exhibits a declining tendency (Table 4.7). The mean daily income expenditure per adult equivalent of food non poor and food poor household were found to be Birr 13.21 and 32.98 respectively (Table 4.6). The chi-square showed that there is association between household food expenditure per adult equivalent and household food poverty at ( $X^2 = 318.13, p < 0.002$ ).

#### **5. Household food poverty and income source**

For the purpose of this study income source of sampled households includes total monthly salary. The monthly income of sampled households revealed the share of income comes from monthly salary from employment (29.6%), small business (33.8%), pensions (17.5%), and house rent (7.0%) and daily laborer (12.1%). The bi-variate analysis showed that there is lower association between household income source and household food poverty at ( $X^2 = 8.01, p < 0.214$ ).

#### **6. Household food poverty versus saving and access to credit**

Ownership of bank account with sufficient balance and any credit source was found to be a significant variable in determining food poverty status of households. The survey result showed that out of 390 respondents 205(52.6%) have no any saving and credit access whereas only 185(47.4%) of households any credit access. Out of these 185 households 98.9% were found to be food non-poor whereas only 1.1% was found food poor. In addition to this out of 205 households 128(62.4%) were found to be food non-poor and (37.6%) were food poor (Table 4.7). The chi-square result confirmed the existence of

statistically significant association between saving and access to credit and household food poverty at ( $X^2 = 94.61, p < 0.001$ ).

**Table 4.7 Determinants of household food poverty by socio-economic Variables**

Characteristics	Household grouping	Poor	Non- Poor	Total	$X^2$	p-value
Education status	Illiterate	34(49.3%)	35(50.7%)	69(17.7%)	195.22	0.001
	Informal education	18(51.5%)	17(48.5%)	35(9.0%)		
	Primary education	24(18.9%)	103(81.1%)	127(32.6%)		
	Secondary education	2(2.0%)	102(98.0%)	104(26.7%)		
	Diploma	1(3.85%)	25(96.2%)	26(6.7%)		
	Degree	0(0%)	29(100%)	29(7.4%)		
Credit access	Yes	2(1.1%)	183(98.9%)	185(47.4%)	94.61	0.004
	No	77(37.6%)	128(62.4%)	205(56.6%)		
Health of household head	Not healthy	31(50.9%)	30(49.1%)	61(15.6%)	6.1	0.301
	Healthy	44(15.7%)	237(84.3%)	281(72.1%)		
	Moderately healthy	4(8.4%)	44(91.6%)	48(12.3%)		
Income expenditure per adult equivalent	0-15	2(50%)	2(50.0%)	4(1.0%)	318.13	0.002
	15.01-30	53(84.2%)	10(15.8%)	63(16.2%)		
	30.01-45	24(42.2%)	33(57.8%)	57(14.6%)		
	45.01-60	0(0%)	47(100%)	47(12.1%)		
	>60	0(0%)	219(100%)	219(56.2%)		
Household income expenditure	0-600	15(60.0%)	10(40.0%)	25(6.4%)	149.12	0.001
	601-1200	30(50.0%)	30(50.0%)	60(15.4%)		
	1201-1800	23(34.4%)	44(65.6%)	67(17.2%)		
	1801-2400	10(17.2%)	48(82.8%)	58(14.9%)		
	2401-3000	1(0.6%)	176(99.4%)	177(45.4%)		
	>3000	0(0%)	3(100%)	3(0.8%)		
Income source	Pension	28(41.2%)	40(58.8%)	68(17.5%)	8.01	0.214
	Employed	14(12.2%)	101(87.8%)	115(29.6%)		
	Small business	26(19.9%)	105(80.1%)	131(33.8%)		
	Daily laborer	9(19.2%)	38(80.8%)	47(12.1%)		
	Renting home	2(7.5%)	25(92.5%)	27(7.0%)		

Source: PSNP socio- economic and demographic survey data

## 4.4 Interpretation and results of Multivariate Analysis

In this section the demographic and socio-economic determinant of household food poverty were examined using logistic regression. Since the dependent variable is dichotomous, the model was fitted using logistic regression model. It is used to analyze the dependence of a binary response variable on a set of independent explanatory variables. And the logistic regression predicts the log odds of the dependent variable (Walker, 1996). The logistic model expressed by the equation:

$$L_i = \ln \left[ \frac{P_i}{1-P} \right] = Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n$$

Where, P is the predicted probability of the event which is food poor coded with 1 and 0 otherwise. The regression coefficients together with their sign indicate the magnitude and direction of the effect in the log odds, being in the category of interest of response variable for a unit increase in the predictors (Walker, 1996). And exp (B) is the estimated multiplicative change in the odds for a unit increase in the predictor, controlling the effect of others.

The application of logistic regression in this study is based on the dependent variable coded with zero if the household is food non – poor and a value of one if household is food poor. Sets of the independent variables that were theoretically predict the dependent variable was entered in to the model.

In total, twelve independent variables were used for estimation. To identify determinants of food poverty, among hypothesized explanatory variables that are supposed to have influence on household food poverty, regression model was estimated using a statistical package known as SPSS version 20.

### 4.4.1 Econometric Analysis

Regressions model was employed to identify the determinants of household food poverty. The variables included in the model were tested for the existence of multicollinearity, if any. Contingency coefficient and variance inflation factor were used for multicollinearity test of dummy and continuous variables respectively.

Contingency coefficient value ranges between 0 and 1, and as a rule of thumb variable with contingency coefficient below 0.5 shows weak association and value above it indicates strong association of variables. The contingency coefficient for the discrete variables included in the model was less than 0.5 that didn't show any multicollinearity problem as depicted on Table 4.8.

**Table 4.8: Contingency coefficient for categorical/discrete variables**

Discrete variables	MARTIAL L STATUS	SEX OF HH	death of household head	EDUCATION STATUS	HEALTH STATUS	CREDIT SERVICE
MARTIAL STATUS	1					
SEX OF HH	.487**	1				
INCOME SOURCE	.113	-.106	1			
EDUCATION STATUS	.062	.234**	-.144**	1		
HEALTH STATUS	-.030	-.028	.000	.185**	1	
CREDIT SERVICE	-.003	.049	-.095	.358**	.128	1

As a rule of thumb continuous variable having variance inflation factor of less than 10 are believed to have no multicollinearity and those with VIF of above 10 are subjected to the problem and should be excluded from the model.

**Table 4.9: Variance inflation factor for continuous variables**

Variables	Tolerance	VIF
Age of household head	0.768	1.302
Household family size	0.865	1.157
Dependency ratio	0.785	1.274
Household food expenditure per adult equivalent	0.768	1.302

**Table 4.10 Types, codes and definition of the variables**

<b>Variable type</b>	<b>Code</b>	<b><u>Definition</u></b>
Dummy	V002	1 if male: 0 otherwise
Dummy	V010	1 if household have any credit access: 0 otherwise
Dummy	V012	1 if Married: 0 Otherwise
Categorical	V006	0 if not healthy 1healthy 2: somewhat healthy
Categorical	V005	0 uneducated: 1 informal education: 2 Primary 3 Secondary : 4 Diploma : 5 above Degree
Continues	V007	Household income and food expenditure in Birr
Continues	V003	Age of the household head
Continues	V004	Household size in number
Continues	V018	Dependency ratio
Continues	HHFEXP	Household food expenditure
Continues	HHFEPAE	Household food expenditure per adult equivalent in birr
Continues	V008	0. Pension 1.employed 2.small business 3.daily laborer 4. Renting home

#### **4.4.2 Regression analysis**

Finding the factors that contribute to food poverty goes beyond the descriptive analysis and requires employing econometrics analysis as it was mentioned in the methodology. It was briefly presented so far, now it is presented in details with analysis and interpretation of the estimates. Before the regression model was fitted in this section, the data has been tested for internal consistency or reliability using Cronbach or coefficient alpha and the test shows that data has no any internal consistency problem. The problem of multicollinearity was checked through VIF's and contingency coefficient for all explanatory variables. The avoidance of multicollinearity problem enables the explanatory variable can separately contribute to the variation in the

dependent variable. Food expenditure (HHFEXP) was excluded due to multicollinearity issue with household food expenditure per adult equivalent (HHFEPAE).

Based on the specification of the model in the methodology chapter, regression model was designed to estimate and examine the effects of the expected determinant factors of food poverty in the study area (Table 4.11-4.12). The magnitude of the coefficient obtained from the model shows the marginal effect of each explanatory variable on the probability of being food poor.

**Table 4.11 Logistic regression for demographic determinants with reference category**

Variable type	Definition	B	Wald	Sig	EXP(B)
Discrete and dichotomous variables	Sex of household head				
	Male	.577	.308	.579	1.781
	Female	1.00*			
	Dependency ratio				
	50.01%-100%	-0.805	9.216	.000	0.447
	100.01%-150%	-0.701	8.333	.004	0.496
	150.01%-200%	0.003	.464	.000	1.003
	>200%	1.019	.292	.001	2.770
	0-50%	1.00*			
	Age group				
	19-30	.474	.811	.368	1.606
	31-40	.486	.886	.347	1.626
	41-50	.551	.954	.329	1.735
	51-60	.708	.034	.854	2.029
	>60	1.00*			

**Table 4.12 Logistic regression for Socio –economic determinants with reference category**

Variable type	Definition	B	Wald	Sig	EXP(B)
Discrete and dichotomous variables	Credit and saving access				
	No	-0.154	2.248	0.025	0.857
	Yes	1.00*			
	Income per adult equivalent				
	15.01-30	.986	9.741	.000	2.680
	30.01-45	.955	23.265	.000	2.599
	45.01-60	-.441	12.753	.000	0.643
	>60	-1.997	-.511	.000	0.136
	0-15	1.00*			
	Educational status				
	informal education	-.724	4.025	0.10	0.485
	Primary education	-.302	5.024	0.12	0.739
	Secondary education	-1.432	3.124	0.00	0.239
	Diploma	-1.012	3.021	0.00	0.363
	Degree and above	-3.024	9.024	0.00	0.049
	No education	1.00*			

#### 4.5 Explanation of independent variables

Nine independent variables that are hypothesized to have influence on household food poverty in the study area were included in the model, of which five were found to be statistically significant even though the level of statistical significance and the sign of the significant parameters were almost as expected. The model output revealed that household food expenditure per adult equivalent (HHFEPAE), dependency ratio (V018) and education status (V005) were significant at less than 1 % probability level. Access to credit service (V010), age of household head (V003) were found to be significant at less than 5 % probability level and the rest four variables namely, marital status of household head (V012), health status (V006) and household size (V004) were not significant at  $P < 0.05$  level. But, sex of household head (V002)

was found significant at  $P < 0.1$  level. Experts were interviewed to provide possible explanations and reason for each independent variable and those expert opinions were included and presented as follows

#### **4.4.3 Explanation of significant variables**

**Dependency ratio (DRG):-** The survey result shows a positive relation between dependency ratio and household food poverty and the relationship is highly significant at  $p < 0.01$ . Keeping other factor constant, household food poverty will increase of by a factor 3.068 as household become more dependent. The result corresponds with the prior expectation. The possible explanation is that when the dependency ratio is high, the ability of the household to participate in saving and credit access will decrease and this leads to hand to mouth life and finally makes household to be food poor (Appendix 4).

The logistic regression result also showed a variation in the likelihood of household food poverty between different levels of dependency. Table 4.11 clearly indicates that the risk of household food poverty increase with increasing level of dependency ratio. Increasing level of dependency from 0-50% to 50%-100% increases the risk of household food poverty by 44.7%. In the same way, moving from 0-50% to 100%-150%, increases the risk of household food poverty by 49.6%. The odd ratio also confirmed that household food poverty increased by a factor of 1.003 and 2.770 as the dependency becomes 150%-200% and above 200%, respectively. And the correlation coefficient for all level of dependency was found statically significant at  $P < 0.01$ .

**Income expenditure per adult equivalent (HHFEPAE):** The survey result showed a negative relation between daily income per adult equivalent and household food poverty and the coefficient is highly significant at less than 5% probability level. Household food poverty, holding other variables constant, decrease by a factor of 0.761 as daily income expenditure per adult equivalent increase by one level. The result corresponds with the prior expectation and the possible explanation is that income determines purchasing power of the household with the prevailing price so that those households having higher daily food expenditure per adult equivalent are less likely to become food poor than low income households (Appendix 5).

The logistic regression result showed a variation in the likelihood of household food poverty between different levels of income expenditure per adult person. Table 4.12 clearly indicates that the risk of household food poverty decrease with increasing level of income per adult equivalent. The odd ratio also confirmed that household food poverty increased by a factor of 2.680 and 2.599 as the income expenditure per adult equivalent become 15.01-30 Birr and 30.1-45 Birr respectively. Increasing level of income expenditure per adult equivalent from 0-5 birr to 15.01-20 Birr decreases the risk of household food poverty by 35.7 %. In the same way, moving from 0-15birr to greater than 60 birr decreases the risk of household food poverty by 86.4%. And the correlation coefficient for all level was found statically significant at  $P < 0.01$ .

**Saving and access to credit (V010):** It was hypothesized that ownership of bank account will negatively affect the household food poverty. The sign was as expected and significant at  $p < 0.05$ . Holding other variables constant, risk of household food poverty was decreases by a factor of 0.946 as head of the household have any access to credit. Being a member of saving association with sufficient balance means there is excess money to be saved, therefore, the household could cope –up food poverty problem. The possible explanation is that credit gives the household an opportunity to be involved in income generating activities so that derived revenue increases financial capacity and purchasing power of the household to escape from risk of food poverty. Access to credit from any source also smoothen consumption when household faces with hard time.

**Educational status (V005):-** Descriptive results showed that there is significant negative relationship between education status and household food poverty at significant level at  $p < 0.001$ . Holding other variables constant, risk of household food poverty decreases by a factor of 0.974 as head of the household becomes literate. This result implies that household heads with relatively better education are more likely to be food non-poor than those uneducated (illiterate) household heads. Possible explanation is that education has contribution on work efficiency, competency, diversify income and becoming visionary in creating conducive environment and to educate dependants with long term target than illiterate ones. Thus, being literate reduces the chance of becoming food poor in the sample households. The result coincides with the theoretical evidences that educational improvement could lead to reducing the problem of food poverty.

The logistic regression result for educational attainment showed a variation in the likelihood of household food poverty between different levels of education. Table 4.12 clearly indicates that the risk of food poverty decreases with increasing level of educational attainment. Increasing level of education from no education to informal education reduces the risk of household food poverty by 51.5 percent. In the same way, moving from no education to primary, secondary, diploma, degree and above level of education decreases the risk of household food poverty by 26.1 %, 76.1%, 63.7% and 95.1 %, respectively. And the correlation coefficient for primary level of education was found statically significant at  $P < 0.05$  but for secondary and above level of education it was less than or equal to 0.01 level.

**Age of household head (HHAG):-** The descriptive result showed that there is significant positive relationship between age of household and household food poverty status at significant level less than 5%. Hence this result corresponds with priori expectations. Holding other variable constant, the risk of household food poverty was increased by a factor of 2.038 as the household suffer the loss of heads through death (Appendix4). The risk of household food poverty was 1.606 times more likely to increase as the age of household increase from age 19 -30 to age 31-40. Similarly, the risk of household food poverty was 1.626 times more likely to increase as the age of household increases from age 19 -30 to age 41-50 (Table 4.12). The odd ratio also confirmed that household food poverty increased by a factor of 1.735 and 2.029 as the age of household becomes 51-60 and above 60 respectively.

#### **4.5 Extent and severity of food poverty**

The three FGT indices used are head count index, food poverty gap and severity of food poverty. The results of the survey revealed that the head count ratio or incidence of food poverty are 0.203 which implies 20.30 % of the sampled households cannot meet the daily income expenditure per adult equivalent recommended for caloric requirement. In order to know how far the food poor households are below the recommended daily income requirement, food poverty gap was calculated. Food poverty gap provides the possibility to estimate resources required to eliminate food poverty through proper targeting. The calculated value for food poverty gap was found to be 0.05 which implies 5 % gap. This measure is helpful and showing the cost of eliminating poverty (relative to food poverty line), because it show how much would have to be transferred to the poor to bring their incomes or expenditures up to food poverty line. Therefore,

if the city administration mobilizes and distribute resources that can meet this 5 % gap, which is income per adult equivalent to meet daily caloric requirement for every food poor households to bring up to the recommended daily income requirement level or food poverty line, then theoretically food poverty can be eliminated. It means that assuming sampled households are representative there are about 47,021 households with 181,202 adult people. Considering the daily recommended 2200 kcal per adult equivalent, a resource needed to push all households to daily subsistence requirement is estimated to be 398,644,400 kcal per day/1,884,500.8 Birr per day. Finally, to approach the most food poor sample households, severity of food poverty was calculated by assigning a higher weight,  $\alpha= 2$ . Thus, the survey result indicated that the severity of food poverty becomes 0.019 which is 1.9 %.

#### 4.5.1 Incidence of food poverty and household characteristics

The incidences of food poverty with some household characteristics are depicted on Table 4.14. The severity index did not show clear pattern or relationship between family size and food poverty. The higher severity was noted on households sizes 9, 5 and 4 members with severities of 0.3527(35.27%) and 0.3111(31.11%) and 0.2848(28.48%) respectively. The lower severity is found on household sizes 2 with 0.00002 (0.002%). But, household food expenditure per adult equivalent (HHFEPAE) had inverse relationship (-0.745) with household food poverty (Table 4.13).

**Table 4.13 Pearson correlation for independent variables versus severity index**

		HHFEPAEG	family size	Severity index
HHFEPAEG	Pearson Correlation	1		
family size	Pearson Correlation	-.228**	.1	
Severity index	Pearson Correlation	-.742**	.098	1

The prevalence of food poverty decreases as household head education status improves, i.e. Mean prevalence rate of food poverty is higher for illiterates (49.27%). Households with informal education have much higher incidence of food poverty than those households with elementary and secondary education. Household who attained first degree and above have no food poverty incidence.(Table 4.14). In addition to this, households with higher daily income per adult equivalent have much lower incidence of food poverty than households having lower daily

income expenditure per adult equivalent. Incidence of food poverty is much lower for households who earned Birr 60 per day per adult equivalent than those with less than Birr 30.0. The prevalence of food poverty of households who had no saving account and access to credit was 43.90%. Regarding to sex of household head, female-headed households have higher incidence of food poverty than male-headed household, i.e., 15.24 % and 33.34 %, respectively (Table 4.14).

**Table 4.14 Incidence of food poverty**

Characteristics	household grouping	Number of food poor	Total sampled household	Food poverty incidence
Age of household head	19-30	2	99	0.51
	31-40	24	115	6.15
	41-50	15	69	3.84
	51-60	21	55	5.38
	>60	20	52	5.12
	Total	79	390	20.30
Education status	Illiterate	34	69	8.71
	Informal education	18	35	4.61
	Primary education	24	127	6.15
	Secondary education	2	104	0.51
	Diploma	1	26	0.25
	Degree	0	29	0.00
	Total	79	390	20.30
Saving and access to credit	Yes	2	185	0.51
	No	77	205	19.74
	Total	79	390	20.3
Income expenditure per adult equivalent	0-15	2	4	0.51
	15-30	53	63	14.10
	30.01-45	24	57	6.15
	45.01-60	0	47	0.00
	>60	0	219	0.00
	Total	79	390	20.3
	Dependency ratio	0-50%	6	206
50%-100%		29	105	7.43
100.01%-150%		11	23	2.82
150.01%-200%		21	35	5.38
>200%		12	21	3.07
Total		79	390	20.3

## 4.2 Discussion on major findings

This study looked at the levels and associated factors of household food poverty in Addis Ababa, Akaki Kaliti sub city using PSNP socio- economic and demographic data. The head count ratio revealed that 20.30% of sampled households are found to be food poor. The gap and severity of food poverty were estimated to be 5% and 1.9% respectively. This finding is relatively similar with national food poverty rate reported in (FDRE 2017), the head count, gap and severities were reported to be 24.8%, 6.7% and 2.7%, respectively.

The study also found dependency ratio, education status, and age of household head, income per adult equivalent and saving and access to credit significant predictors of food poverty. The findings are relatively similar with previous studies (Aschalew, 2006, Ejigayehu, 2011, Girma, 2012, Craig and Scanlan, 2001 and Gani. and Prasad, 2007). Education was found significant determining food poverty at less 5% probability level, similar with (Ejigayehu, 2010 and Girma, 2011). But, it was not found significant at similar probability level with (Aschalew, 2006).

(Aschalew, 2006, Ejigayehu, 2011, Girma, 2012, Craig and Scanlan, 2001 and Gani. and Prasad, 2007) has found that household size is significant at  $p < 0.05$ . But this study opposes what they found out, family size was found insignificant. As the result, researcher strongly agree that the family size is not a problem as long as there is no dependency.

The study also identified age of household significant. This finding is similar with previous study (Ejigayehu, 2010 and Girma, 2012). But, it is opposite with what (Aschalew, 2006 and Abrhamet al, 2015) found. The difference might be due to recent government policy and social environment related to youth, for example technical and vocational education.

Marital status and sex of household were not found significant and this result is similar with (Ejigayehu, 2011 and Girma, 2012) but opposite with what (Aschalew, 2006) found. The main reason for this difference might be attributable to the ecological differences (study setting) and socioeconomic variations among study areas.

However, the levels of food poverty observed in this study is lower than the findings reported by a number of studies such as reports of study conducted in Addis Ababa city (47% ), Dire Dawa town (43%) and Sodo town Wolaita zone ( 37.6%) .In the contrary, however, the finding

observed in this study tends to be higher than the findings of study conducted in the Punjab province of Pakistan (19%).

The study identified that the households that had more than two dependent members in households were about 1.25 times more likely to be food poor as compared to households with one or less dependent members (Table 4.14). The higher the number of the dependents in the household, the lower the income generated to purchase food items to fulfill all family needs. This finding is similar with study conducted in Sodo town.

Regarding household food expenditure per adult equivalent per day, households expending less than 30 ETB per adult equivalent per day were about 2.5 times more likely to be food poor than those households who expend more than 30 ETB (Table 4.14). Households with higher monthly income are less likely to suffer from food poverty as compared to households with lower incomes. The findings are similar with the findings from studies conducted by Aschalew (2006) in Dire Dawa town and Ejigayehu (2011) in Addis Ababa city also. This may be due to low income and purchasing power of food for their consumption, as the proportion of expenditure on food decreases, access to food by household also decrease.

## **CHAPTER FIVE**

### **CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Conclusion**

Most empirical evidences confirmed that much attention has to be given to alleviate household food poverty problem. This study attempted to analyze the determinants of urban household food poverty in Akaki-Kality Sub-city. First, it describes the socio-economic characteristics of the food poor and food poor sample household by using descriptive statistics. Second, an attempt has been made to identify factors that determine the urban household food poverty using regression model. Accordingly, in the study area the proportion of food poor people who were estimated to be 20.30 %. The percentage of food consumption needed to bring the entire food poor population to the food poverty line is 5% while the severities food poor population is 1.9 %. Considering the daily recommended 2200kcal/10.34Birr per adult equivalent, a resource needed to bring all food poor households in the study area to daily subsistence requirement amounted to 173,800 kcal per day/816.86 Birr per day.

The result of the regression model indicated that out of nine independent variables that are hypothesized to have influence on household food poverty, five of them were found to be significant. The model output revealed that daily food expenditure per adult equivalent, dependency ratio and education status were significant at  $p < 0.01$ . The remaining saving and credit access and age of household head were found to be significant at  $p < 0.05$ .

Dependency ratio and age of household head were found to be positively related with probability of being food poor whereas saving and access to credit service; income expenditure per adult equivalent and education status of household head were negatively related with probability of being food poor.

This study has attempted to come up with the result of the analysis with defined scope however a lot remained to be unanswered. To provide basic information on the patterns and determinants of urban food poverty, the social, political and environmental dimensions, descriptive data on purchasing patterns of food poor, specific characteristics that make urban poor more vulnerable to food poverty and their coping mechanisms demands future researcher's attention.

## 5.2 Recommendations

Possible recommendations that emanate from the results of the research study are presented as follows.

1. Dependency ratio was found to be directly related with household food poverty. The increasing trends of unemployment have contributed to the deterioration of income generation capacity of food poor households. With these scenario, having a larger household size couple with high dependency ratio aggravate the problem of meeting food requirements, leave alone education, health and other non – food demands of household that will bring future return.
2. Saving and access to credit can create an opportunity to be involved in economic activity that generates revenue to households. Recently established small and micro business agency in the region has started activity of organizing and training of every business community who are interested. The other pressing issue related to provision of credit is the requirement of collateral and group lending procedure, which discourages so many households. People are afraid of holding accountability for others so individual lending should be considered as another option and collateral requirement procedure should be changed if there is a need to lift food in poor households from their current misery.
3. Since the role of education is vital significant role for betterment of living condition, strengthening both formal and informal educations as well as technical and vocational training should be promoted to reduce food poverty in Akaki-kality Sub-city.
4. Major findings of the study prove that the activity of urban agriculture in Akaki-Kality Sub-city has been insignificantly undertaken. Despite the fact, urban agriculture can contribute to the income generation of the urban poor families thereby contributing towards alleviating the intensity of poverty. Additionally, the sector has a paramount importance in providing these families with food and employment opportunities. Therefore, it has been highly recommended that the government gives sufficient attention to the industry, particularly, in the areas of support for research and development, in the areas of provision of extension workers, inputs, and credit facilities for the overall improvement of productivity and the successful development of urban agriculture.

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## Appendix 1 Conversion factor used to calculate adult equivalent.

Age (years)	Adult – equivalent conversion factor
New born	
0-1	0.29
Children	
1-3	0.51
4-6	0.71
7-10	0.78
Men	
11-14	0.98
15-18	1.18
19-24	1.14
25-50	1.14
51+	0.90
Women	
11-14	0.86
15-18	0.86
19-24	0.86
25-50	0.86
51+	0.75
Breast feeding women(+500kcal)	
11-14	1.06
15-18	1.06
19-24	1.06
25-50	1.06
51+	0.75
Pregnant women(+300kcal)	
11-14	0.98
15-18	0.98
19-24	0.98
25-50	0.98
51+	0.82

Source:- Adult-equivalent estimates of calorie availability Cad. Rio de Janeiro (2010)

## Appendix 2. Calorie value of food items consumed by sample households

Food items	Unit	Kcal
Teff	Kg	3589
Wheat	Kg	3623
Sorghum	Kg	3805
Maize	Kg	3751
Barley	Kg	3723
Oat	Kg	3599
Peas	Kg	3553
Lentils	Kg	3522
Fenugreek	Kg	3824
Irish potato	Kg	1037
Sweet potato	Kg	1360
Onion	Kg	713
Meat	Kg	1148
Milk	Kg	737
Egg	Each	61
Butter	Kg	7364
Edible oil	Kg	8964
Coffey	Kg	1103
Sugar	Kg	3850
Spaghetti/Macarouni	Kg	3550

Source: EHNRI, 1998; \* Dire Dawa Food Complex

## Appendix 3 Data reliability analysis

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.499	.747	25

## Appendix 4

### Logistic regression for demographic variables

	B	S.E.	Wald	Sig.	Exp(B)
V002	-.732	.390	3.530	.060	0.481
HHAG	.712	.123	.010	.031	2.038
DRG	1.121	.133	70.943	.000	3.068
Constant	-2.803	.431	42.269	.000	.061

## Appendix 5

### Logistic regression for socio-economic variables

	B	S.E.	Wald	Sig.	Exp(B)
V005	-.026	.009	-2.837	.001	0.974
V010	-.055	.027	-2.032	.043	0.946
Step 1 <sup>a</sup> HHFEPAE	-.273	.012	-23.071	.000	0.761
Constant	1.183	.034	34.298	.000	3.264