Food Security and Livelihood Strategies of Rural Farm Households with Focus on Female-headed Households in Sasiga District, East Wollega Zone, Ethiopia

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FOOD SECURITY AND LIVELIHOOD STRATEGIES OF RURAL FARM HOUSEHOLDS WITH FOCUS ON FEMALE-HEADED HOUSEHOLDS IN SASIGGA DISTRICT, EAST WOLLEGA ZONE, ETHIOPIA

BY

DEREJE TOLERA GELETA

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Statement of Declaration

I hereby declare that this dissertation was composed of my original work, and has not been submitted to, in part or entirely, any academic institution for the award of other degree or professional qualification. I confirm that all the contents of the dissertation are solely the result of my own work undertaken during my candidature for higher degree in Addis Ababa University. Further, all the concepts, arguments, and explanations included in this report from sources (theoretical and empirical literature and secondary sources) by other authors were duly acknowledged and properly cited in the reference section.

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Signature of the Candidate

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This is to certify that the Dissertation prepared by Dereje Tolera entitled: **Food Security and Livelihood Strategies of Rural Farm Households with Focus on Female-headed Households in Sasigga District, East Wollega Zone, Ethiopia**: submitted in fulfillment of the requirements for the degree of Doctoral Philosophy in Rural Development complies with the regulations of the university and meets the accepted standards with respect to originality and quality.

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Abstract

Ethiopia has a long history of famine. Regardless of the many attempts made to end it, the issue of food security is still unresolved. Most of the previous inquiries on the issue have focused on certain parts of the country known as "famine prone" which are affected because of prolonged civil wars, recurrent drought, and other factors. Whatsoever the cause, food insecurity has a disproportionate effects on different groups of people who have varying levels of access to resources, local culture, and institutional support. Nevertheless, there was less inquiry on how this affects the food security of certain disadvantaged groups of people in the regions assumed to be food self-sufficient. Most food security studies neglected southwestern part of the country and female-headed households (as a unit of analysis) in their approaches to deal with the issue. With such background, this study was set to investigate the livelihood strategies and food security status of female-headed households in Sasiga district of East Wollega zone of Oromia regional state. The principal objectives were to examine the level of access to livelihood resources needed to pursue different strategies and food security situation of householdsby utilizing Sustainable Livelihood Framework (SLF). To this end, a mixed research design was employed to systematically integrate the socio-economic data generated through survey, key informant interview, FGDs and observation. A cross-sectional Data were collected cross-sectional household survey of 390 (257 male and 133 female-headed) randomly sampled households. The result shows, based on, all the different indicators used in the study, female-headed households were more food insecure than male headed households. Such food security situation steamed because of unequal access and control on productive resources and inability to properly utilize the available resources which hindered female-headed households from pursuing viable livelihood strategies and ensure their food security. Therefore; female-headed households, though in a relatively abundant productive resource and less environmentally affected region, are in a dire food insecurity problem. The study recommends that female-headed households' access to productive resources should be improved. The agricultural technologies and social services have to be designed to fit to the needs of female-headed households. Sustainable awareness creation works on gender equality to members of the society shall be imperative.

Keywords; livelihood, local institutions, food security, farming households, female-headed households

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Acronyms

AAI	Agribusiness Action Initiative
ADB	African Development Bank
ICESCR	International Covenant on Economic, Social and Cultural Rights
ANRTU	Agriculture and Natural Resources Team of the United Kingdom
DFID	Department For International Development
AU	African Union
BASIS	Broadening Access and Strengthening Input Market Systems
CCAFS	Climate Change, Agriculture and Food Security
CHF	Canadian Hunger Foundation
CIDA	Canadian International Development Aid
CRSP	Collaborative Research Support Program
CSI	Coping Strategy Index
CSU	Colorado State University
DFID	Department for International Development United Kingdom
DPPC	Disaster Prevention and Preparedness Commission
ECA	Economic Commission for Africa
EIU	Economic Intelligence Unit
EWZFEDF	East Wollega Zone Finance and Economic Development Office
FAD	Food Availability Decline
FANTA	Food And Nutrition Technical Assistance
FAO	Food and Agriculture Organization
FAOUN	Food and Agriculture Organization of United Nations
FDRE	Federal Democratic Republic of Ethiopia
FED	Food Entitlement Decline
FHI	Food for the Hungry International
GFA	Global Food Assessment
GFSI	Global Food Security Index
HFAS	Household Food Insecurity Access Scale
HHDDS	House Hold Dietary Diversity Score
IDS	Institute of Development Studies

IFPRI	International Food Policy Research Institute
ILO	International Labor Organization
IPCC	Intergovernmental Panel on Climate Change
KII	Key Informant Interview
LSP	Livelihood Support Program
MDG	Millennium Development Goal
MoFED	Ministry of Finance and Economic Development
MOWA	Ministry of Women Affairs
NGO	Non-Governmental Organization
ODI	Overseas Development Institute
OSSREA	Organization for Social Science Research in Eastern and Southern Africa
RCL	Reach Consult Ltd
SDPED	Social Development and Poverty Elimination Division
SDPEDO	Sasiga District Planning and Economic Developmnt Office
SLA	Sustainable Livelihood Approach
SLF	Sustainable Livelihood Framework
UNDHR	United Nation Declaration of Human Rights
UNDP	United Nations Development Program
UNDP	United Nations Development Program
UNICEF	United Nations International Children's Emergency Fund
USDA	United States Department of Agriculture
WDG	World Bank Group
WFP	World Food Program
GIS	Geographic Information System

Chapter one

Introduction

1.1. Background of the study

Food is one of the basic human needs. Consequently, the right to food (UN, 1948)is included as one of the core elements of an adequate standard of living in UNDHR 1948, article 25 (Mechlem, 2004). According to IFPRI (2012), the issue of food security has become a concern beginning from the world food crisis of 1972-74 and the universal declaration of human rights. Together with poverty, it still occupies the head-lines of development agendas, particularly in regard to developing countries.

Globally, for a longer period, food production has kept ahead of necessity(Stephen & Ingram, 2011,Shapouri, Rosen, Meade, & Gale, n.d)and even slightly outpaced growth in consumption (IFPRI, 2004). This day, (Shaw, 2001)states, availability of enough food in the world to provide everyone with an adequate diet is not mattering. However, the paradox is, undesirably large number of people -one in twelve (FAO IFAD WFP, 2015)in the world is suffering from the problem of insufficient food, among which children under five being acutely malnourished (Hobbs & Bush, 2014). The recent report on the state of world food security shows that the number of food insecure households was on the rise and reached 821 million in 2017 (FAO, IFAD, UNICEF, WFP and WHO. 2018). According to Haan, Majid, & Darcy, (2006) more than two billion people are also suffering from malnutrition often called hidden hunger. It can be understood from this that a significant proportion of world population is facing food insecurity and malnutrition. Reports also indicate that the figure remains nearly one billion from the Rome world food summit of 1996 to 2015(FAO, IFAD, & WFP, 2005, 2015, &FAO, 2014).

This problem has disastrous effects on life and health through the disease, disabilities, and premature deaths that it inflicts, which in turn cause human and economic costs on individuals and societies (FAO et al., 2005). For instance, Campbell, (2011) noted that food insecurity accounts for the death of more than 70 million people worldwide in the 20th century despite the achievement of capacity to abolish famine globally during that time. This makes the avoidable

mass death on such scale an atrocity. The extent of the problem can be best expressed in (Shaw, 2007 p.388) statement as:

"Hunger and malnutrition kill more people every year than AIDS, malaria, and tuberculosis combined, and more people die from hunger than in wars. At the center of this human tragedy, is food insecurity, inability to access the safe and nutritious food necessary for a healthy and active life."

Large numbers of the undernourished people live in developing countries with a heavy concentration in parts of Asia and Africa south of the Sahara (Wiggins & Slater, 2011). Still, within these countries, the burden of food insecurity is heavier on the poor, vulnerable and disadvantaged groups of people constrained by various factors. Women because of their low economic and social condition can be categorized into this group. They account for 43% agricultural labor; 15–40% in Latin America, 10–25 % in Asia, and 20–45 % in sub-Saharan Africa (FAO, 2012). Nevertheless, various sources such as World Bank, 2008 and Ellis, (1999) documented that differences in access to and control over vital productive resources as; assets and services between men and women arising from gender inequalities negatively affect women's food production. Specifically, (Menale, Stage, Hailemariam, & Erenstein, 2015) stated that female-headed households are disadvantaged in access to land, livestock and other assets, health care, markets, and extension services.

Concerning its causes, food insecurity can be attributed to diverse factors each with numerous characteristics (Degefa, 2001; Degefa, 2005). Many authors as; (Adnew & Smith, 1993) mentioned; the rising number of population with changing diet, pressure on soil and water, climate, and cost of energy, income shocks, production, price and assets, unsustainable livelihoods systems and breakdown of local institutions. These are frequently referred to as causes of food insecurity with different impacts on households, which of course may vary depending on the nature, and composition of the households. Still, national policies relating to production (Guha-khasnobis, Acharya, & Davis, 2007) inequality in gender relations (BRIDGE, 2014) and the overall livelihoods of households (Degefa, 2005) are suites of factors and processes operating at a range of scales to cause the problem.

Given the fact that food insecurity is still an unresolved problem particularly for female-headed households who account for 25% of the households in Ethiopia (UN Women, 2014), it is reasonable to have a further investigation of the issue to look for a workable solution. To this end, (IPCC, 2008) advocates the need for more research on highly vulnerable microenvironments and households to provide agronomic and economic coping strategies. Similarly, (IFPRI, 2012) also suggests the need for research to develop useful food and nutrition security strategies requires identifying the factors, which constrain progress most in the particular context. Specifically, Guyu (2014) recommended comprehensive research and policy directions towards Western Ethiopia.

Sasiga, the district which was selected for this study is found in the western part of Ethiopia. Being located in this region, it has evergreen environment and abundant natural resource. But in the long run, the natural resources particularly land has become scare because of the growing number of population of the area and also large number of people who moved to the area through settlements (both government sponsored and self-initiated). Other than growing population, the productivity of land is also declining from time to time because of acidity of the soil and degradation of land. Thus it has become one of the districts in East Wollega which have the problem of food security.

This study was therefore designed to understand how female-headed households in Sasigga district access and utilize productive resources and with the support of existing local institutions pursue different paths of livelihood to ensure their food security. It aimed at addressing the food security status of female-headed households, factors affecting their food security, major livelihood activities carried out by female-headed households to secure food for their household, their access and use of local institutions and the ways in which the persistent inequalities in access to resources combined with the other factors affect their adaptation to food insecurity in Ethiopia: based on a case of Sasigga district of Eastern Wollega zone of Oromia National Regional state.

1.2. The problem of food security and propositions

Hunger and malnutrition are among the grave problems that a large number of population in the world is facing every day and hence one of the most critical global issues. For instance, Maletta, stated the extent to which hunger is frequently talked in the press as in the development literature or academic publications, especially in relation with emergencies such as floods, droughts, and violent conflict, and other similar predicaments (Maletta, 2014). This is despite the recently steadfast records in the fields of science and technology and socio-economic developments. A considerable increase in the global food production was achieved (Stephen & Ingram, 2011) as part of the gains from science and technological advancements which enabled modern plant breeding, pesticides, and irrigation to dramatically increase yields through Green Revolution of the 1960s (Chaifetz & Jagger, 2014). Of course, this might have lessened only the food security concerns on the supply. However, according to BRIDGE (2014), the number of people affected by hunger is still high regardless of more than enough food in the world to feed everyone. Thus, there is large number of population which is food insecure regarding access with a disproportionate impact on women and girls.

The bulk of this chronically food insecure, according to FAO (2006) being found in developing countries, of course, with varying differences between regions. Being one of the developing countries, Ethiopia faces a severe problem of food insecurity both chronic and acute ones (Devereux, 2000b, United States Department of Agriculture, 2015 DUPONT, 2014 DUPONT, 2015, FAO, 2016). Ethiopia has a long history of famine and near-famine conditions (Haan et al., 2006). Famine affects a large number of people since the first famine in 9thcentury AD and to this date Ethiopia had about twenty-three major famine devastations (Kumar, 1987) of which the worst was the great famine that occurred 1888-89, termed as *'kefu-Qan'*; locally to mean "evil days" (Bahru, 2002). Of these, the 1972/3and 1983/4 famines can be mentioned as historical famine devastations (Kumar 1987) happened in the modern time. Though it was not as severe as the previous ones, the problem has also occurred in the 2002–2003, which made 13.2-million population recipient of food assistance (SAVE the CHILDREN, 2004). Ethiopia has been the leading recipient of such food aids from 1988-2003 (Lowder & Raney, 2005).

By a recent global food security assessment, Ethiopia was ranked 86th from the 109 countries and has the highest proportion of undernourished people in SSA suffering from stressed to emergency levels of food insecurity (DUPONT, 2014). Regardless of some improvements during the subsequent period, this status, however, has remained unchanged for Ethiopia on the 2015 global food security index (DUPONT, 2015). Looking into figures from 2000 to 2015 at a glance, the problem of food insecurity is still critical in Ethiopia.Currently, about ten million people are affected by food shortage caused by crop failure from El Niño, which affected a large part of eastern and southern Africa. Triggered by this El-Niño, in the same historical year when Ethiopia is certified by FAO to achieve food security, about 10.2 million people including 435,000 million children are facing acute malnutrition (FAO, 2016). The same source also states a higher number of hungry people and in need of food assistance than any other time in the past decade.

Food security is widely studied in Ethiopia (Getachew, Degefa & Negusie, 2018, Furgasa & Degefa, 2017, Guyu, 2016, Dagiye, Belay, & Mengistu , 2013, Degefa, 2005, Devereux, 2000). Reviews on most of the studies shows that, the food security problems of Ethiopia have been viewed to be 'confined' to certain parts of the country mainly the northern, eastern and southern referred as famine-prone areas regarding the location and demographic and environment concerning the causes. In the same way, most food security studies also focused on these regions.

Sasiga district has evergreen environment and perceived to be surplus in food supply. Though these resources particularly land for agricultural production is gradually becoming scarce and agricultural productivity is declining because of degradation, acidity, and termite infestation, female headed households and some disadvantaged group of people are food insecurity because lack of access to the available resources and inability to utilize the one at their disposal. Several studies (Nigussie & Alemayehu, 2013, Zemedu & Mesfin, 2014) also confirm that women in general and female-headed households are more severely affected by the problem of food insecurity. The proportion of food insecure female households was higher in almost all those empirical findings which have included women or female-headed households in their study (Fekadu & Mekuanent, 2010; Degefa, 2005; and Tassew, 2000).

Despite this fact, most of the research endeavors on the topic preferred to carry their inquiries by using general household or community level unit of analysis. Hence, the food security situation of households who are geographically located in areas which have less environmental problems (drought and variability of rain) were ignored as these areas were viewed to be self-sufficient in agricultural production. In particular, studies on the issue of food security are very limited. Thus, an implicit assumption of resource endowment of the rural communities in such areas misses the crucial roles that access to and control of the livelihood capitals (human, natural, social, physical and financial) by disadvantaged groups as female-headed households play in the pursuance of different livelihood strategies and secure food.

There was no study conducted that adequately address how households headed by women, commonly referred to as female-headed households, access and utilize livelihood capitals temporally and in the long term to address their livelihood problems and food security. As a result, food security programs and aids too were pulled towards the same region. Hence, the present study has far moved from the previous approach in many ways (i.e. study area, unit of analysis, and the methodology adapted) to examine the food security situation of female-headed households who live mostly without a spouse compared to women in male-headed households.

The Sustainable Livelihood Framework (SLF) was employed to see food security of households as an outcome of access to livelihood resources, institutional support and utilization, and livelihood activities and strategies. A mixed research design was used to analyze the food security situation of households as measured based on suits of indicators.

1.3. Objective of the study

1.3.1. Main objective of the study

Grounded in the Sustainable Livelihood Framework, this study was aimed at examining how rural farm households and in particular female-headed ones access productive resources to pursue different livelihood options for the purpose of ensuring food security in Sasigga district of East Wollega zone; western Ethiopia.

1.3. 2. Specific Objectives

To achieve the aforementioned general objective, the following specific objectives were:

I. To investigate households' access to livelihood resources and some contexts under which the resources exist
II. To explore the livelihood strategies, with their viability, pursued by households to attain food security and improved livelihoods
III. To appraise the role of local institutions and their utilization by households for food security and livelihoods improvement
IV. To examine the food security status of female-headed households and factors that affect the status it in the midst of the region understood to be food self-sufficient

1.4. Significance of the study

It is true that food insecurity affects nation, community, household, and individuals. However, the burden of hunger is disproportionately heavier on some social groups, communities, and localities. Similarly, many pieces of evidence indicate that the problem is severe on female-headed households. Female-headed households have weaker resource bases and limited livelihoods diversification opportunities compared to male headed households because of factors related to their social and economic positions which directly or indirectly affect their possession of the various productive resources and mobility. It is with this conviction that households headed by women were emphasized in this research.

The findings of this study are thus expected to provide information on the food security of female-headed households in relatively better agro-ecological (adequate rainfall, biomass) and socio-economic situations perceived to be food self-sufficient. Hence, the researcher hopes, it has an important contribution as part of the broader national effort to improve the food security of rural households. This study which is on food security of female-headed households also challenged the previous food security studies with solid evidence on how future inquiries into the issue should also target those social groups inhabiting better off regions but who are disadvantaged in their social, economic and environmental conditions. Besides, the result of this research is also expected to influence previous views (short of reasonable evidence) held by

researchers and policymakers on food security of the region and other regions with similar socio-economic settings. Thus, it provides useful information, which will assist policy makers and planners in designing policies and development programs striving to improve the food security of female-headed households specifically by formulating strategies on their livelihoods and improving the capacity of local institutions. In addition to this, it could also serve as an input for different sectors of government organizations at national, regional and local levels and nongovernmental organizations closely working on food security mainly female-headed households.

The finding of the study is particularly applicable to the four Kebeles of Sasiga district, but it also has relevance to a population of other areas of the region having a similar socio-cultural, psychological and economic situation. Hence, while adding to the wealth of information currently available on food security in Ethiopia in general and female-headed households (food security status, determinants and livelihood strategies) in Western Oromia in particular, it is also expected to some extent narrow the gap in research concerning food security in this specific location perceived as surplus producing region. Besides, the result could also serve as a basis for further detailed empirical studies in the study area, as well as the subject matter

The finding may also contribute some insight on the area of food security study by adding empirical evidence regarding different aspects of livelihood and food security situations of female-headed households (disadvantaged group) in Sasiga district-located in the southwestern region of Ethiopia where there is scant empirical information on the issue. Besides, this study is to record and document information on the food security situation of female-headed households in the Sasigga district. It may also inform different bodies like; the district Agriculture and Rural Development office, Women and Children's Affairs office, Rural Microfinance institutions and local NGOs which are working on women particularly on access to and utilization of livelihood assets and the role of local institutions in improving the livelihood and food security.

1.5. Limitations

Inquiries into food security can be approached in different ways but researching by employing all the approaches to be used, and population to be covered is easier said than done. In the same

way, the available funds and time resources limited this research to be restricted to Sasiga District concerning area, which in turn may limit the generalization of the finding to other areas because of difference in the local context. As the data used in this study was cross-sectional, it was difficult to analyze the stability, which is an essential component of household food security. Lack of previous empirical works in the study area has also affected the identification of the research problem. Nevertheless; in this research, a Sustainable Livelihood Framework mixed was employed to encompass different the resources (natural capital, human capital, physical and social capital), pathways of households and the role of local institutions to ensure their food security. In addition to this, multiple indicators of food security were also used to capture various aspects of household food security.

1.6. Structure of the dissertation

The thesis has eight chapters including the background chapter, which introduces the main proposition and objectives of the thesis. The next two chapters (i.e., Chapter Two and Three) highlight on the review of related literature and methodology of the thesis. Chapter Four through Seven present the findings on the specific objectives of the study while the remaining chapters were devoted to the synthesis, conclusion, and recommendation of the entire work.

Chapter Two presents the review literature. In this chapter, an attempt was made to track the trajectories that the different concepts, theories, and measurements on food security have passed through to this date. Based on this, relevant theoretical and conceptual frameworks and the methodology underpinning the study were identified. Chapter Three explains the mythology, philosophical underpinnings, and ethical considerations. All the procedures followed in the course of the study as; selection of the study population, techniques and tools employed in the collection of the primary data were elaborated. It also gives some picture about the study area by highlighting on its general physical and socio-economic features and justifies why it was picked for this research.

Chapter Four describes the demographic and socio-economic background of the study participants. The primary focus of the chapter was to assess households' access to livelihood assets with particular attention to the gender of heads of the households. The trends of some of

these resources as land, forest, and productivity of agricultural production were also included. The Fifth Chapter deals with the role of local institutions in food security and livelihoods of the households. Various indigenous informal and formal institutions and organizations, which mediate access to different resources, were also explored. How far the different institutions were able to meet the interest of women particularly those headed by females was given significant emphasis in the chapter.

Chapter Six analyzes the different types of livelihood strategies pursued by the study households. It also examines what constrained female-headed households' participation in different livelihood strategies and the viability of the different strategies. In the Seventh Chapter, the food security status of the study households and the results of the econometric analysis of the determinants of food security of households are discussed. Chapter Eight investigates the convergence or divergence of the finding against the food security theories used in the study. It also highlights the methodological and knowledge contribution of the study and concludes the entire work and draws some policy implications.

Chapter Two

Theoretical and Empirical Literature

2.1. Introduction

This section deals with the literature part of the study having two aspects. The first one presents theories regarding what affects the food security of households while the second provides empirical literature. The latter is cascaded from global to Africa and then down to the national and household level.

2.2. Conceptual and theoretical literature on food security

Basic Concepts

The term "food security" is widely used in development literature and the media. For many, the concepts of hunger, famine and food security are blurred and often interchangeably used, but they are not the same. Several sources show the emergence of a plethora of definitions of food security since the development of the concept in the 1970s. In an annotated bibliography on food security by Maxwell & Smith, (1993) it is indicated that there is no single definition of food security. Instead, a complex wave of interrelated strands exists of which some are more often cited than the others.

On the first world food conference, (UNFAO, 1996) food security is defined as: "the availability at all times of adequate world supplies of basic food stuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices." This definition reflected on the global food supply and prices, especially in developing countries, which was a central concern at the time (Opara & Agrisciences, 2013). But over time, as noted in Pieters, et al, 2012), the definition has experienced a substantial evolution, moving from the supply focused concept to a notion taking other multifaceted dimensions. After about a couple of decades, a more comprehensive, acceptable and widely cited definition on food security has emerged out of the World Food Summit of 1996 when the concept has expanded to include many aspects including; access, sustainability, and quality of food. On this summit, food security was defined *"food security exists when all people, at all times, have physical, social and economic access to*

sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (UN FAO, 1996). From this time on; this definition has been governing policies, programs and activities of nation states and international and local organizations on matters related to food security.

Food security is a complex and multidimensional issue, and consequently, different conceptions have emerged related to it (Opara & Agrisciences, 2013) within a very short period. Nevertheless, still, the issue of famine is one major factor that bottleneck development particularly in developing countries known for its lack of consensus among scholars on its definition, causes, and analysis. The history of famine and malnutrition were common phenomenon throughout the long human history (Degefa 2005). The same author citing (Sen, 1981, Mesfin1984, Pankhurst 1985), stated that famine of varying magnitude has occurred to different countries of the world with subsequent excessive death of populations which only a few countries could escape. Similarly, (Cormac, 2009) also documented that; history certainly suggests that […] no part of the globe has always been free from famine [except] some regions have escaped more lightly than others.

Though attempts in explaining why famines happen go as far back to the 1700's thought of Thomas Malthus, lack of consensus on the same topic still exists in the 21st century leading to passionate and often bitter debate among analysts on famine. This disagreement, according to Devereux, (2000), maybe because of scholars' disciplinary specializations and thus inability to understand interactions among different variables causing famine. Regardless of the concepts in the definition, for instance in studying food security, Maxwell & Smith, (1993) recognized the existence of some clear patterns between governments and international agencies and the academia. According to these authors, studies sponsored by the former tended to give priority to food production with the overall objective of national self-sufficiency while the later focus on consumption and nutritional outcome of households and individuals. However, various sources indicate that, since mid of the 1930s, the topic gradually started to be more organized, involve people with different backgrounds on the same forum and obtain ownership of such a gigantic international organization as FAO and gained worldwide attention than ever before. Authors like

Shaw, (2007) related such progress achieved at this time to the contribution of great depression and advancement in the science of nutrition.

Thus, food security has been slightly viewed in different ways since the emergence of the concept. From the few definitions above, the pillars of food security include availability, access, and utilization (Opara & Agrisciences, 2013) while other sources as, (Nyantakyi, 2014) also add stability/sustainability into these pillars.

2.3. Changes in the thoughts and measurement of food security

Over the past several years that followed the first world conference on food security, perspectives on food security have been greatly changing in response to the improved understanding on the various components of the topic. The primary concern of the international discourse on food security has frequently been changing with focus on aggregate global/national availability, food sovereignty, access, livelihoods, and individuals perception each taking predominance at different times. Consequently, such frequent changes in views of food security to this date in turn also lead to shifts in the analytical frameworks, causes, unit of analysis and suggested solutions as highlighted in this section.

2.3.1. Changes from national supply to individual or household accesses

In the early days, food security study rests narrowly on the food production at the national level. According to these early thoughts (Desai Jaikishan, Kritin, & Alessandro, 2006), the problem of hunger was related only to reduced food availability. In the same document, it is stated that acute food shortage leads to hunger, and particularly famine, for which increased production and distribution was sought to be a solution. Hence, food security is viewed in terms of aggregate quantity (a fixed amount of kilocalorie) at a national level until the seminal work of (Sen, 1981) in the early 1980s and Opara & Agrisciences, 2013).

Later, this thought was challenged when it was found that, those factors as; drought, flood and related factors previously attributed to food insecurity in a given area were no more leading to food insecurity in other places facing same problems. Therefore; the focus on the aggregate supply of food championing the thinking on food security dominated until the concept of

entitlement failure disputed it. The treatment of famine since the early 1980s as being induced by entitlement failure which leads to the inability of individuals to access the food they need due to poverty (Desai Jaikishan et al., 2006) came to dominate the concept. Thus; as (Maletta, 2014) stated the concept of food security shifted away from the traditional view of self-sufficiency from this time on.

2.3.2. Changes from Right to food and food self-sufficiency to food sovereignty

Food sovereignty is a contested concept. The concept was defined in the (NYÉLÉNI 2007) Declaration, as; "the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods and their right to define their own food and agriculture systems" (NYELENI, 2011). This definition was given after a decade of uncertainty (March & Macrae, 2015). It emphasizes the right of nations and their people in controlling their food systems through production modes, food cultures, and environments. It has been related to political project and campaign, a social movement, and an analytical framework lacking agreed upon definition for an extended period.

The root of food sovereignty movement is traced back to the 1940's "right to food" previously conceptualized in the UN Commission on Human Rights (Steve Wiggins and Rachel Slater, 2011) which was formally recognized in the mid-1960s. In the context of (March & Macrae, 2015) the "right to food" discourse, citizens' right to food has been set as each state's obligation within "the maximum of its available resources" to ensure compliance with the treaty.

Later, in 1993, the most well-known food sovereignty organization with its headquarter located in Jakarta, known as La Via Campesina was formed by small and medium scale farmers from all over the world. The La Via Campesina recognizes food as a basic human right and struggles for agrarian reforms, natural resource protection, reorganization of trade, an end to hunger, and general democratic control of food (NYELENI, 2007). It advocates for food security through basic production on a small scale and localized system against the globalized import-export system and corporate power and large scale farming and agricultural processing. This is because, according to (Gross & Feldman, 2013) if the population of a country must depend for their next meal on the global economy, the good-will of a superpower not to use food as a weapon, or the

unpredictability of shipping, then that country is not food secure. Of course; the concepts of food sovereignty are broad which goes even beyond that of food security.

As noted by (March & Macrae, 2015), the movement was formed in response to the corporate control of the food system over social welfare. It was an alternative rights-based approach to organizing agri-food systems that are fundamentally opposed to neoliberal globalization (Godek, 2014). Rather, as documented in the (NYELENI, 2007) declaration, it is placed at the heart of food systems and policies; the interests and needs of those who produce, distribute and consume food, prioritize local and national economies and markets and empower peasant and family farmer-driven agriculture than the demands of markets and corporations. It is not limited to simply favoring such interests but also offers a strategy to resist and dismantle the current corporate trade and food regime, provide [new] directions for food, farming, pastoral and fisheries systems determined by local producers and users. By this approach, critical attention is given on the means of production of food such as land; territories, waters, seeds, livestock and biodiversity to be in the hands of those who produce food.

Despite all such ambitions, the food sovereignty concept is according to (Chaifetz & Jagger, 2014), is hampered by several challenges related to articulation, workability, measurement, and lack of a full-fledged model. This is because, as documented by this author, it is an advocacy-oriented movement than a policy objective that could be implemented and evaluated in any meaningful way. Moreover; achieving by restructuring food and agricultural input systems based on the principles of food sovereignty is a formidable challenge in the face of international food policy objectives set to end global hunger. It might not be an [appropriate] answer to food security in the era of relatively high food prices.

Nevertheless, food sovereignty is an important normative concept in fighting against the globalization of food and resources and negative effects on health and the environment, by condemning systems that promote transgenic crops, endorse industrial agriculture, displace individuals due to political conflict, and marginalize women and ethnically and racially diverse communities. It also encourages more equitable outcomes and may grow in importance if policymakers accept the “right to food” discourse (Chaifetz & Jagger, 2014) as part of their national laws.

2.3.3. Changes in measurements of food security

In all the food security concepts which were in use, as (Maletta, 2014) stated, until the 1980s, people are classified as food secure or insecure based on objective measures which failed to include the subjective feelings and beliefs of the people. With the continued evolution of the concepts, subjective measurements were introduced in the early 1990s marking another conceptual shift. It is cited in (Maletta, 2014) that, the approach (subjective measure) was adopted as a regular module in the US Current Population Survey since 1995 from which it was later spread into other developing countries. This shifted not only the emphasis from objective to subjective indicators but also shifted attention from the current or past situation of food to expectations or plans about the uncertain future.

Contrary to the objective measures of food security in this approach, the perceptions and expectations of households on their ability to meet present and future food needs of their families and actions taken (or intended to be made shortly) at times of insufficient access are incorporated (Maletta, 2014). Previous studies (D. Maxwell et al., 1999; D. G. Maxwell, 1995, 1996), stated that this approach has also introduced into food security concept of risk assessment and management by the households themselves who are the victims of food insufficiency. In doing so, the severities of the food insecurity risks are indicated regarding their importance and subjective cost of actions that households use or contemplate to use as coping strategies.

This subjective food security measurement has become a usual complement to more scientific notions, but it is not without limitation. Of the limitations; this approach can be misleading as some people claiming to be food insecure while they are regularly eating much more than they need and others not complaining unless hunger is extreme particularly in the poorest nations as a degree of food insufficiency is habitual with them (Maletta, 2014).

2.4. Theoretical approaches to food security

Food security as stated by (Burchi & Muro, 2012) is a widely debated and much-confused issue. Likewise, theories on the relationship between famine and its attributes such as; political, economic and environmental factors have frequently been changing because of the changes in

views and understandings of the practitioners and scholars. Thus many models have been suggested one after the other with a particular focus on different factors at different times in analyzing the determinants of famine. These views as discussed under this section were focusing on various aspects of food security as; availability, access, political system, and livelihoods at different times.

2.4.1. Food Availability Decline

This approach is certainly the oldest one and still the most influential. Until [other approaches emerged] in the early 1970s, this was the reference approach for the international community, both at the political and academic level (UNDP, 2012) to study food security.

Traditionally famine has been related to those factors which affect production as the act of God and some other times, nature's fault. This approach is (Sen, 1981) cited in (Vadala, 2009b) known as the Food Availability Decline (FAD). It has two versions. The first one takes natural disasters like drought and flood as the major determinants to reduce food production while the second version focuses on population growth (Vadala, 2009b). According to this latter approach, food insecurity is the consequence of disequilibrium between population and food i.e in order to maintain this equilibrium the rate of growth of food availability should not be lower than the speed of population (UNDP, 2012).

Throughout most of human history, growth in population size was viewed as a sign of prosperity until Thomas Malthus challenged it in the late 18thc by his theory on the relationship between population growth and the environment (Hirschman, 2004). This theory declared the not matching relationship between the two by explaining the exponential growth of population against arithmetic growth of agricultural production on finite arable land (Bremner, 2012). His theory argues that the future lack of enough food per-capita compared to the rapid growth of population would cause famines and starvation(Burchi & Muro, 2012).

According to his theory, the rapid growth of population against limited production capacity places a direct restriction on population growth through positive checks or preventive checks (Marquette, 1997) as famine, malnutrition, disease and higher infant mortality (Bremner, 2012).

Of these checks, starvation, disease, and wars were hypothesized as positive checks on population growth by the attendant death as the original views of Malthus which were replaced by the neo-Malthusian preventive checks.

The theory of Malthus has faced strong opposition from the agronomist Ester Boserup, who argues that a shortage of food supply for the growing population could not be a challenge. Because according to her, people can respond to it through advancements in their agricultural system such as intensification including multi-cropping, increased labor to land ratios, and the development and use of better tools, irrigation systems and soil amendments, which in turn increases agricultural yield (Devereux, 2000b). Other strong challenge to the theory of Malthus also come from (Simon, 1981) who argues through his writing on population termed as "The Ultimate Resource" that, large populations with potential source of ingenuity and creativity will stimulate technological change and productivity and thus would be more likely to develop because of larger number of potential scientists, inventors, and creative minds.

The idea that, growing agricultural population ultimately leads to a decline in agricultural output, which was central to the Malthusian assumption was entirely opposed by Boserup (Hirschman, 2004, Simon, 1981). In addition to this, (Lambin, 2012) also criticized the view of Malthus regarding scarcity of land; as narrow and ignorant of many factors which can ease this scarcity of land like international trade and changing geographic distribution of land use and Ricardo view that, (Lambin, 2012) the problem of shortage of land can be overcome through expansion to new marginal lands. In line with this, the author argues that, though the land is finite in its total quantity, more efficient use and technologies give more access to it but at the cost of other social, economic, and environmental benefits.

As clearly stated in (Lambin, 2012), the view of food availability was shifted away from population and scarcity of land and gradually lost its dominance to Food Entitlement Decline (FED) when it was found that, drought doesn't always lead to famine. In the same way, the world population has dramatically increased, but the doomsday posited by Malthus has not yet happened. These changed how people viewed the causes of food security. Therefore; the premise of famine as a sharp decline in food availability in a country or region (Burchi & Muro, 2012)

wrongly assumed (Woo-Cumings, 2002) a closed economy with no access to sources of food outside the affected area.

This theory can be useful for the study of famine and its prevention in Ethiopia where 85 percent of the population is engaged in subsistence agriculture with recurrent unfavorable weather conditions, degraded farmlands, less use of agricultural input, less diversification and increasing population pressure on land are important factors that challenge food security. Thus, the FAD approach, though it is acceptable to have many inconsistencies, still provides a partial explanation of famine in Ethiopia where food production is done through backward farming techniques and highly dependent on the state of the natural resource bases.

2.4.2. Basic need Approach

Basic need approach is concerned with basic needs, and it emphasizes the poor, immediate needs and specific quantities of consumption. It was aimed at providing income earning opportunities to the poor through restructuring and goods and services they need (UNDP, 2012). In particular, it focuses on material needs such as food, clothing, and shelter without which person can exist and the less tangible ones such as autonomy (Crosswel, 1978). Thus it is against the income-based approach where income alone was viewed as a means of food security.

Basic need approach was adopted based on the basic working paper entitled; Employment, Growth and Basic Needs prepared for the 1976 ILO conference where it was declared as priority objective to be implemented in the development plans of nations. Food for private family consumption; which is termed as the most basic need (UNDP, 2012) was also included in the list of requirements identified to be met to satisfy basic needs of people (Chambers & Conway, 1992).

With time, food has begun to get more emphasis as an essential element of basic needs through; human right to adequate food (Kent, 2005) and food first discourse (Maxwell & Smith, 1993; (D. G. Maxwell, 1995) cited in (UNDP, 2012). The approach as applied to food security; mentioned in the same document; shifted the analysis of food security from the macro level to the micro level with its direct focus on whether people eat enough food. According to this source, food

security is assessed in terms of food frequency at the household level (as reported by households) and direct observation of food consumption (to take calorie availability by aggregating from the nutritional contents of all food consumed by household members) at the individual level and more recently using HHDDS.

In assessing food security, compared to the micro income approach, the basic need approach directly focuses on what is eaten? i.e., the food needed as a commodity instead of the income necessary to purchase it. In such a way, information on the current price of food and the physical and social problems of people in buying food are excluded. By focusing on whether households have enough food to feed all its members in a given time, or, eventually, in the past, this approach is concerned more with short-term food security and hence cannot provide a clue on potential food deprivations in the future.

2.4.3. Food Entitlement Decline (FED)

The food entitlement decline (FED) emerged as an alternative approach to the food availability decline (FAD) in the course of famine analysis (Burchi & Muro, 2012) from the beginning of the 1980s. Entitlement is defined by (Sen, 1981) as the set of alternative commodity bundles that a person can command in a society using the totality of rights and opportunities that he or she faces. The central argument of the approach is; famine should not necessarily be linked to the availability of food, rather very critical is, access to sufficient food by a particular group of individuals or household. The importance of people's control on the food over its existence as a commodity was explained in the words of Sen as; "starvation is a matter of some people not having enough food to eat and not a matter of there being not enough food to eat." In contrast with the traditional food availability approach, the entitlement approach thus concentrates on the ability of different sections of the population to establish command over food using the entitlement relations operating in that society depending on its legal economic, political and social characteristics (Sen, 1981).

The empirical evidence by (Sen, 1981) on famine from Bengal of India in 1943, Wollo in Ethiopia between 1973 and 1974, and Bangladesh in 1974, shows that hunger can take place without substantial food availability decline. In other words, there was no decline in the

availability of food in any of these three countries he studied when the calamity of famine occurred to a large number of population in these places. The result of this work has brought to attention about the need to look at the available means of access to food and the conditions of different social groups than the mere per capita availability of food in the analysis of famine.

Sen's, entitlement (the legal sources of food) are grouped in to four as; I) production based, II) trade based, III) own labor based, and IV) transfer based (Sen, 1981) which is further regrouped into three as; endowment set, entitlement set, and entitlement mapping by (Purusottam, 2000). This author stated endowments as resources including both tangible assets, such as land, equipment, animals and intangible ones such as; knowledge and skill, labor power, or membership of a particular community all combined as entitlement set and enable a person to produce, exchange or transfer food. Entitlement mapping is simply the relationship between the endowment set and entitlements. Famine can be the consequence of a decline in these endowments or exchange or exchange entitlement mapping or transfer failure (Purusottam, 2000 Burchi & Muro, 2012). Entitlement failure can be, according to (Devereux, 2001), either direct or indirect. Immediate entitlement failure is a loss in production caused by drought while indirect entitlement failure, on the other hand, is exchange related or failure in trade in the form of an unfavorable shift in the price of food and other non-food resources including wage.

Regardless of all its convincing concepts in this theory since the early 1980s, however, it is commonly observable to this date that, there is continued domination of the narrow sectoral focus on the agricultural supply, productivity, and technology in the international food security discourse and practices by some organizations working closely with food security. Despite the adoption of a much broader and advanced definition of food security after 1996 World Food Summit, which includes besides availability, other fundamental dimensions of food security, such as access to and utilization of food (UNDP, 2012), availability still is given much attention. This is because availability, though not sufficient by itself, but remains an important approach in food security.

Nevertheless, the entitlement approach though recognized and appreciated by many scholars to provide a general framework for the analysis of famine and become very influential for its analysis but shortly start to face criticism from a number of researchers mainly for its, seemingly

ill-equipped to explain the modern conflict-related famines in Sub Saharan African countries (Plu & Neumayer, 2009).

2.4.4. The Political Economy Explanation

In the continuous process, as stated by Plu & Neumayer(2009), famine theorizing has contested many aspects of the entitlement approach which finally led to the emergence of new theoretical paradigms (political economy) on the explanations and prevention of famine. Sen himself (founder of the entitlement approach), in the early 1980s, shifted his thought on the theory of famine from entitlement to democracy. With this new approach, a much wider role of the state and other agents in managing famines has replaced the entitlement approach.

Thus; out of continues debate about the causes of famine, the attention of the scholars once again shifted to the political economy explanation instead of the entitlement failure. According to this approach, the explanation of modern famine focuses around the political and institutional failures than technical capability for production and distribution. Regarding this, (Devereux, 2003) argues that the causes of disrupted access to food may or may not be 'technical,' but the origins of famine are always political. Hence, the issue of famine both in its causation and prevention was situated in the political sphere. This is well articulated by the same author (Devereux, 2000a) as; "as the balance of famine causality shifted decisively away from natural factors, so the responsibility for both creating and preventing famine became intensely politicized."

Most famines in the contemporary world are according to (Woo-Cumings, 2002) rarely been a matter of insufficient production of food; instead usually happen because of sharp political changes or armed conflicts that cut off ordinary supplies of food. This is well summarized in what (Cormac, 2009) has stated as; a distinguishing feature of twentieth-century famine mortality was more often linked to wars and ideology than to poor harvests per se. Thus; the idea of famine to be apolitical than insufficient production, has got strong support from many scholars.

While explaining how famine can be a result of political factor in various ways, some scholars still contend that famines could be a deliberate act of some forms of governments. Faminogenic

practices as described by (Jappah Jlateh Vincent & Smith Danielle Taana Smith, n.d.), are caused intentionally by maintaining policies that engender famine as a tool of extermination of specific populations. Concerning this; (Clover, 2003)(Clover, 2003) also stated how certain groups who have no political power might be more vulnerable because of deliberate indifference by the government. The same author explained the issue by taking wide-scale starvation happened in both Angola and Sudan because of deliberate victimization on the part of the government through a targeted attack, forceful displacement and systematically plundering, preventing them from growing or harvesting crops and depriving civilian population of basic resources.

From this, it is apprehended that, famine is caused when governments with the intention to perpetuate famine through policies designed for the same purpose or as the policy they design become inappropriate to prevent before it occurs and manage it once it happens and procedures (which favors some group of societies). Similarly; (Pieters et al., 2012) also associate responsibility for a famine to individuals and institutions either by deliberately causing it to happen (acts of commission) or by failing to prevent it despite having the capacity and mandate to do so (acts of omission).

Hence; famine, according to the political economy explanation, is something that can be prevented in two different ways either through proactive measure before it happens or reactive measures once the problem occurs. As noted by (Plu & Neumayer, 2009) its effect can be reduced through free or subsidized provision of food, the creation of employment and income opportunities for the affected people, control of epidemics and the provision of health services, of course, all depend on the nature of the political system and institutions by the state.

In support of the political economy approach, many practical comparative studies are available which provide sufficient evidence on how government institutions can cause or prevent famine. In line with this, (Clover, 2003) "ultimately hunger is a political creation which must be ended by political means" While elaborating on these means; (Plu & Neumayer, 2009) noted that, democracies act more decisively against famines than autocracies, and their policies are aimed at preventing harm to all people from famine. According to these authors, autocratic leaders are relatively more responsive to members of the elite while democratic governments respond more to the demands of the broader population who are the voters. Similar studies by (Burchi & Muro,

2012) also shows, in low income and emerging countries, the political rights are highly significant in reducing the number of deaths during famines while efficient governments (autocrat) together with effective rules and transparent institutions might also reduce the likelihood of facing a famine.

The recent, 2011-2012, famine in Somalia can be a good example for political economy explanation of famine. During this famine, although there were several other factors existed as causes of food production decline and food security in the country, however, it was because of the lack of accountability by the Transitional Federal Government of Somalia and doners. Among these causes were; lack of effective humanitarian response, the counterterrorism law of United States which criminalized the flow of aid in to the areas occupied by Al-Shabaab militant groups and restriction by Al-Shabaab to the famine affected areas by local authorities, and aid workers all combined to complicate the problem (Pieters et al., 2012).

On the other hand, others still argue that democracy although important is not sufficient for the prevention of famine. Concerning this, (Myhrvold-Hanssenby Thomas L., 2003), argues about the importance of non-instrumental means such as; land redistribution, education, public health services, etc., to be more successful in preventing famines from occurring than a free press. Against this argument, (de Waal, 2000) stated democratic government and its institutions prevent famine because its power depends on it and information about an approaching or actual famine cannot be suppressed (including at times when a free press is absent). Rather, he concludes that something more than just a democracy "an anti-famine political contract" refers to a specific mechanism that can exist in a democratic state to prevent famine is required for famine prevention. All the above pieces of evidence confirm the lions' share of governments and their institutions in either causing or prevent famine and manage the number of casualties once it happens.

Analysis of food insecurity in Ethiopia can be based on the Malthusian and 'political economy cluster' 'governance' approaches. The first one focuses on physical ecology explanations as population growth, declining soil fertility, and drought, while the second one blames government policies, weak markets and institutional failure (Devereux, 2000). According to this author; the

two approaches though have some merit as partial explanations, but neither is sufficient in itself. He, therefore; recommends the need to adopt a holistic approach based on 'livelihoods' analysis.

2.5. Food insecurity because of vulnerable livelihood

2.5.1. Key Concepts Related to Sustainable Livelihood

A livelihood is how people are making a living and of course not direct in its approach to food security. As highlighted by (Scoones, 2009); it is a means of making a living by different people in different places through various combinations of resources and activities. In the same way, the concept of livelihood as stated by(Chambers & Conway, 1992) widely cited in a number of sources including (FAO & ILO, 2009), (Morse, Mcnamara, & Acholo, 2009); comprises the capabilities, assets (including both material and social resources) and activities required as a means of living.

In relation to sustainability, livelihood is viewed by Chambers & Conway, (1992 1992 pp 7-8) as the ability to cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation. Here in addition to the resources and activities required to make a living as in the simple description given on livelihood, the enhancement of assets and capabilities by a social unit against shocks and stresses over time and provision of net benefits to other livelihoods locally and over the wider geographical area are addressed as strands of sustainable livelihoods. In other words, besides the presence of the resources, trends of these resources whether they are increasing, decreasing or remaining same over time, the possibility of enduring shocks are given important considerations. It is a wider view of development and according to (Scoones, 2009), emphasizes on diverse ways of making living cutting across the boundaries of more conventional approaches to looking into rural development with particular focus on some defined activities such as agriculture, wage employment, farm labor, small-scale enterprise, and others.

In most of the materials on development inquiries and practices reviewed for this study, the term 'livelihood' is numerously mentioned in conjunction with different words as; livelihoods approaches, perspectives, frameworks, and urban/rural, farming/pastoral and others. A number of sources also indicate that sustainable livelihood as a 'concept' originated in the 1980' and '90s

(Brock, n.d.; Degaga, 2005; Levine, 2014; Morse et al., 2009; Solesbury, 2003). Contrary to such claims, however, (Scoones, 2009) argues that such perspectives did not suddenly emerge on the scene in 1992 with the influential paper by Chambers and Conway alone, rather, the perspective has a long history that dates back another fifty or more years. But it could not dominate development thinking in the decades that followed because of the more mono-disciplinary perspectives promoted by the modernization theories. Thus, according to this author, it did not emerge in a vacuum instead gradually developed out of older trends and ideas preceding the 1990's such as the UNDP's Human Development approach (Morse et al., 2009).

Nevertheless, the notion of sustainable development (sustainability), what was later came to be conceptualized as Sustainable Livelihood Approach, has for the first time appeared in policy debate in the 1987 report of World Commission on Environment and Development commonly called "Brundtland Commission report" named after Gro Harlem Brundtland; the then prime minister of Norway who chaired the Commission on Environment and Development (Solesbury2003). This author argues that the general ideas about the focus on the needs of poor people need for participation, emphasis on self-reliance and sustainability, and ecological constraint; the ingredients that later constituted the SLA were evident in the Brundtland commission reports.

Other equally important for the development of SLA to its full appearance was the White Paper of 1997. Through the White Paper, the sustainable livelihoods become among the important principles underpinning UK's development policy and the basis for a number of DFID programs and practices intended to improve the wellbeing of poor people (in developing countries) in late 1990s (Solesbury, 2003) incorporated in her new development policy to eliminate poverty (Chambers & Conway, 1992). In reality, the sustainable livelihoods approaches a basis for conceptualizing development programs and practices has emerged in 1991 out of continuing conversations between Chambers and Conway and the book they co-authored "Sustainable Rural Livelihoods: Practical Concepts for 21st Century, Discussion Paper" in which they provided a working definition on sustainable livelihood similar with the one used later by DFID (Chambers & Conway, 1992).

Once born as a concept, its adoption in development practices and policies was facilitated by people playing different roles in their respective organizations (Naresh Singh in UNDP and Koos Neefjes in Oxfam-as testers and developers of the framework, Diana Carney- working as Secretary in the Rural Livelihoods Advisory Group- as interpreter and communicator, Michael Scott- acted as a champion for SLA within DFID, and Ian Scoones and Frank Ellis- described the frameworks) (Solesbury, 2003). These figures have played important roles to make the sustainable livelihood approach increasingly important in the development debate since the 1990s.

Following its introduction through the publication of (Chambers & Conway, 1992), the sustainable livelihoods approach according to (Scoones, 2009), has less ambitious aims at its early stage. But this was only until the latter part of the 1990s and the beginning of 2000s; the time, that marked the turning point in the appreciation of sustainable livelihood frame as theory and analytical framework in development research. In the late 1990s, DFID has adopted it as an analytical framework in practical analyses that it has commissioned in Bangladesh, Ethiopia and Mali being coordinated by Institute of Development Studies (IDS). Oxfam and CARE. International (NGOs) also adopted it to formulate their overall development programs and their evaluations. Still, UNDP took it for both analytical and planning methodology (Solesbury2003). It was from this time on that these organizations saw sufficient advantages in the sustainable livelihoods approach and began to extensively employ it in programming and analytical contexts for the formulation of sustainable and pro-poor development policies especially in southern developing economies (Mensah, 2012 Krantz, 2001). Once the concept has been adopted, it took only a few years to become an important tool in development and research to be used by organizations as an approach.

The sustainable livelihood approach has unique qualities since it, prioritize people than their resources, dynamic to adapt to changes in the livelihoods of people, the institutions that are shaping them and holistic in approaching the whole livelihood of people with all its facets (Kollmair & St. Gamper, 2002). The approach depends as stated by (Morse et al., 2009), upon the participation of those who are said to be helped by the change and cannot be done from an office. In addition to such qualities giving more attention to the people, compared to other

development approaches which aim to reduce incidences of low incomes, poor health, lack of education, food insecurity, social exclusion, or vulnerability, this approach instead builds on the existing capacities (strong vocational skills, resource sharing processes) of people (Kébé & Muir, 1999).

Sustainable Livelihood Framework (SLF)

The SLF has been widely applied for various purposes such as; an analytical framework, development objective and even to policy decisions in the development efforts at varying levels. There is no unified approach in its application, and as noted, it can be flexibly shaped to be fitted to specific local settings and different objectives defined in a participatory manner. Likewise, (Krantz, 2001) also recommended that it needs to focus on the livelihoods of the poor, avoid the standard procedure of conventional approaches of taking specific sectors such as agriculture, water, or health as an entry point. It must be clarified that, in the present study, the approach is employed as an analytical framework to investigate and understand the complex trends in the environment, socioeconomic interactions between households and institutions, access to resources and activities and livelihood strategies in rural farm households with major focus on female-headed one to ensure household food security and wellbeing.

Livelihood sustainability or vulnerability of a household as an outcome is predominantly based on the interaction between a particular context (history, trends, and socio-economic conditions), access to assets (different types of capitals), the institutional processes (both formal and informal institutions, organizations and social or power relations) and combination of livelihood strategies (agricultural intensification/intensification, livelihood diversification and migration) pursued by people (Scoones, 1998). The institutional processes as a mediator in carrying out different strategies which help to achieve a positive or negative outcome are of particular interest in the SLF as it transforms the different livelihood assets to different consequences either desirable or undesirable. When desirable, it leads to more income, increased wellbeing, reduced vulnerability, improved food security, and sustainable use of natural resource base. On the contrary, it can also lead to undesirable outcomes, such as soil degradation, increased vulnerability, less supportive and cohesive social environments. The desirable outcomes feed again back to build the capital assets base of households and visa a vis (Odero, 2014).

In the same way, the undesirable livelihood outcomes also deplete/weaken the asset base of households as indicated in (Fig.1). In this approach, sustainability is also weighed in terms of the vulnerability of the multiple capitals (natural, human, social, physical and financial) in relation to various contexts (trends, shocks, and stresses) in which these assets exist (Morse et al., 2009). Not only the vulnerability of the capitals, but the degree of sustainability of livelihoods is also (FAO & ILO, 2009) determined by the interaction of several forces and elements in the SLF; the assets and activities, vulnerability and coping strategies, institutions and processes and livelihood outcomes.

Thus, the sustainable livelihood framework has emerged as a counter to such fashion of basing the study of people's wellbeing on technical and financial analysis alone which in (Levine, 2014) was overly technical and technocratic approaches to rural development concerned mainly with improving the efficiency and productivity of agricultural practices in developing countries and lack of focus on people. According to (Krantz, 2001) it goes (in its scope) beyond the conventional definitions and approaches which narrowly focused on certain aspects of poverty and hence take in to consideration vital aspects of poverty such as vulnerability and factors and processes which either constrain or enhance poor people's ability to make a living in a sustainable manner. Thus, this approach discards the idea of using only simple technical or financial analysis and limited sectors such as agriculture in which people earn their living to understand people's wellbeing.

As common to other frameworks; it is not free from certain limitations. Among the critiques were (Morse et al., 2009) it does not show people in the framework, not all of the assets in the asset pentagons are measurable and even when measurable because of trust, households may withhold information regarding some of such assets (e.g., land) as they are related to taxation, unpredictability of shocks and trends especially at macro-scales and others. Nevertheless, the framework provides a checklist of important issues and sketches out the way these link to each other, while it draws special attention to core influences and processes and their multiple interactions in association with livelihoods (Kollmair & St. Gamper, 2002). Accordingly, every elements of the framework (contexts, livelihood assets, transforming structure, livelihood options and household food security as an outcome), and the manner of their cyclical interlace with each

other in the real-life situation is highlighted as follows in the analytical framework (Figure 1) so as to provide a clear picture of the framework as conceptualized in this study to assess food security of households.

2.5.2. Livelihood Assets (resources or capitals)

Assets refer to the resource base of people out of which people construct their lives in a complex combination among these resources (FAO & ILO, 2009, Krantz, 2001). These assets are also called capital. Some of them can be categorized as straight forward (tangible) and less immediately obvious (intangible) ones (Morse et al., 2009). The tangible resources are according to (Chambers & Conway, 1992) include stores of values (jewelry, savings, and food), and other resources (land, water trees, livestock, farm equipment) which are under the command of the household and the intangible ones are claims on individuals or agencies at the time of contingencies and access to use the different resources. Whatsoever the form, the general premise is according to (DFID, 1999), those who are endowed with adequate assets are more likely to be able to make better choices to achieve positive livelihood outcomes, than being forced into any given strategy that exists as the only option.

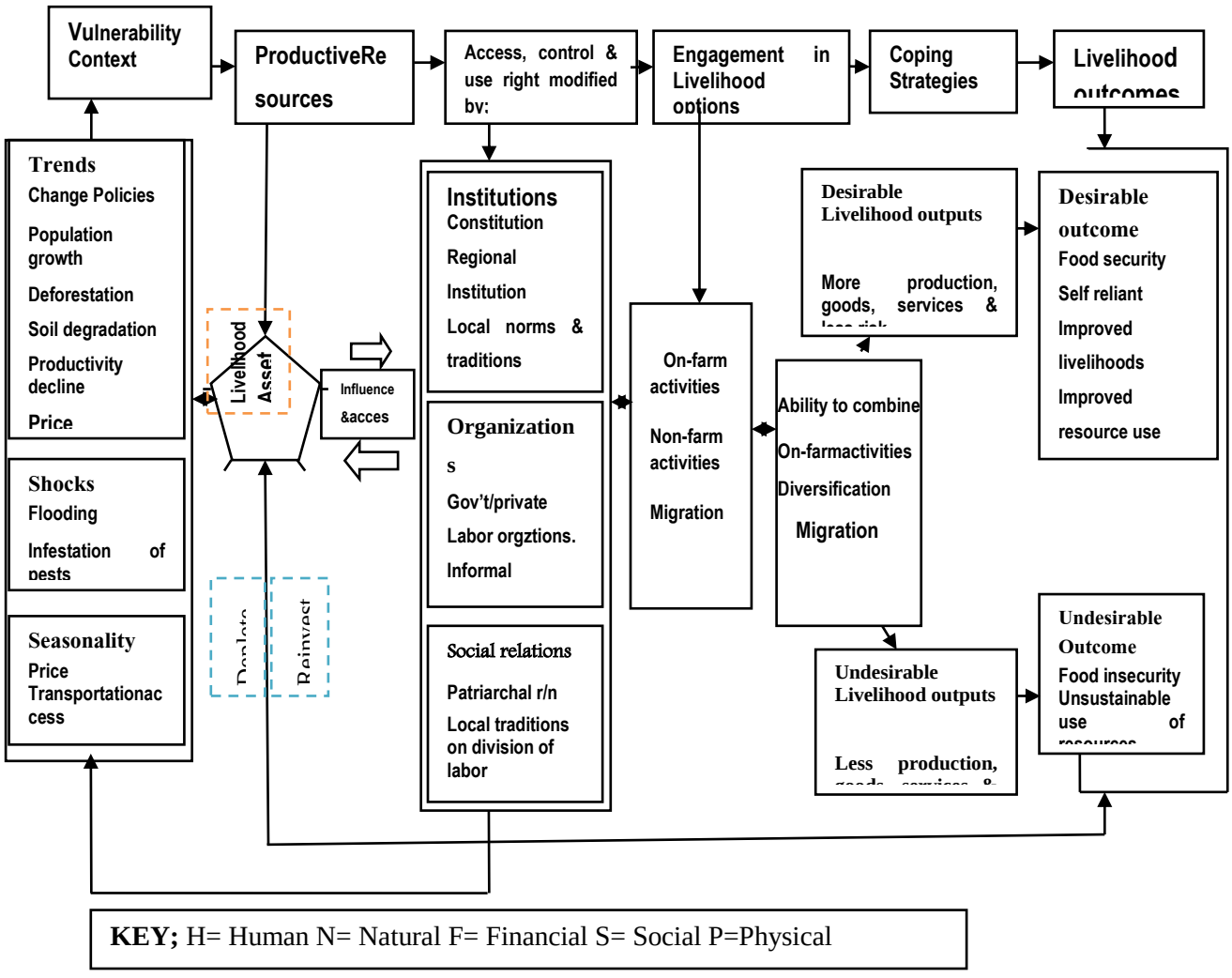
The livelihood assets are categorized according to (FAO & ILO, 2009) into five as natural, physical, financial, human, and social capital. The five capitals identified as livelihood assets are dynamic and change over time in their shape as represented in the asset pentagon in the framework (see Fig. 1) depending on their level of access (Scoones, 1998). Regarding the importance of the different capital, (Krantz, 2001) stated that all assets are [equally] essential to construct and contrive a living for people. But as people are both object and subject of development, the human capital is perhaps the most important one according to (Odero, 2014). People rely for their success on the values of services drawn from this total capital stock.

Natural capitalrefers to the natural resource stocks from which resource and services useful for livelihoods are derived and in particular includes; soil, water, air, genetic resources, flora, forest, wildlife and environmental services (Scoones, 1998, FAO & ILO, 2009). They are biophysical elements which are naturally occurring (Odero, 2014). Some of these capitals resources (soil, vegetation water pasture, firewood, and charcoal) as stated by (Degefa, 2005), are very important

elements on which most rural livelihoods such as; production of crop and livestock husbandry are relying on and the access to which is directly linked to food security of rural households.

Physical capital concerns the manmade assets (FAO & ILO, 2009) which are reproducible goods (Odero, 2014) encompassing basic infrastructure and production equipment and technologies required for the pursuit of any livelihood strategy (Scoones, 1998) either privately owned or provided as public goods. Specifically, this capital; according to (Kollmair & St. Gamper, 2002) include affordable transport, secure shelter and buildings, adequate water supply and sanitation, clean and affordable energy and access to information very much needed to support livelihoods.

Table 2.1: SLF showing capital assets institutions livelihood strategies and outcomes



Source: Adapted from DFID guide sheet 2000

Human capitalthe concept of human capital views human beings (with their productive capabilities) as one of the means and contributing factors (Šlaus & Jacobs, 2011) in sustainable development. It comprises according to the skills, knowledge, nutritional status, ability to labor and good health and physical capability as well as intellectual capabilities for discovery, invention, innovation, and resourcefulness needed for the pursuit of different livelihood strategies (FAO & ILO, 2009, Krantz, 2001). It is from this capital that all the other capitals drive their value, utility and application making it relatively more important in the productivity and sustainability of the other resources (Šlaus & Jacobs, 2011). The human capital is vital in making use of any other type of assets, and its presence at the household level is determined by, household size, skill levels, leadership potential, health status, etc. (Kollmair & St. Gamper, 2002). It is expected that the lack of human capital (both regarding its availability and quality) is among those challenges female-headed households are facing.

Financial capital denotes the financial resources that enable people to adopt different livelihood strategies. Its main sources are available stocks (cash, bank deposit, liquid assets such as livestock and jewelry) and regular inflows of money through labor income, pensions, or other transfers from the state, and remittances (Kollmair & St. Gamper, 2002). Since it is used as a medium of exchange, financial capital is also critical to successfully utilizing other resources (Odero, 2014).

Social capital refers to resources as; networks, social claims, social relations, affiliations and associations upon which people draw when pursuing different livelihood strategies requiring coordinated actions (Scoones, 1998) which in turn increases people's trust and ability to cooperate or membership in more formalized groups and their systems of rules, norms, and sanctions (Kollmair & St. Gamper, 2002). These capitals are an important asset that one can approach upon crisis, enjoyed for its own sake, and leveraged for material gain. Similarly; (Degefa, 2005) argued the important role of this capital in maintaining food security at an individual and household levels. Access to this capital according to (Kollmair & St. Gamper, 2002) is determined by birth, age, gender or caste and may even differ within a household.

Other than the five capitals indicated in the SLF (DFID, 2000), some authors still argue on the existing political capital (FAO & ILO, 2009) and information capital (Odero, 2014) in addition to the five capitals which are increasingly important to achieve a sustainable livelihood. It is documented by (FAO & ILO, 2009) that political capital is not considered as part of social capital, instead it is linked with the ability of households and individual's stock of political capital which will determine their capacity to influence policy and the processes of government and claim rights to assistance during the events of disaster. Though the political capital can be important elements of livelihood assets, it is addressed under transforming structure in sustainable livelihood framework. Information capital too was viewed as social capital. Hence; in this study, only the five capitals shall be considered as indicated in the SLF (Figure: 2.1)

Many studies indicate the existence of high variation among households in accessing the different livelihood capitals and pursuance of varying livelihood strategies. According to (Frank 2009), compared to those in male-headed households, women who head households are extremely disadvantaged and face different constraints in getting access to labor, land, oxen and other [productive] resources as information regarding inputs as well as the actual inputs themselves rarely distributed to them, limited income generating opportunities, lack of training, and face major constraints in obtaining livelihood security through other means.

In general, these assets are important in pursuing different livelihood strategies to ensure food security. According to Ellis, (2007); through livelihood strategies, rural households construct diverse portfolio of assets and activities to improve their standard of living and survive unfavorable conditions. These strategies include framing activities (cropping, livestock rearing, beekeeping), off-farm activities (daily labor work, work for food), and non-farm activities (petty trade, handcrafting, and remittances), which are important to build assets and contribute to welfare improvements of households. In this study, how access to livelihood resources and strategies is determined by the age-old local socio-cultural traditions on the gender of households and its influence on food security of households was investigated. In particular; the study was interested in examining the problem of female-headed households.

2.6. Empirical reviews on food security

2.6.1. Global level

Evidence from many studies by ischolars and international organizations shows that the number of the world population who do not get food in an adequate amount reaches close to one billion. At the target year set for halving the proportion of food insecure people of the world, based on the latest FAO report, the figure remains high at 795 million (FAO, IFAD, WFP, 2015). This figure according to (FAO, 2001) has remained almost constant on such high level from 1997-99. This indicates that food security has been affecting large number of people over longer period.

However, a recent improvement on food security (availability, access, and utilization) is an undeniable fact. According to latest FAO report, most countries have already achieved the target (reducing the proportion of hunger by half at the national level) set by the world food summit and others are close to it. The number of food insecure population has also declined by 10 million from 2014, and the prevalence of undernourishment dropped to 10.9 percent (FAO, IFAD, WFP, 2015). This witness the improvements in global food security. Comprehensive Food Assessments of recent time on 76 low and middle income countries (39 included from Sub Saharan Africa, 22 from Asia, 11 from Latin America and 4 from North Africa) indicates improvement in food security between 2014 and 2015 with the number of food insecure declined by 9% from its 2014 level and the share of food insecure population also projected to fall (United States Department of Agriculture, 2015). Global Food Security Index on the same year confirms the rapid improvements in food security in almost all regions of the world with the highest scores in low income and lower-middle-income countries (DUPONT, 2015).

Nevertheless, problem of food security still remains challenging for the world nations with of course; varying severity, intensity, the number of people affected, and future hopes to overcome the problem. Thus, it is a big concern at global level. Because still, the 795 million people lacking adequate food for an active and healthy life is an unacceptably large number. Taking into consideration, the rise of the total population by 1.9 billion over the same period (FAO IFAD WFP, 2015), the achievement against hunger is not significant when compared to the set target by 1996 world food summit for 2015. As the projection of the Global Food Assessment shows,

the food security of some region where improvements were reported may deteriorate over the next decade with the share of food insecure population to rise to just over 15 percent in 2025 (USDA, 2015).

Many factors are currently challenging food security at the global level. Among the major ones that are constraining the progress of food security (DUPONT, 2015) in almost every region are increasing the volatility of agricultural production and lower urban absorption capacity. Most of the problems of the world food insecurity are attributed to the continuous changes daunting future food security (Barron et al.) rapid demographic change, climate change, economic, markets and governance changes at the global scale, and shocks on our food systems and the agro-ecosystems that are the ultimate sources of food which will compromise world food security (Barron, 2013). What makes the problem of food security worrying is, most of its causes are crosscutting issues and less likely controlled by individual efforts of nations.

Comparatively, the burden of food security is heavier for developing countries because of lack of basic infrastructure complicated by political risks and corruption. It seems the problem of food security of these nations is related to indirect events taking place in other parts of the world. As it can be understood from report of (UNICEF, 2011), recent souring international food prices are derived from expansion of bio-fuel production, high oil prices, exogenous supply shocks, policies on export and taxes, high transportation costs, increasing prices for agricultural inputs, and exchange rate fluctuations all together cause serious negative consequences on developing countries, particularly on those dependent on food imports. These impacted local prices to the extent of threatening the survival, nutritional status, and livelihood of vulnerable populations.

As the issue of food security is critical, attempts have been always there to solve it at the global level, however; to make things worse, some of the measures taken with this regard are not well tuned against the causes underlying the problems. Again, the results of these measures had varying level of benefits to different groups. For instance, some of the approaches designed to solve the problem of food crisis like; (AAI, 2009) the expansion of global supply chains through private investment and trade benefited few companies (distributors, traders and, increasingly, retailers) that control global supply chains of food than the smallholders who most need assistance.

Most marveling is, in addition to the darkest consequences that food insecurity has already caused to human life, regarding health and overall wellbeing, some of the future forecasts also indicate that the problem will be worsening. For instance, according to (Ackello-ogutu & Bahal, 2012), with business as usual, the number of malnourished children under five years in Sub-Saharan Africa is predicted to reach 42 million by 2050. Some scholars and organizations including (Steve Wiggins and Rachel Slater, 2011, FAO, 2003) are also desperate that the problem will be solved either shortly. For instance (FAO, 2003), expressed its worry that, the world may continue to bear the problem of hunger even longer times to come in the future [unknown]. In the words of (Stave and Rachel 2011) "hunger and malnutrition remain a major problem in the 21st century" indicates that ending hunger within short period of time is difficult.

Still, whether the relatively fast decline of hunger and malnutrition which has been observed towards the final years of the world food summit and MDG is because of the many efforts made through campaign by governments of the world states to reach the target, or attained because of the real internal capacity of these states and whether it keeps on until the remaining gap is closed or not is difficult to predict. Information regarding this issue determines the judgment on the fresh data talking about improvements in the world food security.

2.6.2. Africa

As observed from many empirical pieces of literature, the issue of food security in Africa is very critical. It affects approximately 300 million Africans per year on average, while 200 million are chronically food insecure. The average daily calorie intake in one-third of African countries remains below the recommended level and malnutrition in its various forms is chronic and widespread. The situation is exacerbated and results in crises when shocks such as droughts, floods, pests, locust invasion, economic downturns, and conflicts hit households and their livelihood assets (FAO, 2006b). Not only in the proportion of people it affects and large geographical areas it covers, but the food security problem of this continent is also serious in relation to its various dimensions.

In addition to cross-sectional studies and annual reports, some works provide information over a more extended period useful to see how deeply rooted the problem is. Of these works, the national level per capita trend analysis of the last 40 years (in which ten countries are included)

by (FAO, 2006b), indicates that, most countries are close to the food insecurity line with slight recover over the last ten years except counties as Ghana which remained well above the food security line for the previous ten years.

The low availability, access, and utilization of food security in this region can be attributed to many complex factors. Mwaniki related the problem to adverse factors including; weather conditions, farm input investment, decline in soil fertility, rapid population growth, and limited access to agricultural technical assistance, disease infestations (malaria and HIV/AIDS) and climate and the problem of poverty, market and globalization for that of access (Mwaniki, 2006). Similarly; lack of access, inability to pay for imported food and high dependence on vulnerable income sources-agriculture (FAO, 2006a) can be provided as causes of the problem.

In general, in this region, the problem of food security is pervasive. The current situation in terms of the proportion of malnourished people suffering from food shortage is not very much different from what it was in the long past. It was growing at constant rate for the past 15 year's pace (FAO, 2006b) thus less improving.

2.6.2.1. Sub-Sahara

The food security problem in Sub Saharan Africa can be taken as more severe relative to other parts of the world and no case where this region is excluded as an example from reports on food security issues. According to the latest information, just under one in every four people, or 23.2% of the population, is estimated to be undernourished (FAO IFAD WFP, 2015). This shows, despite the present improvements for the continent as a whole, SSA continues to lag (EIU, 2015) behind to meet the hunger target set for 2015.

From assessments on annual basis conducted to learn about the food security status of regions where considerable numbers of states are taken from Africa, by the 2014 evaluation, Sub-Saharan has the lowest regional score in all the measurements used in this assessment such as; affordability, availability and quality and safety categories because of such reasons as; low average incomes, widespread poverty, low agriculture output, political unrest and conflict and a heavy reliance on costly food imports (DUPONT, 2014). From this, it can be understood that there is no aspect of food security with which this part of the continent is better off. In 2015; the

year which was designated to meet hunger target of (1996 Food Summit and MDG), Sub Saharan Africa is labeled as (USDA, 2015) the most vulnerable region in the world with; the lowest per capita consumption levels, hosting more than half of the food-insecure population and about 30% of food insecure in Africa. Countries of (SSA) whose malnutrition figure is less than 30 percent account only for less than 50 percent. This situation is still increasing in some of these countries such as Mali, despite economic growth and sufficient aggregate availability of food (EIU, 2014). Thus; it can be noted that economic growth (GDP) alone is not adequate to ensure food security. This is easily observed from overall food production in Sub Saharan Africa which remains almost 20 percent below the levels of the early 1970s in per-capita terms (FAO, 2006b) and according to Hilderink et al. (2012), there is about 50% gap between potential and actual crop yields for some staples in many countries affecting the availability of food production.

Apart from the current status, the food security of this region is less predictable to cope with the changes undergoing in the region. Based on what (PBL Netherlands Environmental Assessment Agency, 2012, Ringler, 2010) indicate, the total food required to meet the need of the growing population (1.7 billion by 2050,) in the region and relatively high-income growth and diversified diets do not match each other. In addition to these, Ringler and his collogues also emphasized on the challenge imposed on food security of this region from; the weak environmental conditions as; land degradation, water scarcity, climate particularly in the arid and semi-arid areas of sub-Saharan Africa together with high poverty.

In a similar way, the persistent food insecurity (availability, access, and utilization) of this region is linked to many interrelated causes reported by (Matshe, 2009) as; absence of credit facilities, little or no access to supplementary irrigation, insecure land tenure rights, low income, and low educational attainment of mothers particularly in rural areas Africa. All these pieces of evidence confirm that the problem is endemic to the region and often unfold as triggered by fewer alterations in price, whether and political situations.

2.6.2.2. Ethiopian Case

Food insecurity in Ethiopia has a long history. There are plenty of works ranging from the older information regarding famine based on historical accounts to that of empirical studies. The former ones are largely based on data of deaths of people, livestock, crop failure and other

disasters reported by different sources after the end of such events while the latter (since the mid of the 1990s) are based on scientific approaches. Both confirm the tenaciousness of the problem.

From studies carried for the past two decades; we can see the persistence of food insecurity problem in Ethiopia to this date. For instance, in 1995, fifty-seven million people; virtually the entire country were estimated to be food insecure, and this remained so until the mid of 2000 USDA, 2015). The same period was reported by (Devereux, 2000b) as catastrophic. Within five years, according to this author, the number of population in need of food assistance has increased from 2.7 million in 1996 to 7.7 million in 2000 with the food aid increased from 262000 metric tons to 896936 respectively. Evidence in this study is mainly based on the size of people who were in need of food assistance which may underestimate the problem as some affected people may not be reported or exaggerate the number as food secure ones may be receiving aid because it is free. Beyond such accounts (through history and practical research), the painful 1984/85 famine catastrophes happened to Ethiopia is still fresh memory of the people.

Recent reports fom FAO, IFAD, and WFP (2015) indicate improvements in the food security situation in Ethiopia with the achievement of MDG 1c hunger target. Similarly, (USDA, 2015) confirms such improvements since 2000 with the share of food-insecure people reduced to 30 percent in 2015. In relation to the persistence of the problem, (Devereux, 2000b) argues that the impact of the impressive [economic] growth that Ethiopia achieved since the 1990s is negligible on food security and also limited on poverty which overlaps with food security. The improvement may seem better when viewed in relation to the status of the country in the late 1990s and early 2000 but still a lot to be done. Thus, rather than the figure of food insecure at national level, researches need to answer why the problem persists against high economic growth and what the problem seems local.

Concerning its causes, studies show numerous factors contributing to the nagging food security problems in Ethiopia. Drought, degradation of soil, low use of inputs, and others are frequently mentioned in most of the food security of this country (Nigussie & Alemayehu, 2013, Endalew et al., 2015). For instance, (Devereux, 2000b) argues that the household food insecurity [problem] in Ethiopia primarily emanates from the performance of agriculture characterized by high variability and unpredictability mainly due to erratic weather conditions. Likewise, this

author associated the hunger which affected the northern part of the country in 1984/5, 1987/8, 1990/2, 1993/4, and southern Ethiopia in the 1990s with such factors. Still, when viewed at a glance, the recent history of famines in Ethiopia (the 1970s and 1980's), particularly in Tigray and Wollo (which were producing 40% of food in the country before the occurrence of the famine in 1973), seem to be triggered by bad weather conditions.

Other research aimed at the Horn of Africa by (Béné, Devereux, & Sabates-wheeler, 2012) taking panel data (from 2006 and 2008) of rural households from eight woredas where PSNP has been implemented in Ethiopia were included, identified drought as the predominant factor followed by crop failure. This study also indicated other shocks such as; death of family members, crop theft, disability, and a split of a family member are still important factors to affect food security and wellbeing of households but with low prevalence. It is known that drought is recurrent in Ethiopia but is not permanent. The effect of drought is complicated when compounded by other factors which affect the livelihood of households. In the same way, (Vadala, 2008) argues, though it is easy to realize that natural disasters decrease the food available in a particular region, the explanation on food insecurity as caused solely by this factor is only a partial explanation.

The consequence of food insecurity as caused by natural disasters including drought is not equal on all victims. For instance; studies by (Nigussie & Alemayehu, 2013, Zemedu & Mesfin, 2014) indicate that women in general and female-headed households are more severely affected by the problem. According to (Vadala, 2008) why always such 'disasters' affect selected classes in society (when the natural disasters as drought occur) can be [more] explained by entitlement failures which are thus a policy matter. According to this author, still, the inadequate attention to famine prevention is evidenced by the general inclination of the government policy towards the production of cash crops for export. Thus study by (Béné et al., 2012) though used a panel data but has narrowly focused on drought in the case of four woredas tried less to make the work representative.

Similarly, (Keller, 1992) relates the underlying causes of the famine problem of this period with the mismanagement of the famine because of ineffective regime of Haile Selassie I which was characterized by ethnic and regional inequalities and Derg's ill-conceived (revolutionary)

policies which went as far as using food obtained from relief agencies as weapon of war. In support of this, a study by (Devereux, 2000b) also reveals that these food security situations were worsened by civil conflict and militarization which exacerbated the drought by inhibiting traders and government and donor responses against the harvest failure. Though management of famine once it happens is important element in food security but is not sufficient. Because, the exploitative land tenure system, the agricultural policies and other mechanisms required in preventing famine before it happens are equally important.

In a research work, (Degefa, 2005) has employed Sustainable Livelihood Framework to holistically capture livelihoods, poverty and food security of the study households. Though it was on smaller communities and still in the famine-prone regions, it is among the few types of research that have used such a broader approach in studying food security in Ethiopia. In this study, the researcher has followed a holistic approach to investigate how various factors (social, economic, political and environmental factors) interact to affect availability and access of households' food security. Methodologically, he employed different qualitative approaches such as perceptions of the households, and feelings about their food security. Still being important to study the topic; however as some of the qualitative information deal with the problem over the past several years, may be subject to accuracy problem because of recall. Moreover; though difficult to accurately judge the case in the study communities, but for some cultural reasons and expectations, people may be less overtly to express out about their household /domestic issues such as food. Subjective food security approach also proves the same thing that, people who live in the environment where food insecurity is persistent do not openly express their food insecurity which the researcher himself has also included in his field encounters that some informants were doubtful when providing information while others were faded up of giving information. Still, a survey data from only two communities Erenssa and Garbi (from kebeles near to each other) was combined with historical records of different times about famine in Ethiopia to be generalized for objectives dealing on food security at national level. Finally, most of the historical accounts used in the research were written by historians on famine and talk about its magnitude concerning the number of death, area affected, causes and its political consequences and little touch the different aspects of food security.

Another review was done on research work by (Abate& Tessfaye, 2015). This study attempts to identify the roles that women play to ensure livelihoods and sustainable food security. In doing so, the frequency of feeding per day, and dietary composition of food taken by women were analyzed using a percentage of responses. Additionally, vulnerability of women to famine/food insecurity was also assessed simply based on qualitative data. The researchers have found that women play important roles in the production of food, but they are vulnerable to food insecurity.

However, the findings (roles, food insecurity and vulnerability) are based only on descriptive analysis. The authors failed at least to relate the inquiry with those common factors that constrain women to ensure their food security such as access to the productive resources as land, credit, inputs, labor, and others. They also did not use any model in the analysis of vulnerability. The categorization of households into vulnerable and non-vulnerable was simply based on response to items like; "if they are affected by drought or not." The concept of vulnerability was not clearly understood which can be observed from the phrase "breastfeeding, pregnancy, and workload" that the authors identified as causes for women's vulnerability to famine as. All these indicate inadequate methodological approach used to study such a complex topic "livelihood and sustainable food security" combined. There was also no point included in the body of the research on "sustainable food security" other than in the topic. The result of the study which indicates that women have limited access to the dietary composition of nutritional meals in the study area is not based on data generated for the same purpose using appropriate tool- dietary diversity.

A study by Wali and Penporn (Wali & Janekarnkij, 2013) is also reviewed. In their attempt to identify the determinants of rural household food security in the Jigjiga district, the researchers have employed a logistic regression model commonly used in other researches for a similar purpose. There is no question on the capacity of this model to serve such purpose. Still, it is common practice that, in most studies concerning food security, factors that underlay the problem/determinants are always part of such activities. What these researchers have done in their endeavor to study the issue among the rural households of Jijjiga is also the same.

But, the work still lacks element of rigorousness as it is limited only to the determinants. Various problems may restrict the access and utilization of the different productive resources should have

been touched by this study. The calorie energy requirement of household based on 24 hours recall period alone used in this research to assess food security of households is still not adequate to study food security in such areas compounded by an arid and semi-arid environment, poor infrastructure and other economic factors. This is because this tool captures only the static aspect of the issue. In addition to this, using households past 24 hours consumption alone is not sufficient as people may go hungry not to sell their productive assets.

Regarding this; (Vadala, 2009a) argues that it is difficult to identify a single factor to explain the occurrence of famine in Ethiopia. In relation to its causes, natural disasters or population pressure can be one factor as easily realized when droughts decrease the food available in a particular region but provide only a partial explanation. According to this author, in Ethiopia, the problem of famine always faced by selected classes in society while there is enough food at the national level is instead better explained by entitlement failures and policies.

The study also ended up with recommending the government's Agricultural Development-led Industrialization activity in the district to strengthen the rural credit services, agricultural input supply, extension services, animal health services, and rural income generation activities. But data on nature, status, and factors constraining credit, health, extension services, and rural income generation were not included in the analysis of the study.

The study by (Mcbriarty, 2011) who has carried his inquiry as a voluntary intern in the "Chronically Food Insecure Rural Women Program Design Team," under CARE Ethiopia entitled is also part of empirical works consulted for this study. This work was carried out in two zones in Ethiopia; south Gondar and West Hararghe, where the program has been implemented. McBriarty used subjective measures than the traditional techniques employed by most researchers in the field of food security. Though the main participants of the research are women in general, the researcher has also tried to look with due attention to the problem as felt by female-headed households. This is a strong positive side of the study which most empirical studies on women lack. The researcher has also tried to make the work comprehensive by including a range of factors which may affect the food security of women.

Though it is obvious in Ethiopia that, women, in general, have lesser access and control of productive resources; the relationship between women's livelihood resources and food security is not explored. The food security issues of women (those who are in the male and female-headed households) should have been disaggregated.

Similarly; as understood from the title, it was expected that, in the findings of this work, the participants should be identified into food secure and insecure ones with proportion (percentage). But the information on what portion of the participants face the problem is not explicitly addressed. The status of the participant's food security is based on sixteen case studies based on an in-depth interview; by taking eight from each zone. This makes the analysis on determinants of the problem weaker. In addition to this, only two zones; South Gondar zone from Amahara region and West Haraghe from Oromia region were taken to represent all regions of Ethiopia. Other than the narrow sample frame, the study is also dominantly qualitative to be generalized for the whole country. All these accounts for the less reliability of the result from the study.

Other empirical work on food security reviewed in this work is the one carried by Workneh (Workneh, 2004). In this work, apart from the kilocalorie energy requirement, the researcher has also has tried to look into wider aspects underlying food (in)security as; resource endowments, institutions, technology, agro-ecology (Belg growers, Meher growers, and Belg and Meher growers), off-farm income, remittance and other things which together make the study more comprehensive. Unlike most of the studies on food security, the researcher has also used "panel" data generated between mid of December 2000 to middle of June 2001. Case studies from both food secure and insecure households were also presented. In doing so, the researcher has tried to approach the multifaceted food security.

But the work is not without weak points. Though the study has included data on (household size, gender of household head, age of the household heads, literacy status of household heads, religion and ethnicity) that determine the food security of households, the effect (either positive or negative) of all these demographic variables on food security of the participants is not included in the analysis. Rather; the work emphasized largely on resource endowments (size of cultivated land, off-farm cash income, labor units, and oxen) and agro-ecologies. Some of these data were descriptively analyzed and compared among the study kebeles.

To sum up; some studies used single measurement such as kilocalorie and thus insufficient to capture the complexity in measuring food security. This measurement is also static and cannot give information on food security situations of households immediately before and after the study time. Still, most of the studies see the problem of these disadvantaged groups (female-headed) combined with male-headed households. For instance, (Abate& Tessfaye, 2015) have combined data obtained from women in male-headed households and female-headed ones to study the problem of food security of women. But such data would yield unrealistic picture of the problem. These works failed to separately look into the issue of female-headed households-who struggle to ensure food security of the household without support from their husband. In particular, they overlooked this problem as felt by this group inhabiting less famine prone/food insecure areas.

In a given study on food security, it is difficult to address every aspect related to the subject. What can be observed from the few works reviewed here is the same. All the works have their methodologies, sites, size of samples, purpose, scope and resources (time and finance) available with which they have tried to address their stated objectives. Some of the works attempt to generalize their findings obtained from very smaller areas to the food security issue at the national level which has also danger as the recommendation from such results will lead to misguided policy interventions. For the findings of such studies to be representative and generalized over large areas, adequate data should be taken concerning the diversified agro-ecology and lifestyle of the people.

With few exceptions, most of the studies focus on the general community and household level unit of analysis at places where the problem of food security is acute and faced by the mass and none has examined the issue in terms of access to livelihood assets and food security on female-headed households in areas having less environmental and food security problem as a region. These studies failed to pick the case of certain groups of the society likefemale-headed households who live in food secure society/where food security problem is less but are affected by food insecurity which is not faced by the Wlarger community.

The need for studying food security in Sasiga

Sasiga, the study district, is located in southwestern parts of Ethiopia which is evergreen and also remained free from the famines that hit other parts of the country at different times. With their sparsely populated and large areas of uncultivated land, they have rather sought an ideal place to relocate the famine-affected populations implemented through a series of resettlement programs during the 1980s and 2000s. It has been perceived as the home of surplus production. However, still the few available studies on the topic of food security conducted in neighboring districts and zones of the study area such as; Jimma zone, Belo Jigenfoyi, and Gobu Sayo by (Birara, Mequanint, & Samuel, 2015, Guyu, 2015, and Getu, Dessalegn, & Habtamu, 2014) show the existence of food insecurity and malnutrition resulting from multifaceted social, economic and political than drought which have been commonly cited as factors that cause of food insecurity in the prone areas mentioned in most of previous studies.

Though it could not catch the attention of researchers and policy makers mainly because; there is no drought in the region, and the problem did not affect the mass and also deceived by the evergreen vegetation and adequate rainfall, the food security problem is critical mainly among a particular group of society as; female-headed households. Thus; the central argument of this study is; food security and livelihood of households is determined not by availability of natural resources alone but also by trends, access to livelihood assets (capitals) such as; social capital, financial capital, human capital, and presence of local institutions important to pursue different activities as a livelihood strategies.

Specific information is lacking on how factors such as farming skills, entering into a contract on farm activities with others because of local traditions/culture determine female-headed households human capital, social capital. These things are challenging for female farmers as they are traditionally viewed as a male's role. In the study area, because of local traditions, female-headed households are "restricted" to perform some agricultural activities, particularly; plowing land using oxen, and some activities of livelihoods and diversification such as; traditional beehive, hunting and seasonally migration and also participate in some labor activities. This demands a study to understand how these things may affect female-headed household's food security.

Households pursue various economic activities within and outside agriculture as their livelihood strategies. Diversification is important to increase sources of household income and also mechanism to reduce risks. In line with this; several shreds of evidence indicate dependence on limited livelihoods is frequently mentioned for the deteriorated food security in the country. For instance, according to (Devereux, 2000b), food insecurity in Ethiopia is directly derived from reliance on undiversified livelihood which is based on low input, low output rain-fed agriculture and extremely low human capital being intensified by the adverse synergies created between poor education, health and nutrition status, and low labor productivity.

Although, those mentioned above and various other factors constrain female-headed households' food security and improved wellbeing, in Ethiopia, previous studies even in the intensively studied areas either ignored or gave little attention to these groups. Still, those studies have abundantly adapted community and general household level unit of analysis as an approach to studying the issue. There were very few studies on certain groups of societies as female-headed households, youth, tribes and others who face challenges in accessing resources required for their food security. Thus, despite the existence of many empirical literatures on food security in Ethiopia, evidence related to this section of the society; particularly away from areas supposed to be food insecure are almost nonexistent.

Therefore; this research is to inquire, the status of food security of female-headed households, what factors are affecting the food insecurity of these groups of the societies? How are resources accessed? What are livelihood opportunities available for them? How their participation in different livelihood strategies are restricted? And how do they make use of local institutions? Concerning this, studies at such smaller units such as female-headed households are necessitated to have a practical experience on the food security situation of this group of societies in the district which will be used to find feasible contextual solutions based on informed policy decisions for the problem.

Finally, this study confronts the trends of confining food security studies in certain contexts of environmental degradations like draught and limited corners of the country termed as; famine-prone areas. Rather; because of the complex underlying factors (social, economic, cultural)affecting availability, access, and utilization of food under different local contexts, the

subject needs to be examined including in areas where it is less widespread but still affecting some disadvantaged group of the society such as female-headed households.

Most of the studies on food security problems in Ethiopia seem to focus on environmental issues such as degradation of soil, drought, flood, crop failure, and other factors. The less rationality of natural hazards as a causal factor for food insecurity is also supported by only a few researchers on Ethiopian food security such as (Degefa, 2005). This author argues that, though natural hazards are [always] there working against food security, argues that, the contemporary famine are mainly due to human failure. This is because, according to him, with the existence of better knowledge of such hazards, the disasters they cause could be overcome or managed by putting relevant policies and strategies.

Many evidences can be mentioned that the problem of food security in Ethiopia also lies outside the "degradation school of thought" indicated in (Degefa, 2005). For instance, according to Yishak et al.(2014), farmers' choice of the most remunerative livelihood strategies such as; on-farm alone, farm and non- farm, farm and off-farm, and farm, nonfarm and off-farm are important in shaping their food security. From this, it can be confirmed that basing food security inquiries on livelihoods of households than specific factors such as livestock, land, inputs, and others is appropriate.

Hence this study was to counter this lacuna in the study of food security by investigating how female-headed households living in a production self-sufficient and resource endowed areas access these productive resources compared to male-headed households? What hinders their access to these resources and How far they can utilize the resources they can access? Does equal access to the various productive resources (different livelihood capitals) enable female-headed households to pursue multiple strategies which are adopted by male-headed households and yield similar outcome for them? What is the role of local institutions in the livelihood and food security of female-headed household? What implication do unsupportive local institutions have on food security of female-headed households? mechanisms by which female-headed households cope with a shortage of food should have been answered to this date at least by some of these studies.

Chapter Three

Methodology and Study Site Setting

3.1. Introduction

In this chapter, the methods used in the process of undertaking the study; starting from the research design to that of analysis were briefly explained. The selection of methodology used in the generation and interpretation of data was guided by SLF which was adopted both as a theoretical and analytical framework. Some biophysical characteristics and socio-economic features were described.

3.2. Setting of the study area

3.2.1. East Wollega Zone

The study was conducted in Sasigga District, found in East Wollega zone of Oromia National regional state. This zone is situated in southwestern Ethiopia bordered by regional administrative states of Amahara in the north, Benishangul Gumuz in the northwest, Illu-Ababr in the southwest, Jimma in the south, Western Showa in the east. Most of the tributaries of Nile originate and cut through the deep gorges of this zone. It has high latitude (*dega*), mid-latitude (*woyna-dega*) and low altitude (*qolla*) agro-ecological zones. It is found in the evergreen region of western Ethiopia with adequate rainfall received in one rainy season and endowed with natural resources like rivers, forest, and soil conducive for production of crops. Mixed smallholder farming is the primary economic activity practiced in this zone.

East Wollega zone has once been part of the former Wollega province which includes the present administrative zones of Kellam Wollega, West Wollega, East Wollega, and Horro Guduru Wollega. This zone once had vast agricultural land with less population density and had been hosting many state-sponsored and self-initiated population resettlements since the 1950s to recent time. Only to mention a few of the recent resettlement, according to (Masresha & Mberengwa, 2013) between 1980 and 1985 alone, people who make up twenty-five *kebeles* were resettled in Anger-Gute resettlement site alone which is the biggest and one of the oldest resettlements site in East Wallaga zone. In addition to this, East Wollega also served as a

potential area for commercial farming, and hence, some mechanized farming activities were established during the *Derg* regime.

In general, though the natural resources the zone has high potential for agricultural production, food insecurity has been frequently occurring in some of the districts. Information obtained from the zone Agriculture and Rural Development officials show that some districts periodically face food security problems. Sasiga district was mentioned as one of these districts which face this problem.

3.2.2. Sasigga District

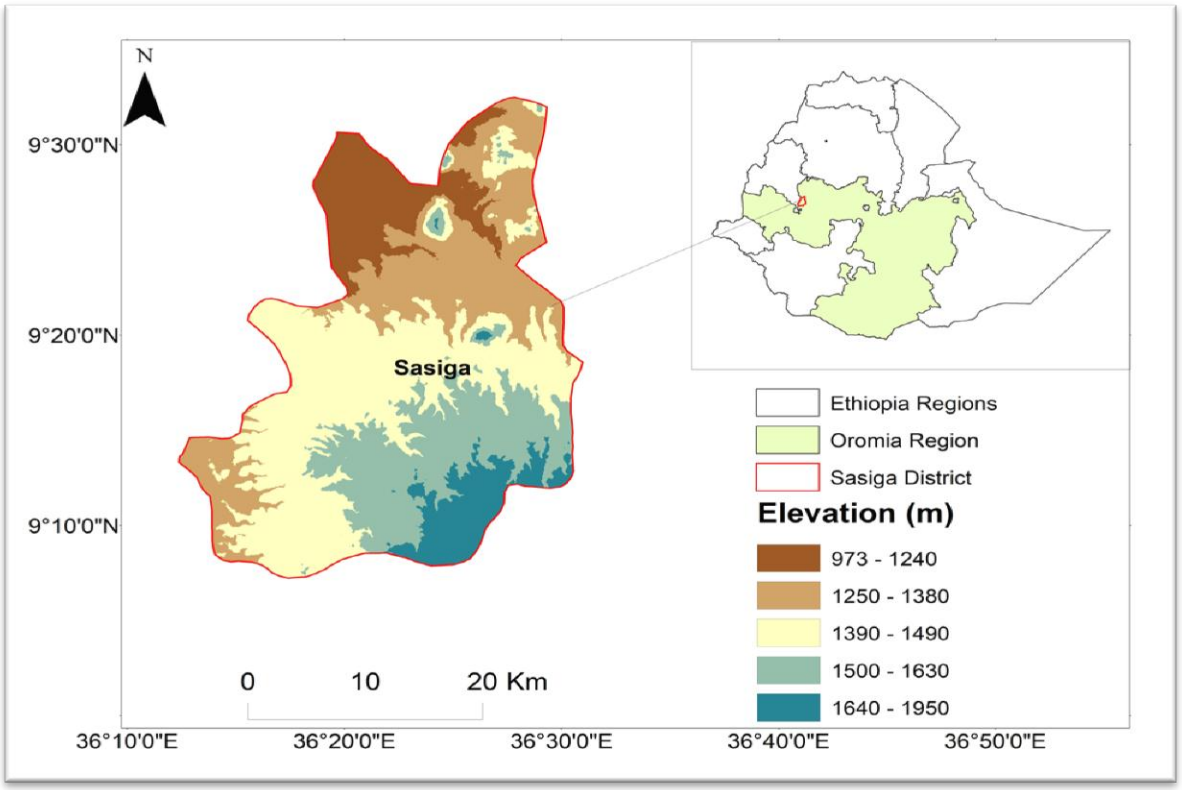
Sasigga is one of the eighteen districts found in East Wollega administrative zone. Its capital is located 18 km from Nekemt, the capital of the zone and 356 km from Addis Ababa in the southwestern direction. It has a total area of 947.52 km2 and 27 rural *kebeles* administrations and one urban kebele. Astronomically, the District lies between 9010` N, 9030`N latitude and 36010` and 36030 E longitude (Fig. 2) and bordered by districts of Limmu in the North, Guto Gidda in the East, Digga in south (all found in East Wollega zone) and Balo Jigenfoy district of Benishangul Gumuz national regional state in the northwest (SDPEDO, 2013). The altitude ranges from 973 to 1950 masl (meters above sea level). Hence, the topography is generally characterized by undulating land surface while the remaining lowland parts found near to Anger and Didessa river valleys have a gentle topography with small altitudinal range.

Sasiga District has been a land of an abundant natural resource. Information obtained from key informants, community leaders, and elders indicates the presence of a large area of agricultural land. Because of the old age local traditions which treat male and females unequal, such abundant of resources as land has been controlled by men. Making use of these resources by women depends on males. Women use their land (to produce agricultural products) either when it is worked on by their husbands or by sharecropping/renting it out to get only part of its produce/with the absence of male labor/ when they are heading their house by themselves.

Two agro-ecologic zones characterize the district. Of these, temperate climate humid zone locally known as "*bad-dare*" accounts for 57% while a tropical climate "*gamojji*" accounts for

the remaining 43% (SDPEDO, 2015). The rainfall pattern in Sasigga is uni-modal with longer (nearly eight months) rainy season with the heaviest (locally known as *ganna*) between June and August and light ones from March to May (locally known as *arfasaa*) and September to November (locally known as *birraa*).

Figure 3.1: The Location of Sasiga District in Oromia region and Ethiopia



SOURCE:Constructed by the researcher using GIS data (2016)

Being located in the southwestern region of Ethiopia, it has annual rainfall ranging between 800 mm to 1200 and the mean temperature varying between 250^0c–300^0c. It is also endowed with many rivers with high volume of discharge such as, Kersa, Gumbi, Haro, Didiga, Koho, Bege Adiya, Gerersa, Akeya, and Adi which drain into Anger and Dhidhessa rivers (SDPEDO, 2013) which the tributaries of Blue Nile. Despite the more extended rainfall, the farming households use only one growing season except for production of crops through small scale irrigation.

Based on the 2007 population and housing census, Sasigga district has a total population of 98,114 with a crude population density of 100 persons per km^2 of this total population 95,455 (97%) were rural, and 2,659 (3%) were urban. Regarding sex, 55239 were male while 42875 were females. Still, when seen in age composition, the age group 15-64 is the highest which accounts for 78,491 followed by the age groups 0-14 and old age (65 and above) which are 14,715 and 4,908 respectively (SDPEDO, 2013).

Of course, the current population size is the result of the high population dynamics which has happened following the establishment of the state farm and the period that followed its dissolution. Majority of the current inhabitants of the lowland *kebels* of the district are immigrants who (previously recruited by the government from different urban areas of the country) as a worker in the state farm who later permanently settled as farm households by occupying areas surrounding the former camps of the state farm after its dissolution. The second wave of settlement was 2003 through which the regional government settled a large number of households from Hararge (come from the same region). Still, a large number of self-initiated immigrants from neighboring *kebeles* of the district has also settled using the loose control of the local administrations.

The livelihood system of the district is dominantly agricultural (mixed farming) which is practiced as the primary source income for the population of the district. The diverse agro-ecological condition enables the production of a variety of crops such as, pulses, oilseeds, vegetables, root crops, spices, and fruits are grown on a subsistence basis. Sesame, haricot beans and coffee are cash crops grown in the district. Very recently, *chat* is also being introduced by settlers from Hararghe. But the mode of agricultural production is traditional, characterized by low capital investments and technologies- few productivity enhancement inputs (chemical fertilizer, improved seed, and weed and pesticides) as the most critical factors of production. Small scale and traditional irrigations are also used to grow some crops.

Raising cattle is also a vital livelihood activity and an indicator of wealth. There is a large population of livestock traditionally reared as a source of food (meat & milk), transport, manure, draft power, and cash income. Of the various livestock raised in the district are cows (88,619), mules (85), donkeys (5909), sheep (7964), goats (10568) and horses (5). The benefits people get

from the large livestock population is compromised by widespread livestock disease (anthrax, brucellosis, pasteurellosis, impanossomosis, and external and internal parasites) (SDPEDO, 2013). The local cultural tradition which gives more values to the number of heads of livestock than its quality is also another factor which negatively affects the contribution of livestock to the livelihood of the households. In addition to agriculture, some off-farm activities are also carried to supplement income from agriculture. Wage labor on others farm, handcraft, mining, petty trading, and others are taken mostly by resource-poor people.

A couple of reasons influenced the selection of Sasiga as the study area for this research. In the first place, though the region is generally perceived as food secure, mostly being deceived by its evergreen environment, but few studies (Guyu, 2014) in Balo Jaganfoy-Benishangul Gumuz, (Mequanent, Birara, & Tesfalem, 2014) in Jimma zone and (Getu et al., 2014) in Gobu Sayo of Eastern Wollega) show the prevalence of the problem in the southwestern region of Ethiopia. Secondly, some studies also show that Sasiga is one of the districts found in East Wollega zone facing a severe challenge in agricultural production because of soil acidity, degradation, termite infestation (Abdenna, 2013 and Abdenna, Bikila, Hirpa, 2013) resulting in the problem of food security. These factors were among the ones which influenced the researcher to undertake the study to the less researched southwestern part of Ethiopia with the pretext of less incidence of food security.

In addition to this, to the knowledge of the researcher, there is no rigorous study conducted in the district and established information on the food security situation, at least for female-headed households who are disadvantaged groups. Hence, an inquiry regarding the issue under study is imperative. With this, the central argument of the researcher is that a study on the status and causes of food security of rural farming households (mainly female-headed) amidst evergreen environment should get the attention of researchers equally with those who live in areas subjected to food insecurity problems in Ethiopia. These were seen as sufficient grounds to motivate the researcher to research this study area.

The district of Sasigga was, therefore; purposively selected based on information obtained from the zone agriculture and rural development office regarding the incidences of food security and other problems which affect agricultural productivity. Finding from studies conducted by Guyu,

(2016) in the surrounding district of Balo Jigenfoy and information obtained from (FHI), an NGO' having a project related with food security in the district were also important. The researcher's own experience on the food insecurity of female-headed households, because of less access and control of productive resources, obtained through exposure to many of the districts in the zone including Sasigga while participating (as the staff of Wollega University) in community service to local farming community members is also used.

3.3. Philosophical foundation for the research

Philosophical foundation in a research process is a philosophy and claims that researchers adopt concerning their worldview assumptions that underpin the research strategy and the methods they choose as part of such an approach. This philosophical worldview assumption is a fundamental constituent in guiding the selection of the research design related to this worldview and the specific methods or procedures of research that translate the approaches into practice. Creswell, (2003) has identified four schools of thought about knowledge claims namely, post-positivism, constructivism, advocacy, participatory, and pragmatism. Positivism[1] argues how the relationship between the researcher and the social world (the subject of the research) and the issues of the study are to be measured. It is a theoretical perspective closely linked to objectivism while Social constructionism[2] claims that knowledge is constructed through social interaction. The pragmatism school of thought which was used in this study is briefly highlighted as follows:

Pragmatism: this knowledge claim applies to mixed methods in that when engaging in research activities, researchers are free to draw from both quantitative and qualitative assumptions and the methods, techniques, and procedures of research that best meet their needs and purposes. Unlike the post-positivism, in pragmatism, the truth is what works at the time and not based on a strict dualism between the mind and reality completely independent of each other. Thus, investigators can use in combination both quantitative and qualitative data because they work to provide the

[1]At the center of this philosophy is an assumption which asserts quoting the social world exists externally to the researcher, and that its properties can be measured directly through observation (Gray, 2003).

[2]It asserts that subjects construct their meaning in different ways even about the same phenomenon. Hence, multiple, contradictory but equally valid accounts of the world can exist because of individuals varying views about the same world (Gray, 2013, Creswell, 2003).

best understanding of a research problem. The followers of this paradigm also argue that research activities take place in social, historical, political, and other contexts and in this way, mixed method studies may include a postmodern turn, a theoretical lens that is reflexive of social justice and political aims (Creswell, 2003).

Generally, regarding the choice of research philosophy, pragmatism lets researchers to decide on their own which philosophical stance they will choose out of the different philosophies, the option which is of course influenced by a number of factors including their views, the resources at their disposal, the nature of the problem to be researched and many other factors. Likewise, in the present research, pragmatism was adopted to reconcile/suit the combined use of positivist and social constructivist philosophies, which underpins the mixed (quantitative and qualitative) method.

3.4. Research methods

In conducting research, there are three sets of methods to be employed by researchers. These are, quantitative, qualitative and mixed where the two are combined. The choice among these different research approaches, according to Gray, (2003) is determined by a combination of several factors. This author noted that selecting from the different methods is influenced by whether it is possible (desirable) for the researcher (based on his/her research topic) to measure an objective reality. The generalizability of such truth to a larger population or whether the real world cannot be measured in this way and instead needs full descriptions based on qualitative data. Alternatively, elements of both methods might also be adopted.

Mixed research is a method which involves combining various methods in single research work or a set of related works. As defined in Onwuegbuzie & Collins, (2007), it is the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study. It is a recent development in the social and behavioral sciences commenced by researchers and methodologists who believe qualitative and quantitative methods are useful in addressing research questions better (Johnson et al., 2007).

In expressing about the benefit of this approach Antwi, Hamza, Polytechnic, & Polytechnic, (2015) argue that using only quantitative research or only qualitative research approach in undertaking research is accepted as limiting and incomplete. According to these authors, the appropriate mix depends on the research questions and the situational and practical issues facing a researcher. The utility and importance of mixed approach go beyond the quantitative versus qualitative arguments. This is because according to the justification of Johnson & Onwuegbuzie (2004) the goal of mixed method research is not to replace either of these approaches but rather to draw from strengths and minimize the weaknesses of both in single research studies and across studies. Hence, a mixed approach can be viewed as reconciliation between the quantitative and qualitative approaches to yield more result than when they are used independently and compete for the domination in the field of inquiries.

In the present research, a mixed method which combines quantitative and qualitative research approaches was employed to make use of the many advantages of it including according to (Johnson & Onwuegbuzie, 2004b) comprehensiveness and also suitability to the pragmatic philosophy. The selection was based on the importance of the approach in relation to the complex (both quantitative and qualitative) nature of the measurement of food security. It was adapted with the assumption to minimize the weakness of using a single approach to capture both quantitative and qualitative information that are required to achieve the objectives identified to address food security and livelihood strategies of female-headed households. Concerning the sequence of the qualitative and quantitative methods in the process of the research, as suggested by (Antwi et al., 2015), there are, of course, different possibilities to either conduct the qualitative and quantitative parts of research concurrently or sequentially one after the other. In this case, major part of both quantitative and qualitative data was generated simultaneously. But some additional qualitative data was also collected after the end of survey.

3.4.1. Sampling technique

Several factors influence the selection of sample in research. Concerning this, Israel, (2013 & 2015) described the level of precision, level of confidence or risk, and the degree of variability in the attributes being measured in addition to the purpose of the study and population size as criteria to determine the appropriate sample size. Regarding the various approaches in sampling,

this author states, sample size for a given study can be determined using census (for small populations), reproducing a sample size of similar studies and use of published tables which recommends 398 samples out of 100,000 and 400 for a large population (greater than 100,000) at ±5% level of precision, 95% confidence level and P=0.5. Citing Yamane (1967) the same source also identified a simplified formula to be used to calculate sample sizes (where 95% confidence level and P = .5 (Israel 2013) are assumed as follows:

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

Where n is the sample size, N the total population size, and e the level of precision.
Accordingly, the total sample for this study was determined by applying the following formula to the total rural population of Sasigga district (the target of the study) which was 95455 (SDPEDO, 2013).

$n = \frac{N = Number\ of\ rural\ households = 15909.1667}{1 + N = Number\ of\ rural\ households = 15909.1667\ (.05)2}$ = 390 households out of which male and female-headed households were selected proportionally.

The 15909 (sampling frame), the total rural households out of which 390 samples were selected from was obtained by dividing 95455 the total rural population of the district by the average household size in Ethiopia which is 6. Since this figure was less than 100,000, using either the published table or the formula yields nearly the same results.

Once the district was purposively selected, and the size of the sample was determined with its total population, a mixed multistage sampling technique was employed to select households for the quantitative data to be generated through structured survey questionnaires. In the first stage, the rural kebeles were categorized in relation to their food security situation (based on information obtained through consultation with Agriculture and Rural Development office of both East Wollega zone and Sasiga District, FH an NGO operating in Sasiga District). Based on this information, four kebeles were purposively selected. Secondly, the 390 total sample households were proportionally assigned to the four *kebeles*. Finally, after determining the sample size of each *kebeles*, the list of all households of each of the four *kebeles* was obtained

from officials of the local administrations based on which female and male-headed households were selected using systematic random sampling. In doing so, care was also taken to select from both sexes proportionally.

Of course, although food insecurity and livelihood strategies of female-headed households was the focus of this study on which detailed information pertaining livelihood capitals, local institutions, livelihood paths, and outcomes were sought, it was important to include information from male-headed households too on the topic as no community can be fully understood without considering all those that live within it.

3.4.2. Data sources, instruments and collection procedures

Household Survey

The primary data was generated through a survey conducted towards the end of 2016 (in August, September, and October). These months were preferred as a season when food stores usually are lowest. For the quantitative data 390 (133 (34%) were female and 257 (66%) male headed) household were interviewed through a structured questionnaire.

As the research approach was the mixed type, qualitative data was also obtained from purposively selected individuals and groups. Thus, qualitative data for this research was generated through focus group discussions (FGDs), key informant interview, and interviews with a range of informants including selected households, NGO personnel, extension/development agents, government administrative officials, and observations. One FGD was conducted in each of the four kebele. A total of 27 individuals (FGD participants) were selected with great care to include men and women farm households who have good knowledge on issues related to access to livelihood capitals, the role of local institutions, livelihood strategies of the study community, and food security situation of the area. Similarly, 28 persons from government offices (DAs and Agriculture and Rural Development head), Microfinance institution officers, NGOs, and local elders were consulted for data related to access to social services, and economic background of the district. Case studies on food insecure female-headed households were also used to explore problems with food insecurity issues and coping strategies. In doing so, open-ended checklists and interview guides, and observation guides were pretested and then employed. Some of the

survey questionnaires were also developed by consulting the works of Degefa, (2005) while others were adapted from standardized instruments such as HIFA, HHDDS, and CSI developed by different organizations working on food security.

Before the commencement of the collection of data, the survey questionnaire was commented on, translated to the local language of the participants (Afaan Oromo) and got approval by the research supervisors. The questionnaire was also pilot tested to check for any language barriers, the ambiguity of ideas and similar limitations. Finally, it was administered by enumerators who were given adequate training on how to approach the respondents and manage the entire collection of data while the researcher himself conducted focus group discussions, key informant interview, and observations.

Data from Secondary Sources

Both published and unpublished data were collected by reviewing annual reports, proclamations prepared by Sasiga District, regional and national organizations concerning food security, land use, and administration and socio-economic situations of the district and beyond. Reports of empirical studies by researchers on the issue under study were also used.

3.4.3. Data Analysis and presentation

After the survey was completed, the quantitative data was coded and entered into a computer. A comparative analysis on access to and use of livelihood capitals, livelihood strategies, food security status and coping strategies between male and female-headed households was made with various descriptive statistical techniques such as percentage, frequency tables, cross-tabulations and bivariate analysis (chi-square test and logistic regression) using Statistical Package for Social Science (SPSS) version 20. The large textual data generated through in-depth interviews, observation field notes and FGDs were transcribed (which was started alongside collection of data), grouped and analyzed in the light of the research objectives. As they require different analytical technique; the two types of data (quantitative and qualitative) were independently analyzed, and their findings were integrated to supplement each other and triangulated. The data analysis techniques used for each of the research objectives were highlighted as follows;

Objective 1: Measuring households' access to livelihood resources

A number of livelihood resources both tangible and intangible (Morse et al., 2009) are crucial for households' food security and general wellbeing. To understand households' resource access and control to pursue different livelihood strategies, their access to livelihood (natural, social, human, physical and financial) capitals were quantified before analysis. In doing so, the amount of each livelihood capital owned by households was indexed to be compared on tables and asset pentagon. This was done by weighing different indicators selected to represent each livelihood capital (Chen et al., 2013). On the other hand, information on the means of access and control on the livelihood capitals was descriptively analyzed based data obtained from FGD, KI and observations.

Drawing on the works of Chen et al., (2013), the different livelihood capitals (natural, social, human, physical and financial) were indexed (with values ranging from 0 to 1) and scaled before comparison and analysis were made. Based on their nature, the livelihood capitals indicators were also weighted. Household's response for example; on his/her household members health condition as good, medium and poor was assigned a respective weight of good=1, average=0.66 and 0.33. On the other hand; (yes/no) responses on dichotomous items were assigned 1/0 respectively. In the case of questions that generate responses in the form of land size; the mean values were used to create weighting; i.e., values less than the mean=0.33 (poor), higher than the mean but less than 1.5*the mean= 0.66 (average) and greater than 1.5*the mean =1 (good).

Finally, to quantify the total amount of households' livelihood asset (on the five capitals) a standardized score was created in the form of index to be rated on scales of varying weight as; 0-0.33 (poor), 0.34-0.66 (average) and 0.67-1 (good), that help calculate the value of each livelihood capital indicator which was aggregated and averaged as suggested by (Silvestri et al., 2015; Chen et al., 2013; Su & Shang, 2012) as follows:

$$C = \sum_{n=0}^{n} \frac{In}{Tn}$$

Where C is the score for each asset (0≤1), n denotes certain indicators (n=1,2,3…n); I denotes indicator; T denotes the total number of indicators; LA= (Cn. + Cp. + Ch. + Cs. + Cf.)/5: where LA is Livelihood Assets; Cn., Cp., Ch., Cs. and Cf. are the respective value of natural, physical, human, social and financial capitals respectively. The different types of capitals were then compared for female and male-headed households in terms of mean, percentage and statistical tests like Chi-square.

Natural capital was measured based on households land resources (land size including soil and slop quality), water, and access to forest/vegetation resources for various livelihood activities and a source of food. The assessment of the social capital of the households was made by counting and indexing the number of networks of the households ranging from immediate, reliable friends and relatives to that of cooperatives associations whom the study households could potentially approach for help in times of emergency.

The human capital is essential in pursuing different livelihood strategies by households. Drawing on the works of Su & Shang, (2012) the human capital stock of households which constitutes the total labor capability of a household was indexed to determine the human capital of the households. Specifically, educational attainment, health situation of both head and members of the households, farming experience, skills on different farming and non-farming activities were merged into four human capital indicators and indexed to be analyzed.

Physical capital was measured based on household's access to basic infrastructure (financial institutions, school, potable water, human and animal health), agricultural technologies (chemical input, extension, small scale irrigation) and farming equipment (plow, hoe, ax and others) house and household tools (cooking utensils, seats and others) required to pursue different livelihood strategies.

Regarding financial capital, data pertaining to households either cash income or expenditure was not collected. Instead, the analysis of this resource was measured in terms of production, livestock owned and access to credit. This was because of a lack of regular income flow and poor record keeping on the available income and lack of transparency among rural households to give data regarding wealth. Scholars like Nawrotzki et al. (2014) also recommend the use of

households wealth in less developed countries because of the difficulty to this resource in a measure this resource in a monetary term as many individuals are engaged in informal sectors. Thus, financial capital was calculated from crop production, livestock owned and access to credit of household. For analysis, each household's crop harvest from the 2016 season was converted into monetary value based on the local market price. In the same way, livestock owned was also converted into TLU.

Objective 2: The roles and utilization of local institutions by households

There are many local institutions which shape rural households' access to agricultural technologies, credit, health, and education which in one way or another affect their livelihood and food security. Because of different factors like perception, traditions, customs, and legal provisions, these institutions are differently utilized by male and female-headed households in accessing, and controlling to enable the households to transform the different assets into desirable outcomes. Data gathered using FGD, key informant interview and secondary information on the role of local institutions and level of utilization by female-headed households was qualitatively analyzed.

Objective 3 Livelihood strategies

The various livelihood strategies pursued by households to ensure the food security of their households and their viability was explored using qualitative techniques. Concerning this, data generated through FGD, Key informant interview with community elders, development/extension workers and observations were analyzed using qualitative techniques.

Objective 4: Food security status of households and factors affecting it

Measuring food security is complicated since it is multidimensional and has no one standardized indicator to capture it adequately. The full range of food security problem and hunger cannot be captured by any single indicator (USDA, 2000). For instance D. G. Maxwell, (1996) stated that defining and interpreting food security and measuring it in a reliable, valid and cost-effective way is problematic for researchers and those who are monitoring its risks. This is because according to Arimond et al., (2011), it is loaded with methodological challenges. Hence

researchers are suggested to use different indicators in combination. In this study, self-evaluation, HFIAS, HHDDS utilization, and CSI are among the different tools used in the measurement of food security to meet the specific objective (food security status of households).

i. Self -assessment

Regarding the measurement of food security, most studies on food security of households emphasize the objective measures which are based on the household expenditure survey as suggested by (IFPRI, 2007). Though such kilo-calorie availability is an important tool to measure food security, it neglects the subjective measures which are based on the view of households about their food security situation which is also equally important in the inquiry of household food security. Based on such assumption, the study households' subjective evaluation of their food security status was included as one indicator in this study. This method was used to get insight into the household's judgment regarding their food security status. In such a way the participants of the study were asked to rate their household as food secure or not and for how long do they cover the food requirement of their household from own production. This technique was used to supplement other instruments used to measures food security of the households.

ii. Household Food Insecurity Access Scale (HFIAS)

HFIAS is one of the various techniques used to measure food security of households. It is based on the modification households make/behavioral responses with regard to their diet and consumption patterns because of lack of resources. It is designed to capture based on households' reaction to shortage of food such as anxiety and uncertainty on supply, insufficient quality, and quantity of food. The responses are computed from responses of households on the 9 HFIAS generic questions. The responses or perceptions of households (on supply, quality and uncertainty) against the questions (e.g. whether any adults in the household had to eat less than they thought they should, whether respondents worried about household's food run out etc) are summarized in a scale to provide a continuous indicator of the degree of a household's food security. The food security status of households is thus categorized based on the cutoff points on the scale (Coates, 2007).

Households access to food was gathered by using the response on the nine generic questions on a recall period of 30 days as suggested by (USDA, 2000) and analyzed using frequency of occurrences (rarely – if once or twice, sometimes- if three to ten times, or often- if more than ten times). From these responses, the household food security scale was developed on continuous measures, and food secure and insecure households were identified using the cut-off point on the scale.

One problem in using HFIAS as an indicator to measure households' food security status is its lack of consensus on the cutoff point to classify households into food secure and insecure. Because of this, the use of the indicator has become somewhat subjective. Some studies (FAO, 2008) suggest the HFIAS 17 as cut off point in for binary classification of households. On the other hand, studies by (Garedew, 2017 and Maxwell, 2013) combine food secure and mildly food insecure households as "food secure" and the moderately food insecure and severely food insecure into "food insecure." But this cut off point is very sensitive, it inflates the figure of food insecure households as those who had some minor problems of food (lower score on HFIAS up to 12) can be included into food insecure category. Because of this, in the present study, drawing upon the study conducted by (FAO, 2008) in Mozambique, HFIAS score ≥17 was used as a cut-off point to categorize the study households into food secure and food insecure. In addition to classifying households into food secure and food insecure once, this indicator can also be used to further specify the severity of the food security situation of the households.

Determinants of household food security

Identifying the different determinants of food security is an important step to design appropriate measure to ensure the food security of households. With such objective, in this study, a binary logistic regression was also employed to identify factors which affect the food security of households.

The analysis of determinants of household food security was based on HFIAS. First, the score of households on the nine generic questions was used to construct a continuous scale which ranges from 0 the lowest t0 27 the highest. The HFIAS score of 17 was used as a cutoff point to categorize households food secure and insecure (FAO, 2008). Households who score less than 17

were categorized as food secure and 17 while households with HFIAS score of 17 and above were considered as food insecure. A binary logistic regression was fitted to the dichotomous dependent variable (food secure =1 and food insecure=0) to see the effect of explanatory variables.

Review of theoretical and empirical literature indicates a range of factors affect the food security of households which of course may vary depending on local contexts. In many of these literatures on food security, farmland size, per-capita aggregate production, fertilizer application, household size, ox ownership and educational level of household heads, budgetary support to the agricultural sector were identified as the important determining factors (Adenew, 2004, Degefa, 2005; Devereux, 2000b; Meseret, 2012; Twodros & Feadu, 2014, Badolo Félix & Romuald, 2015, Habtom, Gudeta, & Godfrey, 2005, Matshe, 2009). In addition to these, experiences in farming activities, off-farm and non-farm incomes, as well as soil and water conservation practices (Feadu Beyene and Mequnent Muche, 20220, Owusu V. & Abdulai A. 2009) were also important.

This particular study has also hypothesized sex of household head, Age of household head in years, household size, education level of household head, land holding size in acres, participation in nonfarm activities, access to extension services, ownership of livestock (TLU), amount of fertilizer used, use of small scale irrigation, membership in cooperatives, access to credit, and transportation ta affect the food security of households.

Model specification

With regard to the regression model, there are varieties of models that can be used to establish the relationship between household food security the potential determinants. Among those frequently used in the previous researches on the subject, the present study adopted the logistic model following (Aidoo et al., 2013), which is econometrically stated as:

$$\mathrm{Pi} = \varepsilon(Y = 1|Xi) = \frac{1}{1 + e^{-(\alpha + \sum \beta i Xi)}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Or

$$\text{Pi} = F(Zi) = \frac{1}{1 + e^{-Zi)}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \; where\ Zi = \sum \beta i X i$$

Pi=F(Zi)=1/(1+e^(-Zi)))…………..……………………………………..…where Zi=∑βiXi

p_i= the probability of a household being food secure given X_i

$X_{i=}$ a vector of explanatory variables

α= is intercept

β = is the coefficient of the i^{th} independent variable for i = 1, 2 ……………………….k

e= the base of natural logarithm

For ease of interpretation of the coefficients, which show the relationship between the dependent variable (yi) and the independent variables (Xi), a logistic model could be transformed and written in terms of the odds and log of odd. The odds ratio is the ratio of the probability that a household would be food secure (P i) to the probability of a household not being food insecure (1-Pi) is given as:

$$\frac{Pi}{1 - Pi} = \frac{1 + e^{Zi)}}{1 + 1 + e^{-Zi)}} = e^{-Zi)} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Taking the natural logarithm Li=ln$\frac{Pi}{1-Pi}$= ln(e^{Zi}) yields $\text{Li} = Zi \;\Rightarrow\; Li = \alpha + \sum \beta i X i$ (3) called the logit model

By taking the error term $(\in^{i})$ into account, the equation can be rewritten as:

$$\text{zi} = \alpha + \sum_{i-0}^{m} \beta i X i + \in^{i} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

The parameters of the logistic regression model were estimated using the maximum likelihood approach. The coefficients of independent variables were tested using the Wald Test Statistic. Using the Wald Test, when the p-value of the Wald statistic is less or equal to 0.05, the variable was considered to be significant and thus retained in the model and excluded when higher than 0.05 for it implies that the variable has no significant contribution to the model at large (Owino, Atuhaire, Wesonga, Nabugoomu, & Muwanga-zaake, 2014).

Variables hypothesized to affect household food security

Based on empirical studies and theoretical literature, the expected effect of these variables on household food security was hypothesized as shown (Table: 3.1).

Table 3.1 Dependent variables and their expected effect on food security

Variables	Measurement	Expected effect
Sex of household head	Dummy=1 if male; 0 otherwise	-/+
Age of household head	Number of years	+
Ownership of livestock	Number of TLU	+
Land holding size	Number acres	+
Nonfarm activities	Dummy 1=if participate; 0 =otherwise	+
Education of household head	Years of formal education	+
Access to credit	Dummy 1=if access; 0 =otherwise	+
Use of irrigation	Dummy 1=if use irrigation; 0 otherwise	+
Use of fertilizer input	Number of quintals	+
Access to extension	Dummy 1=if access; 0 =otherwise	+
Access to transport	Dummy 1=if access; 0 =otherwise	+
Membership in coop	Dummy 1=if member; 0 =otherwise	+
Household size	Number of household members	-/+

Source: Adapted from literature

1. Sex of the household head

Being female-headed is associated with food insecurity. This is because of the clear division of labor in carrying agricultural activities particularly in the rural area where most of these activities are assumed to be males' role. But few empirical evidences indicate that there is no significant difference between the male and female-headed households in food security. A finding from a study from Bangladesh (Mallick, Debdulal and Rafi Mohammad (2009) challenges the conventional idea that the female-headed households are more vulnerable to food insecurity especially among the indigenous ethnic groups who have greater freedom to participate in the labor force. In this study, a household being headed by a female was assumed to have adverse effect on household food security.

2. Age of the household head

An increase in the age of households implies accumulation of resource and positive relation with food security. Still old age with a lack of access to labor in production may be associated with less food security. In this study, increasing in the age of households was assumed to have positive relationships with food security.

3. Ownership of livestock

Unlike urban dwellers that save their income in Banks, in rural areas, livestock is a means of saving to draw on the time of shortage. Livestock also has multiple purposes for food security. Primarily in rural Ethiopia, agricultural production is based on livestock as a source of draught power and also used as a means of transportation. Secondly, livestock is also source of food (meat, egg, milk and milk products). Thirdly dung of livestock is also used to improve the fertility of the land. Thus, it was thought to increase the chance of households' food security.

4. Land holding size

Land is important productive resource in agricultural production. Adequate holding size and quality have thus a positive relationship with household food security. This is not always true among female-headed households where the effect of land on food security may be compromised by shortage of other factors of production are highly constrained. In this research, land holding size was assumed to raise the likelihood of households' food security.

5. Participation on nonfarm activities

Commonly rural farm households obtain their food from agricultural production. But they also participate in different activities to generate income other than agriculture. Participation in such activities can supplement income from on-farm activities. In this study too, participation in other activities in addition to on-farm was hypothesized to have positive relationship with food security of households.

6. Education of household head

Education improves the human capital of households. Access to education by household heads enhances access to information and hence the use and adoption of adaptation of technology in

agricultural production, conservation of resources. In this study, it was hypothesized to have positive effect on the food security of the study households.

7. Access to credit

Most of the time rural households save their income in kind/in the form of assets (livestock, grain, and others) which cannot be easily converted into liquidity. Better access to credit services is important for rural households both when they have no income and shortage of cash on their hand to procure agricultural inputs or engage in nonfarm activities like petty trading. Therefore, access to credit from local rural financial institutions such as micro finances, saving and credit societies is important and assumed to boost the possibility of households' food security status.

8. Use of irrigation

Use of irrigation increases the chance to utilize the land to grow crops twice or more times. In the predominantly rain-fed agriculture, the use of irrigation minimizes the vulnerability of households to crop failure due to a shortage of rain. Therefore, the practice of irrigation in growing crops was hypothesized to increase the likelihood of households to be food secure.

9. Use of fertilizer input

Chemical fertilizer is important input in agriculture. With the decline of fertility of land and shortage of new land to bring under cultivation, farmers are increasingly dependent on chemical fertilizer to increase the production on a unit of land. Therefore, the use of fertilizer input was presupposed to have a positive effect on the food security of households.

10. Access to extension service

Commonly rural farming households live in a scattered settlement where modern information on agriculture is hardly accessible. Agricultural extension service is one of the formal channel through which information on agricultural technologies reaches rural farming households. It is important sources of technical support for farming households on different agricultural technologies. Hence, access to agricultural extension is crucial in making proper use of other productive resources such as land, inputs, and others. As it improves the agricultural productivity, access to agricultural extension was assumed to increase the food security of households.

11. Access to transport

Households who have access to nearest road transportation can be easily connected to different social services such as, market, health institutions, and schools. In addition to improvement in the health, and education of the households, such physical accessibilities also open more opportunities to engage in non-farming income activities. This may have positive socio-economic impact on the livelihood of those who have the access. Hence In this study, access to nearest road/transportation was assumed to improve the food security of households.

12. Membership in cooperatives.

Cooperative is a jointly owned form of business organizations. Those who are owned by farmers are established to provide services and inputs needed in agricultural production which in turn the cost of procuring such inputs by individuals. Members can also market their agricultural products with strong bargaining power. Membership in cooperatives was hypothesized to increase the probability of food security of households.

13. Household size

Farming households engage in diverse activities on their farm. These activities are diverse particularly among those who are engaged in mixed farming (crop production and livestock rearing). Other domestic activities and non-farm activities for income important for the households also need more people. Large household size is seen as a source of labor in rural farming households. But as most of the agricultural activities are seasonal, the labor will be sometimes idle and hence not productive. The composition of the household members is also another factor which determines the productivity of the labor of the household. In this study, household size was assumed to have a positive effect on the food security of the households.

iii. Household Dietary Diversity Score (HHDDS)

As defined by Ruel (2002), dietary diversity is the number of individual food items or food groups consumed over a given period. Making assessments on dietary diversity at the household or individual level enables examination on food security access, which is important component of food security at the household and intera household levels (Anne and Paula 2005). HHDDS is suitable to be used as a proxy measure of access was first tried by the FANTA. It was also

proved to be a good measure of access to food based on data set from ten developing countries (Hoddinott & Yohannes, 2002).

The assessment can be conducted either at household or individual level which is decided based on the purpose and objectives of the survey. It would be best done at the individual level by choosing one or two target individuals per household, if the nutrient adequacy is of primary concern (FAO, 2008, 2011 and Kennedy, Razes, Ballard, & Dop, 2010) and household level information if the primary concern of the survey is to assess household economic access to food /dietary energy (FAO, 2011 and Kennedy et al., 2010).

To use this indicator, operational guidelines and questionnaire which are formulated by FAO, 2011 can be used. These guidelines and questionnaire are of course developed with the intention of universal applicability (with no culture, population, or location specific) only by translating them into the local language. Though the guidelines suggest 24 hours recall period (FAO, 2011), however in the present study, seven days recall period was sought to be more desirable than the 24 hours shorter recall periods. This is because it is assumed that, the rural households of the study area commonly rely on the same diet for an extended time before they change it even when they have adequate food compared to urban households.

HDDS (0-12)	Total number of food groups consumed. Values for A through L is either "0" "1" Sum (A + B + C + D + E + F + G + H + I + J + K + L)

During the analysis on dietary diversity score for households, first data collected on the 12 dietary variables with the value of the HHDDS ranges from 0 to 12 (as adopted from FAO 2011) was calculated for each household.

After this, as suggested by (FAO, 2011), the values for each the dietary diversity variable was computed by summing all food groups included in the dietary diversity score of 12 food groups for each household. In the second step, the average HDDS indicator was calculated for the sample population.

Finally, the average household dietary diversity score result was compared to some meaningful target level of diversity to be used as cut off to assess the sufficiency of food with appropriate nutritional level (Bilinsky & Swindale, 2006).

Computing mean of food groups consumed by households

Average HDDS	Sum (HDDS) / Total Number of Households

In the process of measuring households' food security using HHDDS, (Ruel, 2002) recommends the cutoff points to define the diversity of foods to be identified based on the local information, the context in which the tool is used, and the local food systems and dietary patterns. H suggested by this author, cutoff points which indicate adequate or inadequate dietary diversity while was the mean score of the food groups consumed over the previous seven days. The scores of household dietary diversity were also divided into terciles to identify diets of high, medium and low diversity using the mean consumption of the sample population.

iv. Coping Strategy Index (CSI)

When they face shortage of food, people develop different strategies to cope with the problem. Coping strategy index (CSI) is a measure of the various responses of people (behavior) when they face such shortages of food. The different food-related coping responses adapted by households referred as coping strategies (with both their frequency and severity) were thus indexed and used in this study as one alternative indicator of households food security as suggested by (Maxwell, 1996). The relevance of CSI in measuring food security was also validated through continuous works. Concerning the use of this tool as an indicator in the assessment of food security of households, CARE, (2008) recommends the need to accurately adapting it to the local context. According to this source, the right list of coping behaviors and the level of severity of each strategy shall be developed through community-level FGD.

For a similar purpose, FGDs were conducted in the context of the study community to identify behavioral responses and their severity based on a single question which says; "what do you do when you do not have enough food and do not have enough money to buy food?" In the process

of developing context-specific coping strategies, each FGD participants were provided a list of coping strategy index as specified in the field manual formulated by (CARE, 2008). All of the strategies identified by the different FGD were quite similar with the one in the manual prepared by the same author. A discussions with the FGD members indicate the frequent use of these coping strategies by the study community and also existence of unique types of coping strategies in the study community like *liqii baalatti* (taking grain as loan to be paid from next harvest) and *qarmiifunaanuu* (collecting crops left over on the crop fields immediately after harvest) were also observed. But these two strategies were not applicable to the study households because of the time of the survey.

Though it is a common practice, consumption from seed stock was not reported as the time of seed was already passed before the months when the survey was conducted. As all the different coping strategies have different severity levels, they were weighted and grouped into four as, less sever (1), moderate (2) sever (3) and highly sever (4) based on the evaluation of FGD members as depicted on (Table 3.2).

Table: 3.2. 1Coping strategies weighted based on ranks given by FGD participants

No.	Coping strategies	The relative severity of coping strategies					Weighted rank
		FGD1	FGD2	FGD3	FGD4	Average	
1	Less preferred food	1	1	1	1	1	1
2	Borrow grain	1	1	1	1	1	1
3	Purchase food on credit	2	2	1	1	1.5	2
4	Eat immature crop	4	3	4	4	3.75	4
5	Depend on support of relative	2	2	2	4	2.5	3
6	hh member eat elsewhere	2	2	3	2	2.25	2
7	Reduce portion size	1	1	1	1	1	1
8	Restrict adult consumption	2	3	1	2	2	2
9	Feed working members only	3	4	3	4	3.5	4
10	Reduce number of meals/day	1	1	2	1	1.25	1
11	Skip day without eating	4	4	4	4	4	4

Source:Adapted fromCARE(2008)

The weight given by each FGD was counted and averaged to rank all the coping strategies in order of their severity (which is, of course, specific to the study households). Accordingly, eating

immature crops, feeding working household members only, and skipping a meal the whole day were categorized as the most extreme coping strategy. Relying on support from relatives by households was also taken as severe coping mechanism. Purchasing food on credit, sending household members (mostly children) to eat elsewhere and restricting adult consumption were taken as intermediate factors. Eating less preferred food, borrowing grain, reducing portion size and number/frequency of meal per day were among the least coping strategies.

Then the collected data on the short-listed behaviors were used to analyze how often the study households have employed each coping strategy. The frequency of occurrences of the strategy was multiplied with the severity to generate the coping strategy index which was used as an indicator to assess the food security of the households. Other than the food-related short term coping strategies, households also cope with food shortage through long term alteration of income-earning strategies or food production patterns which may involve responses as the sale of assets.

v. Utilization

Utilization of food is the ability of households to use the food the accessed during a given period adequately. It encompasses the nutritional quality of the food and individuals (biological) ability to convert the food consumed and meet their nutrient and health needs has been traditionally measured using anthropometric measures. Using anthropometric measure to assess food security has a limitation (Bashir & Schilizzi, 2012) because of its time and financial requirement and other factors than food are influencing it. Thus, in this particular study, utilization was measured based on health (biological) status of household members, the prevalence of disease, knowledge on nutrition and extravagance and sanitation aspects as access to clean water and latrine.

3.5. Ethical Considerations

There are specific ethical rules to be followed stated by Resnik that includ honesty, objectivity, integrity, carefulness, openness, respect for intellectual property, confidentiality, respect for colleagues, social responsibility, non-discrimination, legality, human subjects protection and others (Resnik, 2013). These ethical rules, we can say, are intended to ensure the pursuit of the scientific inquiries and safeguard the interest of the participants of the research, on the one hand,

and give maximum benefits to the end users of the study on the other hand. Hence, when engaged in any research activities, it is expected that researchers must be accountable to these guidelines pertinent to their fields of study.

Before starting the survey work in the selected kebeles, the consent of the District Agricultural and Rural Development Office of Sasiga was obtained through a written letter to the selected kebeles. In the next step, the participants of the study were let to know verbally about the purpose of the study to decide to participate in the research. In doing so, the researcher took all the necessary measures to protect participants and their rights throughout the research process by conducting the study with integrity, protection of the privacy of participants by maintaining the confidentiality of personal data and abide by the terms of use of data based on the consent of the research participants. In case there was a need to reveal the identity of participants in the final documents of the study, it was done based on their voluntarily consent.

3.6. Reliability, validity and generalization

According to (Kimberlin & Winterstein, 2008) reliability and validity of measurements are crucial indicators of the quality of a measuring instrument in the process of any scientific endeavor. Reliability, as articulated in Jonathan et al., (2014), is the extent to which any measurement procedure in research yields the same result on repeated trials. It is such an important concept based on which researchers use research tools and procedures that produce consistent results which, in turn, facilitate drawing conclusions, formulate theories, or make claims about the generalizability of their research (Jonathan et al., 2014).

Validity is concerned with the degree to which a study accurately reflects or assesses the specific concept that the researcher is attempting to measure (Wahyuni, 2012). However, according to Golafshani, (2003), these concepts of reliability and validity are strongly embodied and long been accepted in the quantitative positivist research paradigm, they may not apply to the qualitative research paradigm. Though important to ensure repeatability and exactness of measures (Onwuegbuzie & Burke, 2006) argue that, the concept of reliability and validity are immature in a mixed research approach where quantitative and qualitative approaches are combined. Instead, in qualitative research, trustworthiness is used rather than validity. To

evaluate reliability and validity in qualitative approach (Onwuegbuzie & Burke, 2006), have proposed credibility, transferability, dependability, and conformability in place of internal validity, external validity, reliability and objectivity as in the quantitative approach.

Accordingly, in the present research which uses a mixed approach, attempts were made to ensure legitimation (a bilingual term for both quantitative and qualitative researchers) was used as an overall criterion to evaluate the quality of studies recommended as by (Onwuegbuzie & Burke, 2006). An attempt was also made to ensure reliability of the survey instruments using coefficient alpha or Cronbach- the most popular method used for testing reliability or internal consistency as suggested by (Drost, 2011). A reliability test was conducted on the instruments developed by the researcher mainly to collect data on the livelihood capitals. Accordingly, the reliability test results in each of the five livelihood capitals have met the requirement (annex 1). The coefficients of Cronbach's alpha was 0.890, 0.812, 0.810, 0.667, and 0.785 on natural capital, physical capital, human capital, social capital and financial capital respectively. On the other hand, as most of the instruments on different indicators of food security were tested and standardized, reliability was not tested on them. Analysis of local institutions, livelihood strategies and the like were based on qualitative data obtained through interview, and discussions and thus not appropriate for such a test.

Chapter Four

Livelihood Assets: Access and some Local Contexts

4.1 Introduction

This chapter was aimed at the assessment of the assets endowments of the study households and some local contexts. With the presumption that gaining a full understanding on productive resources and backgrounds that shapes access to these resources influences household's participation in different livelihood strategies (on farm, non-farm activities and migration and to ensure the food security of their households), evaluating whether female-headed households have the equitable level of access to productive resources with their male-headed counterparts or not was given due attention. Thus, it focuses on comparing the level of access to various livelihood capitals by households based on the gender differences in particular. It also analyzes the different contexts and trends which are beyond the control of the study households but influence the status of productive resources, livelihood strategies (Chapter 6) and food security (Chapter 7). In doing so, a brief assessment of the contexts, trends, and shocks, was made to understand the situations in which the farm households of the study area strive to ensure their food security. This technique also suggested by advocators of SLA. Some demographic backgrounds of the sample households were also briefly highlighted.

4.1.1 Demographic and socio-economic characteristics of the household

A total of 390, out of which 257(65.89%) male and 133(34.1%) female-headed households have participated in this study. Concerning marital status, nearly all 256(99.6%) male-headed households were married contrary to, only 3(2.3%) of their female-headed counterparts who were temporarily heading their house since their spouses were away. Thus, the majority of the female-headed households included in this study were widowed and therefore more likely to face the problem of food insecurity as they are struggling to win bread for their family without the support of adult male. The remaining 112(84.2%) and 18(13.5%) of the female-headed households were widowed and divorced, respectively.

Regarding the ethnic background of the participants, majority 383(98.2%) of the respondents were Oromo while the remaining 7(1.8%) were Amahara. Regarding their religion, the majority

of the households were followers of Christianity of which 297(76.2%) were Protestants and 65(16.6%), orthodox Christian followers. Followers of Islam account only for 28(7.2%) of the participants.

Table 4.1: Demographic Information of Sample households

Variables		**Male headed**		**Female-headed**	
		Freq.	**%**	**Freq.**	**%**
Ag e range	18 - 24	5	1.9	0	0
	25 -44	139	54.1	59	44.4
	45 - 64	96	37.4	64	48.1
	65 & above	17	6.6	10	7.5
Marital status	Married	256	99.6	2	1.6
	Divorced	1	0.4	18	13.5
	Widowed	0	0	112	84.2
Religion	Protestant	203	79.0	94	70.7
	Orthodox	44	17.1	21	15.8
	Islam	10	3.9	18	13.5
Ethnicity	Oromo	254	98.8	129	97.0
	Amahara	3	1.2	4	3.0
Educational	No for. educ.	78	30.4	103	77.4
	Prim school	149	58.0	29	21.8
	Secondary	28	10.9	1	0.8
	Diploma	2	0.8	0	0
Descriptive statistics on age					
Minimum		20		25	
Maximum		70		70	
Mean		43.12		46.60	
Std. Deviation		11.520		9.906	

Source: Field survey, 2016

The average age of heads of the households was 43.1 years for male and 46.60 for female-headed households. About 74(55.6%) of female-headed households were above 45 years of age (Table 4.1). Male headed households who fall in this age category accounts for 113(44%). The age of majority of the male-headed households 144(56%) was between 18 to 45 year. Female-headed households whose age is found within this range were lower 59(44.4 %). This shows that female-

headed households tend to be older than males heads. This might have compromised the labor needed to engage in agricultural (labor intensive in nature) and other activities.

The proportion of those who have some formal education was 178(45.6%), which is a little more than half of the study households. The remaining 181(46.4%) of the households have no formal education. Some 56.9% of those who do not have formal education were female-headed households compared to 43.1% of the male-headed households. There was a different distribution in primary and secondary education of both households too. Of those who had primary level education, female-headed households' accounts only for 29(16.29%) compared to 149(83.7%) male-headed households. Similarly, absolute majority 28(96.5%) of those who had secondary education were male-headed households. Female-headed households were 1(3.44%) rarely represented in the secondary level of education.

4.1.2 Household size and sex composition

As depicted in Table 4.2, the average household size in the male and female-headed households was 5.39 and 4.54, respectively. In term of the sex composition of the household members, households headed by male have nearly three males and females household members compared to that of 2 male and female members among those households headed by women. Male-headed households have larger household size and male members compared to female-headed households which tend to have fewer male household members. The large proportion of female in female-headed households shows the lack of labor on key agricultural activities including plowing land which is considered by the local community as male's role.

Table 4.2: Size and sex composition of the study households

Household	Male headed n=257				Female-headed n=133			
	Min.	Max.	Mean	Std. Dev.	Mim.	Max.	Mean	Std. Dev.
Size	2	12	5.39	1.978	1	10	4.54	2.116
Male members	1	8	2.82	1.378	0	6	2.20	1.455
Female members	1	7	2.58	1.306	0	7	2.33	1.33

Source: Field survey, 2016

4.2. Access to livelihood assets and some local trends

Livelihood assets are important in households' engagement in various livelihood activities/strategies and ensure their food security. According to various studies, Ellis & Freeman, (2004) Mirutse, et al. (2006), these assets are essential for households to engage in production, labor markets and participate in an exchange with other households through reciprocity. In this study, the incorporation of the various types of capitals in the analysis of households' livelihood asset was decided based on the SLF formulated by (DFID, 2000), and adapted by previous works (Degefa, 2005, Morse et al., 2009) and the relevance of the resources in the livelihood of the study households. Households' access to livelihood capitals (natural, physical, financial, human, and social) was analyzed descriptively.

4.2.1. Natural capital

Natural capital refers to the natural resource stocks (land, water, wildlife, biodiversity, and environmental resources) on which people depend for their livelihoods. Scoones (1998) argues that rural livelihood strategies greatly depend on these natural resources status. Of the many other natural resources according to FAO, (2011), access to land is taken as a basic requirement for farming and control over land is synonymous with wealth, social status and power in many areas. In the same way, land has higher importance among the rural households of the study area. It was this priority which dictated me to begin the analysis of households' access to livelihood capitals with land and its embedded resource. The land resources were assessed concerning its size, quality and different socio-economic and environmental contexts that affect the potential benefits which could be obtained from it by the study households.

Access to land

All livelihood capitals are of course important to the livelihood of rural farming households, but the contribution of natural capital such as land and resources (as water, wood for fuel and construction and others) embedded in it is diverse. Provided that all of the rural households of Sasiga are engaged in agriculture, land is indispensable livelihood resource. Significant parts of their food and income from crop and livestock were directly or indirectly derived from land-based livelihood strategies. Though it may vary in size and quality, the vast majority (96.4%) of the households have access to some amount of this important resource. Only 11 (2.8%) of the

sample households do not have land for agriculture. More than half of the sample participants 227 (58.2%) have a land size of one to three hectares, and only 76 (19.4 %) of the respondents have land less than a hectare (Table 4.1).

Table 4.3: 1Households' land holdingdistribution, quality and way of use

Landholding size & quality	**mhhhs**		**fhhhs**		**All together**	
	Freq.	**%**	**Freq.**	**%**	**Freq.**	**%**
No land	3	1.2	8	6	11	2.8
<1hectare	40	15.6	36	27	76	19.4
1 to 3 hectares	154	60	73	55	227	58.2
3 to 5 hectares	47	18.3	13	9.8	60	15.3
5 to 7 hectares	8	3.1	3	2.3	11	2.8
>7 hectares	5	2	-	-	5	1.3
Total	257	100.0	133	100.0	390	100
Quality of land						
Fertile	18	7.0	6	4.5	24	6.2
Medium	163	63.4	78	58.6	241	61.7
Poor	73	28.4	43	32.3	116	29.7
The way households use their land						
Rent/shared in	70	27.2	25	18.8	95	24.3
Rent/shared out	98	38.1	74	55.6	172	44.1
Average holding						
	2.34		1.58		2.08	
	Std.	1.681	Std.	1.360	Std.	.475

Source: Field survey, 2016

By looking only into the proportion of male and female-headed households who reported to have land for agriculture, one may feel that variation in accessing land is very low in terms of gender (Table 5.1). But there was a noticeable difference in the distribution and quality of land based on the gender of the households. The average holding size was 2.36 hectares for male and 1.58 hectares for female-headed households. About one third 36(27.1%) of the female-headed households have an area of land less than a hectare compared to only 40(15.6%) male-headed households. Other than size, the proportion of landless households was also relatively higher among female-headed households 8(6%) compared to only 3(1.2%) among male-headed households.

The land holding size in this study is well compared with the finding from study by Temesgen et al., (2010). A study by this author in the Nile basin shows that the average land holding size was 2.02 hectares. But it is higher compared to the average land size of 4 *timads*/one hectare in Oromia Zone of Amahara region (Degefa, 2005), 0.497 hectare in districts of Wolaita Zone, Southern Ethiopia (Bereket and Degefa 2016), 0.6 hectares in districts of Wolaita Zone, Southern Ethiopia (Kibebew Fisseha, 2014), and 1.8 hectares in Sululta Woreda, North Showa Oromia Regional State (Dereje, 2016). However, the landholding size of the participants of the study was by far lower when compared to the holding size in neighboring district Belo Jigenfoy in the Benishagul Gumuz Regional state (Guyu, 2016) where the average land holding size was 4.5 hectares. Informal discussion with community members and households of the study district who have been sharecropping in a land with Gumuz communities along the border of the two districts also indicates the relative abundance of land in the neighboring district of Belo Jigenfoy of Benishangul Gumuz Reginal state.

Taking the national average size of land holding per holder which was estimated to be 0.93 hectares (CSA & WFP, 2014), the 2.08 hectare of land of the study participants can be taken as adequate. The problem was instead with variation in the landholding size between male and female-headed households and the quality of the soil. Regarding gender of heads, the average land holding by female-headed households in this study (1.58 hectares) was higher compared to holding by female-headed households in Gamo highland, which is 0.52 hectares (Teshome, 2015). However, the gender-based variation in holding size in the present study was wider compared to (Teshome, 2015) where the average holding for female-headed households was 0.52 hectare compared to 0.86 hectare for the male counterpart.

Other than size, most often the study participants complain about quality aspects of their land. A soil survey conducted on thirteen districts of the former East and West Wollega zones of Oromia (Abdenna, 2013) shows that the soil of Sasiga district (one of the sites of the study) has a very high exchangeable aluminum and acid saturation percentages reaching 4.90 and thus categorized as very strongly acidic soils. According to the same study, maize and sorghum (the majority of the households grows staple crops) are growing under suboptimal soil condition. Like that of the size, the land owned by female-headed households also has problem of poor quality. About

43(32.3%) of female-headed households compared to 73(28.4%) male-headed households reported that their agricultural land has poor quality. Of the households who reported to have good quality agricultural land, only 6(4.5%) were female-headed compared to 18(7%) male-headed households (Table 5.1). This witness that compared to males, female-headed households have smaller land holding size with relatively poor quality. Garedew (2017) argues that, together with access, the quality of land determines technology choice and hence crucial aspect on the livelihood earning of the holders.

Figure 4.1: Piles of crop residue used for construction purposes

Source: Field survey, 2016

Discussion with informants from the community members, Development Agents and District Agricultural and Rural Development Office and FGD at two of the study kebeles (Handhura Balo and Galo Janja) shows that, the problem of the quality of the soil is connected with the overuse of agricultural technologies (chemical fertilizer and weed-cide) which in the long run lead to degradation of the soil and conservation of the land resources. In particular, information from the district agriculture and rural development and the inhabitants related the current status (extensively degraded/bare) of the land with the huge amount of chemicals (fertilizer, pesticides, and herbicide) dumped into the ground particularly in the areas of the former state farm.

In addition to this, the utilization of crop residues (particularly of maize and sorghum ought to improve the fertility of the soil) for fuel and construction purposes by farmers according to information obtained through discussion with Development Agents and officers in District Agricultural, Rural Development Office and field observation has contributed significantly to the decline in the quality of the soil. Photographs taken from different villages show that use of crop residues for construction purposes is a common practice among households (Figure 4.1)

As far as the utilization of the land is concerned, households mostly use their land for agricultural purposes on their own. Some also rent out and sharecrop out part or all of their land when they lack other productive resources as labor, inputs, oxen and other resources. Sharecropping in/out can be arranged between two people to pool different productive resources to grow crops and share the product. It has different forms. Sometimes the person who has land but no oxen may enter into an agreement to do the tasks of tillage with the oxen from his/her partner. In this case, the remaining tasks like production inputs and the product are equally shared with his partner. But sometimes the owner of the land may take responsibility to carry all the farming activities with oxen and inputs provided from another party to share the produce equally. The arrangements may also vary to divide the produce in half or two third and so on depending on the level of contribution (supply of oxen, human labor, input cost and the availability of land in the area) made by the partners.

This institution seems to be important for female-headed households in combining their land, oxen, and labor mostly with those who have male labor through sharecropping. Though they have less size of land compared to male-headed households, large proportion of 74 (55.6%) gave their land out in the form of rent/sharecropping. Nevertheless, information obtained through discussion with female-headed households indicates that they could not get adequate produce yield from such land. This happens since their partners who sharecrop with them give priority to their farm. In such case, the sharecroppers give more, input, energy and time to the farm under one's farm.A study by Garedew (2017) shows that, the landless households who access land through labor exchange, rent or sharecropping arrangements give half of their produce to the landholders. Taking only about of half of the produce from the produce of one’s land also

indicates that the land holders were not benefiting from their land resources lie when it is cultivated by themselves.

The other important natural capital for the livelihoods of the households was vegetation in the form of tree and pasture. The livelihood activities of rural farming households' also depend on these resources for various purposes including fuel-wood, timber, construction of a house and livestock shades/stand, fencing of farmland, making furniture, making farm implement and many other things. As to the vegetation resource of the district, information, particularly from discussion with informants and documents from Sasiga district planning and economic development office, show that much of the low land areas of present-day Sasiga, have been covered with dense forest and unsettled until the 1970s. Since they have been abandoned mainly because of being highly infested with malaria and insects which are vectors of animal disease, they were used only for grazing through semi pastoral practice locally called daraba and hunting of big games like buffalo, lion, and others.

But information from discussion with elders who have been living in the area for a longer period indicates that the forest resources of the area have severely declined with the establishment of the state farm. According to this source, starting from the early 1970s, the thick forest of the lowland areas (the present day lowland Kebeles) of the present day Sasiga district and its surroundings was cleared and converted to large state farm. Later, the political instability caused during the 1990s left the inhabitants unchecked to expand agricultural lands to the remaining forest land and eradicated the remaining forest cover of the district. Remnants of big trees observed (during the survey) along river valleys, hillsides in the middle of highly denuded and barren land are indicators of the past rich forests resources of the area. In such a way, the vegetation resources have been rapidly changing in Sasiga (Table 4.2.) mostly because of the clearance of forests for agriculture. Other than agriculture, the local people cleared forests to extract charcoal, firewood and different lumbering materials both for domestic purpose and sale to generate income. The absence of alternative source of income and energy supply has forced the inhabitants to depend on these natural resources (Sasiga District Planning and Economic Development Office 2013).

Some of these changes significantly affected the natural resource basis of the district and ways of living of its people. In particular, it minimized pasture for their livestock. Currently, according to

(Sassiga District Planning and Economic Development Office), out of total 980.70 km2 area of land, the forested area of the district covers only about 21,896.8 hectares of which 3,247 hectare is manmade.

Table 4.4: Perception of households on trends of natural resources

Natural Resources	Frequency(N=390)	Percentage
Increase in soil acidity	183	46.9
Degradation of land	180	46.2
Deforestation	259	66.4
Increase in settlement	78	20.0
Increase in population	246	63.1
Increase in agri. private investment	35	9.0

Source: Field survey, 2016

Because of its decline, access to these resources for different production activities and other purposes as construction and energy is not adequate. The result of analysis on access to vegetation resources indicates that about 234(60%), 201(51.5%), and 200(51.2%) of the participants of the study have accessed forest resources for firewood, making farm implements and fencing respectively. Access to these different vegetation resources for purposes as farming and non-farming activities was big problem. Female-headed households have low access to this resource (Table 4.3). A chi-Square test was run to check the variation based on the gender of the heads of households in access to these useful livelihood resources, and the result was statistically significant Male headed households have more access to the vegetation resources than female-headed households.

Table 4.5: Access to natural vegetation resources by households

Land holding size & quality	**Mhhhs**	**Fhhhs**	**X^2 value (P)**
	Freq. (%)	**Freq. (%)**	
For firewood	185 (72.0)	76 (57.1)	8.721[a] (.003)
Making farm implements	152 (59.1)	49 (36.8)	17.453[a] (.000)
Fencing	148 (57.6)	52 (39.1)	11.993[a] (.001)
Constructing house	111 (43.2)	50 (37.6)	16.202[a] (.000)
Making timber	78 (30.4)	22 (16.5)	8.765[a] (.003)
Pasture	148 (57.6)	43 (32.3)	

Source: Field survey, 2016

Of course, availability of forest is not always viewed positively by rural farming households notably as it hosts wild animals ranging from flying birds to big carnivores which attack crops and livestock. As can be understood from discussion with the community members, plots of land found near thick forests are prone to wild animals, and some holders do not cultivate such plots. A study by Guyu, (2014) Degefa (2005) also shows wild animals attack on crops and livestock as a problem. In particular, preventing livestock and crops from these wild animals during the night is challenging for female-headed households as women both for cultural (as it is cultural taboo and fear of wildlife attack for women to stay outside home during the night) and physical reasons cannot afford to do it.

In the face of degradation of land and its resources, the perception of the study households and conservation measures adopted by them were also assessed. Many farmers perceived that the natural environment in general and fertility of the land, in particular, has dramatically changed with an adverse effect on their agricultural production. Some soil conservation activities (crop rotation, intercropping and fallowing) are also reported to be used by majority of households to manage soil fertility. Female-headed households inclined to the use of traditional soil fertility management compared to male headed households who use both traditional and modern methods in combination.

Sadly, however, none of the conservation practices (both because of their nature and scale) are viable to either restore the degraded natural resource or maintain the available one. Fallowing which has been common method of traditional soil fertility management was halted because of the shortage of land. The integrated water shade management though important approach in natural resource conservation but has some challenges. From the discussion with informants, the community has limited interest in it because of the extensive labor it involves during dry weather condition/dry season. The restriction of the use of all the land (either owned by households or communal) on which such project (integrated water shade management) is done for livestock grazing was the other reason for the lack of interest by the community. In addition to this, though the conservations schemes were to serve every household indirectly mostly through improving the ecosystem services, the households show little participation as they perceived the resource conservation benefits them only if it is done on/near their farmland. To some households,

community-based conservation activity consumes much of their labor and time which could be used for earning income by participating in daily labor work. The people were compelled to participation through indirect ways, i.e., restricted to access services (mostly inputs) provided through local administrations. By no means, the conservation activities practice both through individual farmers and community cannot compare with the scale of the degradation process on the ground.

4.2.2. Social capital

This capital has important contribution to the wellbeing of the study community too. In addition to the contribution of this capital in pursuance of livelihood strategies and reciprocity among kinship and neighbors Degefa (2005) also argues that, social capitals play an important role as means of survival at the time of shortage of food. Life in the study community significantly requires good access to such social capital. This is because, some of the rural livelihood activities are labor-intensive that an individual household can less likely achieve on its own or may be difficult.

In this study, the amount of social capital of households was measured in terms of the number of social networks (ranging from the simple network with relatives/friends to that of farmers' cooperative societies) to which the respondents belong. Though local formal administrative structures such as, *tokko-shane* and *gare misoomaa* (one to five and development group, the smallest unit of formal administration at village level) may also be part of the social networks, but the social organizations/networks addressed by this study were limited to the ones which are voluntarily established and managed by rural households in the pursuance of livelihoods.

With regard to the different types of social networks, *warra* (lineage or close family members) is the small social network to which heads of household belong by virtue of their "blood ties" unlike many of the other social networks and hence most of the time formed by relatives who live in the same village or neighboring villages. Though every individual heads of household have lineage relation in this study, such relationships were considered only when the household heads have claims and reciprocities from such networks. About 163(41.7%) of the sample households have reported to be a member of their *warraa*.

Coffee drinking/network with neighbors is another small gathering/group formed among neighbors in rural areas for coffee drinking. These types of social networks are formed by few households having physical proximity in residence primarily to drink coffee on rotation and according to the tradition of the people of the study area; each household belongs to one such group under normal condition. Though formed for drinking coffee, they also serve important social and cultural roles such as, resource sharing, maintenance of social cohesion and exchange of information among the members. Membership in this small social network was reported by 195 (50%) of the study households. There was no significant variation in the proportion of male and female-headed households on membership in coffee drinking group (Table: 4.4).

The other popular social organization in the study district was *edir* association which is established commonly by household heads. Purely women or youth can also establish it for some desired purposes. Though this association is created mainly for burial services, but they also have many socio-economic benefits such as, settlement of disputes and labor support to members on farming and other activities. The importance of this social network in the mobilization of resources for collective actions in rural areas where people live over scattered areas with inadequate means of communication and lack of such services even with payment is very high. Nearly all (90%) of the survey households reported to be a member of their village *edir* association.

Table 4.6: The level of households' access to social capital

Types of social membership	**Mhhhs**		**Fhhhs**		
	Freq	**(%)**	**Freq**	**(%)**	**X^2 Value**
Lineage group/relatives	123	48	40	30.1	11.395a***
Farmers cooperative	112	43.6	20	15.0	31.888a***
Neighbor/coffee drinking	129	50.2	66	49.6	14.225a***
Village *edir* association	242	94.2	109	82	14.515a***

***, ** & * represents statistical significance at <1 %,< 5%, and <10% respectively

Source: Field survey, 2016

Edir associations were the only local informal organization in which both male and female-headed households actively participate in terms of membership. Accordingly, 242 (94.2%) male

and 109(82%) female-headed households reported to be a member of the edir association which is found in their respective villages. Such active participation demonstrated by female-headed households was not because of the openness of such association to encourage participation and women's high interest to participate in it. Instead, female-headed households who were member in *edir* do not have a husband to represent their household in the *edir* association, which is difficult not to become a member as they are highly needed in bad times such as death. Though the membership of female-headed households seems to be high in these village organizations, their participation was limited particularly in the area of leadership.

Cooperatives are the other important social capital through which households' access different services mostly agricultural inputs. They are independent association organized voluntarily by people to meet their social and economic needs through jointly owned and democratically controlled enterprise. In the study district, there were many multi-purpose farmer cooperative societies with a total membership of 12,196 of which 2104 were women (SDPEDO, 2015). These cooperative societies are organized mainly to provide agricultural input supplies to their members. About 132 (33.8%) of the participants of the study were a member in cooperative society. The proportion of female-headed households' in the farmers' cooperatives was deficient 20 (15%) compared to 112 (43.6%) male-headed households.

Compared to their male-headed counterparts, the participation of female-headed households in the different social networks was lower except that of village level *edir* association (Table 4.4). The average number of social networks to which households belong/engage indicates the amount of social capital stock of a household. Accordingly, the average number of social networks female-headed households are a member were s 6.52 with std. deviation of 2.797 compared to 8.72 for that of the male-headed household. Chi-square test also shows that there exists a significant difference in membership in a number of social and labor networks between male and female-headed households (Table 4)

Some studies also clearly indicate the varying level of access to social capital between male and female-headed households. The low level of female-headed households' participation in cooperatives was consistent with a study by Aidoo & Tuffour (2015). According to this study, women constitute less than 33 % in cooperatives. About 5% and 82% of the cooperatives

societies do not have female as member and leader, respectively. When they are not member of cooperatives, farming households miss many opportunities obtained by working through small groups (Modirwa & Oladele, 2012) such as, competitive and dependable place to sell their crops, accessing inputs, production technologies, information and markets with fair prices as costs are reduced being shared amongst all members of the group. Similar findings from a study by Malual (2014) shows that regardless of the importance of these organizations, the level of membership and benefit from such organizations varies among households based on their socio-demographic factors which mediate participation livelihood outcomes. The possible explanation for this may be because of the local culture which discourages participation of women in social activities and the work-overload because of domestic tasks.

4.2.3. Physical capital

Health facilities are among the communally owned physicals capitals accessed by the study households. In this study, access to health was assessed based on the availability/existence of modern health services in the area to be used by households when they were in need of treatment and thus shall not be confused with respondents visit the health services for treatment. Human diseases like malaria particularly in the lowland areas, pneumonia, acute upper respiratory infection, typhoid, skin infection, gastritis diseases and communicable diseases on children are the widespread health shocks commonly affecting the inhabitants (SDPEDO, 2013). In the face of such challenges to human health, there were two health centers, ten health posts, and nine clinics under government ownership and five rural drug vendors and three drug shops under private ownership which provide human health services (SDPEDO, 2013) to the population of the district. The same source indicates that the health coverage of the district has reached 75%. Majority of the households 374(95.8%) also reported having access to human health services. The proportion of female-headed households who have access to human health service was 130(97.7) which was even higher compared to 244(95%) male-headed households. But the problem the health institution was rather on the provision of adequate services. Concerning this, 169(43.3%), 74(19%) and 73(18.7%) of the participants of the study reported rate of service charge, distance and lack of professionals as the problem of the health services.

Concerning livestock health, the widespread animal disease such as, anthrax, brucellosis, impanossomosis, and parasites has brought many animal health (Veterinary technicians graduated from private institutions, vendors of animal medicines including some unqualified ones) entrepreneurs to in many of the villages of the district. Thus, access to animal health service was not a problem for households. Alike in the case of human, female-headed households have better access 115(86.5%) to animal health services compared to 209(81.3%) male-headed households. Both human and animals health services seem to be good regarding (physical) access. However, what makes the health of the inhabitants and their animals more complex was instead the inadequacy concerning quality/ standards of health facilities and the professionals and the timing of occurrence of these diseases which overlaps with pick agricultural activities.

Water for drinking is mostly accessed from spring. The vast majority 85.3% of the households reported that the water which they use for drinking was "potable." But on the question "where do they get water to be used for drinking?" Some 90.8% of them reported to access it from spring, and only 6.4% of the respondents reported to obtain water from a pipeline. However, information from (SDPEDO, 2015) indicates the rural population with access to potable water to be only 58%. It was also understood from observations made during the survey and discussion with key informants that, the majority of the streams in the vast rural *kebeles* were unprotected and the potable water provided through pipelines and protected streams were concentrated to certain villages which have a relatively large settlement.

The inflation of access to clean water was thus, related to the perception of the respondents regarding the water they use for drinking. Most of the springs, are used under great traditional care and do not lead to immediate water-borne diseases except during few seasons.

There was no difference in access to drinking water based on gender of heads of the households. The problem was instead with regard to the labor and time required to fetch/collect water from streams. As this activity is culturally perceived as women's role, in addition to other productive activities, female-headed households bear the burden of collecting water which thus consumes their time for production activities.

Table 4.7: Level of households' access to physical infrastructures

Types of physical capital	Mhhhs		Fhhhs		
	Freq.	%	Freq.	%	X^2 value
Potable water	221	86.0	112	84.2	.223[a]
Have irrigation	131	51.0	43	32.3	11.554[a***]
Transport	159	61.9	70	52.6	3.084[a*]
Grain mill	220	85.6	116	87.2	.192a
Human health	244	94.9	130	97.7	1.750[a]
Animal health	209	81.3	115	86.5	5.934[a**]
FTC	181	70.4	73	54.9	9.320[a***]
School	252	98.1	130	97.7	.042[a]

***, ** & * represents statistical significance at <1%,<5%, and <10% respectively

Source: Field survey, 2016

Road access was the other physical capital to which the households had good access. The town of Gallo, the main town of the district is accessible by a gravel road that crosses through it to the neighboring Belo Jigenfoy district of Benishangul Gumuz national, regional state. Few kebeles of the district on the southern part and northeastern direction are also accessed by asphalt and gravel road that passes through them from Addis Ababa to Asosa and Nekemte to Amahara National Regional State (Gojjam) respectively.

Other than these main roads, about 184 km of road of which 108 km was gravel have been constructed to connect kebeles with the district town and other kebeles (SDPEDO, 2015) until the end of this survey. Discussion with informants in the District Agriculture and Rural Development Office, leaders in the kebele administration and community members and observation of the researcher witness the considerable effort made in the development of rural feeder roads lining adjacent kebeles. Nevertheless, most of these roads are not providing year-round transportation services particularly during most of the wet season (June to September). As these roads are easily damaged during the rainy season, access transportation is interrupted (Figure.4.2). Additionally, maybe because of their weak financial position, female-headed households have lower access to transportation than the male-headed household. This gender-based difference was statistically significant Chi-square (X 2=3.084) p<.01.

Households' access to irrigation was also assessed. About 174(44.6%) of the households produce some crops by using traditional irrigation. Like most of the livelihood capitals, the proportion of female-headed households who have access to small scale irrigation 43 (32.3%) was also lower compared to male-headed counterparts 131(51%). The Chi-square test result also shows that the difference is statistically significant (X2 11.554a) p<.01. It was possible to understand from informants (extension workers and farmers from the study *kebeles* who use irrigation) that, most of the irrigation they used were developed on small plots of land to grow some crops mainly maize and some vegetables. Unlike other crop production activities, irrigation is more challenging for female-headed households. This is because of the huge labor required to dig canals to divert water from rivers and intensive labor for preparing the land, draining waterlogged, watering, protecting the farm from wild animals and theft.

In the single growing season of the study district, the vast water resources with higher potential for irrigation could have been developed to enable households to grow crops in addition to the summer season. However, nearly all rivers in the district were not adequately used for such purposes.

Figure 4.2: Road damage and its effect on public transportation

Source, Field survey, 2016

Though they have some land which can be used to grow crops through small scale irrigation, most of the female-headed households reported that they do not use it because of the labor-intensive nature of irrigation agriculture.

Education was among the few services to which the study households have easy access. Regarding educational facilities, the 2016 report of the district planning and economic development office shows a total of 47 schools (39 primary, 4 secondary and 4 preparatory) were found in the district. A total of (13283 first cycle 6144 secondary 1842 preparatory excluding 2nd cycle primary school) students were attending their education in these schools. But high student numbers per class, high student-teacher ratio, lesser participation of girls and high student dropout at all levels of school were the major problems (Sasiga district planning and economic development office). Various sorts of socioeconomic issues were attributed to this problem like the one reported by a female-headed woman named Rumiya Jamal (Handhura Balo) who has drawn her elder son from school for two consecutive years when he was hired as herder at house of one of the village farmer as a means to generate income for the household.

Table 4.8: Frequency of extension services as reported by households

Extension services	**MHHHS**		**FHHs**		**All together**	
	Freq.	**%**	**Freq.**	**%**	**Freq.**	**%**
Weekly	28	10.9	12	9	40	10.2
Once/two weeks	57	22.2	11	8.2	68	17.4
Once/month	29	11.3	23	17.3	52	13.3
On land preparation	95	37	41	30.1	136	34.8
Never visited	48	18.7	46	34.5	94	24.1
Total	257	100	133	100	390	100

Source: Field survey, 2016

Imparting knowledge on farming methods and techniques through agricultural extension are essential for farmers to enhance their productivity. This makes agricultural extension service significant physical capital in agricultural production. About 254(65.1%) of the households have reported to have attended pieces of training (on agricultural technologies) at FTC in the production year preceding the survey. However, the extension service had limitations in the mode of delivery and access. The extension service which was provided through demonstration at FTC was not based on in the interest of all of the participants.

This is because, the pieces of training were sometimes limited to specific agricultural technologies (use improved seeds, chemical fertilizer, and others) which all the households do not apply for different reasons. The trainings do not fit to the interest of some of the participants as they are not using some of the technologies. Such participants attend the practices to get other services (edible oil, sugar, and local administrative service) which are indirectly tied with the attendance of these pieces of training. As a result, skills obtained were not used by the households. The other problem was variation based on the gender of heads of households. As depicted on (Table 4.6), about a third of female-headed households never access any extension service.

Discussion with the extension workers and extension department of the district shows that the services are provided mostly for those households who are using some agricultural technologies (primarily fertilizer and seeds). The farms of the poor and disadvantaged households who have no/less of these productive resources are not visited. Other than such limitations related to the extension programs, from my observation during the survey and the informants, the Development Agents (DAs) also prefer to provide services to the well-off households.

The poor access to agricultural extension by female-headed households was similar with a finding from a study by (World Bank, 2014) in which Ethiopia was also part. According to this study, women farmers because of household responsibilities or mobility constraints, and inability to interact effectively with male extension agents due to cultural norms, have less benefit from the agricultural extension and mostly receive second-hand one from husbands and friends when they get it.

Agricultural technologies such as chemical fertilizer, improved seeds, and herbicides were also used in the production of crops among the study households. Growing crop without the use of inputs, particularly chemical fertilizer was challenging. Because of the declining fertility of the soil, crop production has become used by 38.7%, 31.5% and 27.4% of the study households, respectively. This shows that the use of these technologies was low among survey households. The reason provided by the majority of the households 295(75.6%) for the restrained use of these agricultural inputs was affordability in terms of the price followed by the nature of their land/soil reported by 46 (11.8%) of the households.

An independent t-test was conducted to examine gender difference in the use of chemical fertilizer. Leven's Test for Equality of variance showed violation p=.000. The result indicates that males (M=.5691, SD=.89968) used more chemical fertilizer than females (M=.1992, SD=.48242) t(3887.504)-5.283, p<.01.

Similarly, the test on improved seed and herbicide was also statistically significant (Table 5.7). As can be observed, there was also huge variation based on the gender of heads of households in access to all of the agricultural inputs. Thus female-headed households were by far lagging behind their male-headed counterparts in using these inputs. This was also similar to a study by (UN Women, 2014) which shows that women's have restricted access to vital resources such as credit as well as other agricultural inputs. Other than access, female farmers in Ethiopia, (World Bank, 2014) also use lower-quality fertilizer, misapply the input or use it at the wrong time.

Table 4.9: Use of agricultural inputs by households

Agri. technologies	**Mhhhs**		**fhhhs**		
	Freq.	**%**	**Freq.**	**%**	**t-value**
Chem. fertilizer	123	48	28	21.1	-5.328***
Improved seeds	109	42.4	14	10.5	-3.386***
Herb-cide	98	38.1	9	6.8	-6.831***

***, ** & * represents statistical significance at <1%,<5%, and <10% respectively

Source: Field survey, 2016

Though chemical fertilizer is important, households were not able to use because of different problems such as, timely supply, its price, and other factors of production that are jointly used with it. An informant from Handhura Balo narrates the input price as follows:

Before some thirty years, we do not use any chemical input to produce crops as the land was fertile. The use of chemical inputs mostly fertilizers has started recently. Gradually, most farmers have adapted it and currently at some places, the soil even refused to give yield without the application of chemical fertilizer. Now we have reached a situation where we are more dependent on chemical fertilizer to grow crops but cannot afford to purchase it because of its price which is increasing each year.

Farm implements are important physical capital used by households in agricultural activities. Most crop production activities in the study area as clearance of farmland, tillage, weeding, and harvesting which require individually owned traditional farming tools by households. There are some privately owned traditional tools used for these purposes.

Plough, ax, sickle, and hoe are important farming tools used in the preparation of land, weeding, and harvesting. Majority 293 (75.1%) of the study households have access to these critical tools. However, the proportion of female-headed households who have access to these farming implements was lower compared to headed male households. In particular, the difference in plough was very high where only 43.6% of the female-headed households have access to it compared to 91.4% male counterparts.

Table 4.10: Table: 4.8 Households access to farm implements

Farm implements	Mhhhs Freq.(%)	fhhhs Freq (%)	All together Freq.(%)	X^2 value
Plow	235(91.4)	58(43.6)	293(75.1)	107.306^{a}***
Sickle	246(95.7)	117(88.0)	363(93)	8.169^{a}***
Ax	248(96.5)	114(85.7)	362(92.8)	15.294^{a}***

***, ** & * represents statistical significance at <1%,<5%, and <10%

Source, Field survey 2016

The Chi-square test was also statistically significant (p<.01). The big gender-based variation in access to this tool may be because, its utilization was dependent on other capitals such as, male labor, land, and oxen which female-headed households have relatively lower access.

The type of the shelter of the households and tools were also assessed. As the construction material of the shelter of households' was concerned, 51.5% of the households live in houses roofed with iron sheet. The walls of the houses of majority 339 (87%) of the study households were made of wood and mad. Only about 13.1% of the households had houses built of wood, mud, and cement together. The proportion of households who live in houses with iron sheet roofing was also lower 45 (33.8) among female-headed households compared to 156 (60.7) male-headed households.

Other than the housing condition, households have limited access to some of the household equipments. Of these types of equipments, radio, cell phone and solar energy (with a solar plate connected to a battery fixed on private households) were reported to be accessed by only 34.3%, 21.7% and 15.8% of the households, respectively. Compared to male-headed households, female-headed households have minimal access to these essential household assets (Table 4.9). Chi-square test also shows a statistically significant difference in housing and most of the housing types of equipment between male and female-headed households.

Table 4.11: Types of materials used for construction of houses and household equipments

Construction materials & hh equipments	**Mhhhs Freq (%)**	**Fhhhs Freq.(%)**	**All together Freq(%)**	**X^2 value**
Iron sheet	156(60.7)	45(33.8)	201(51.5)	25.327***
Wood -mud Wall	220(85.6)	119(89.5)	339(87)	1.213
Wood –mad & cement	37(14.4)	14(10.5)	51(13.1)	1.21.3
Sleeping mats	242(94.2)	109(82)	351(90)	14.515***
Bed	242(94.2)	98(73.7)	340(87.1)	32.887***
Tables	206(80.2)	81(60.9)	287(73.5)	16.716***
Radio	123(47.9)	11(8.3)	134(34.3)	60.906***
Cell Phone	81(31.5)	4(3)	85(21.7)	41.795***
Chairs	193(75)	72(54.1)	265(68)	17.683***
Cooking tools	257(100)	133(100)	390(100)	
Solar	54(21)	8(6)	62(15.8)	14.743***
Latrine	244(94.9)	109(82)	353(90.5)	17.214***

***, ** & * represents statistical significance at <1%,<5%, and <10% respectively

Source: Field survey, 2016

This finding was comparable to previous findings by (Temesgen et al., 2010) where only 13% lived in residences made of stone and concrete or brick while the remaining 87% had low-cost houses made of wood and wood products and with an iron sheet, grass, or mud roofs. Cooking materials were the only household physical capitals on which all households have equal accesses.

4.2.4. Financial capital

According to Kollmair & St. Gamper (2002) resources like, available stocks (cash, bank deposit, liquid assets such as livestock and jewelry) and regular inflows of money through labor income, pensions or transfers from the state and remittances that enable people to adopt different

livelihood strategies are financial capital. As a mixed farming system was the dominant economic activity of the study area, crop and livestock were primary contributors to the major financial source of the study area household. Accordingly, 318(81.5%) of the survey households of which 227(88.7%) and 91(68.4%) were male and female-headed households, respectively reported having some livestock. As the type of livestock was concerned, cows are the major livestock raised by the households followed by chicken, donkey, and goats. About 68 (17.4%) households also have beehives.

Table 4.12: Distribution of respondent households' by livestock ownership

Livestock type	**Mhhhs**	**Fhhhs**	**All together**	**t -test**
	Freq. (%)	**Freq. (%)**	**Freq (%)**	
Cow	214 (83.3)	82 (61.7)	296 (75.8)	6.261***
Ox/n	176 (68.5)	43 (32.3)	219 (56.1)	-
Goat	42 (16.3)	30 (22.6)	72 (18.4)	.176
Sheep	38 (14.8)	13 (9.8)	51 (13.1)	1.464
Mule	11 (4.3)	1 (0.8)	12 (3.1)	2.426**
Donkey	75 (29.2)	10 (7.5)	85 (21.7)	5.920***
Chicken	160 (62.2)	43 (32.3)	203 (52.1)	4.030***
Bee hive	64 (24.9)	4 (3.0)	68 (17.4)	20.92**
Problem in livestock raising				
Disease	91 (35.4)	45(33.8)	136 (34.8)	
Lack of pasture	156 (60.7)	61(45.9)	217(55.6)	
	Descriptive statistics			
		Max.	Mean	std	
TLU	Mhhhs	32.93	4.6415	4.69639	t =6.574***
	Fhhhs	16.76	2.2069	2.61231	

***, ** & * represents statistical significance at <1%,<5%, and <10% respectively

Source: Field survey, 2016

On average, male-headed households owned 4.6415 TLU with std. deviation of 4.69639 compared to female-headed households who had 2.2069 TLU. An independent t-test was conducted to examine gender difference in ownership of livestock resources. Result indicate that, males (M= 4.6415, SD= 4.69639) have more livestock ownership in TLU than females (M= 2.2069, SD= 2.6123) t(386.02) -6.574, p<.01. Like other livelihood capitals, the gender-based variation between households in access to the livestock resource was high (Table 4.10). The

result on livestock ownership in the present study is better when compared to findings by (Guyu, 2016; Degefa, 2005) in terms of both the number of households who own livestock and also the average TLU.

Information obtained from (SDPEDO, 2015) and informants indicate that, in the study district, the livestock resource has been declining. About 266 (68.2%) and 136 (34.8%) of the households attributed the problem to lack of adequate pasture and animal disease respectively. As can be understood from (SDPEDO, 2015) which annually collects and analyzes data on the socio-economic aspect of the district, there was an imbalance between the livestock population of the district and health services and feed required to maintain the productivity of livestock. According to this report, there were only one type "C" and four types "D" livestock health institutions to serve the large livestock population (SDPEDO, 2015) reared by the farming households of the district in the environments known for its recurrent livestock disease.

In addition to livestock, income from crop also has essential contribution in the financial capital of the study households (Table 4.11). The study households grow crops like maize, sorghum, millet, coffee, groundnut, and some fruits. There was wide variation in the amount of income obtained from crop between male and female-headed households. The result of the analysis shows that, there was a significant variation based on the gender of the heads in the total values of income from crop production in the harvest time preceding the survey. The estimate of the income from the crop of male-headed households was ETB 6878.8340 which was higher than that of the female-headed households which was ETB 3938.1842.

Apart from the estimated value of income from crop, the gender-based variation was also reflected in the production of high-value crops. The proportion of female-headed households who grow crops as teff, groundnut, coffee and chat which have relatively better market price was 2 (1.5%), 17 (12.8%), 42 (31.6%) and 3 (2.3%) respectively compared to 28 (10.9%), 82 (31.9%), 112 (43.6%) and 18 (7%) male-headed households. Among female-headed households, the average value of income from coffee which is both economically and culturally an important crop was ETB 4120.30 (2015/2016) which was by half lower to ETB 8968.78 for male-headed households.

An attempt was made to examine gender difference on access to financial capital in the form of stock of crops from the harvest of the study year. The result of the analysis shows that there was huge variation based on the gender of heads of households in amount of yield of crops. Households headed by male had a better yield from their harvest that preceded the survey of this study (Table 4.11).

Table 4.13: Distribution of households by types of crop grown in 2015 harvest year

Types of crop	**Mhhhs**	**fhhhs**	**All together**	**t- value**
	Freq.(%)	**Freq (%)**	**Freq (%)**	
Maize	234 (91.1)	123 (92.5)	357 (91.5)	5.900***
Sorghum	207 (80.5)	80 (60.2)	287 (73.6)	5.860***
Teff	28 (10.9)	2 (1.5)	30 (7.7)	4.244***
Millet	67 (26.1)	16 (12)	83 (21.3)	3.399***
Groundnut	82 (31.9	17 (12.8)	99 (25.4)	4.024***
Mango	74 (28.8)	38 (28.6)	112 (28.7)	1.185
Banana	43 (16.7)	11 (8.3)	54 (13.8)	1.408
Potato	12 (4.7)	6 (4.5)	18 (4.6)	1.408*
Coffee	112 (43.6)	42 (31.6)	154 (39.5)	5.926***
Chat	18 (7)	3 (2.3)	21 (5.4)	-
Descriptive statistics				
		Mhhhs	Fhhhs	
Mean of income		6878.8340	3938.1842	

***, ** & * represents statistical significance at <1%,<5%, and <10% respectively

Source: Field survey, 2016

The result of an independent t-test on maize, and sorghum which are the staple food of the study households were owned by male-headed households (M=.547, SD=.28564, and M=5499, SD=2757,) than female-headed counterparts (M=.4049, SD=.18672, and M=4077, SD=1968) t (367.161) 5.900, and t (350.065) 5.860 p<.01. Similarly, the test on coffee which is important as a source of income shows that male-headed households have more coffee harvest (M=.517, SD=.29168) than female-headed households (M=.3776, SD=.15459) t (386.834) 5.926, which is statistically significant at p<.01.

In the lowland *kebeles*, a potential crop for food security of households was mango- a fruit crop is widely grown in the area. Mango trees stand almost in every household's compound, but the income obtained by the households from this plant was negligible because of the market and its perishable nature. As it was abundant during its ripping season its price in the local market is meager. Other than the market, a study by (Tesfaye et al. 2014) also shows that, mango product was recently threatened by a disease called white mango scale (aulacaspis tuberculosis).

In general, the problems with crop production were declining yield, input and weather, and environmental factors. Discussion with key informants in the Agriculture and Rural Development Department Office and agricultural extension workers of the district and community members in all of the study *kebeles* indicates that crop production has been declining from time to time. This problem was reported by 78.5 % of the households (Annex productivity decline). Another problem on crop production was declining yield and low use of input. This was because of the rising in the price of inputs reported by 47.7 of the households. Flooding, hail rain, frost, crop pests, crop failure, most of which are primarily related to environmental conditions were also mentioned by a significant number of the households (Annex environmental shocks) as underlying shocks that affect their agricultural production.

The most serious challenge to the productivity of crop production in the district frequently mentioned in discussion with key informants, FGD and district Agriculture, and Rural Development Office was the poor soil and termite infestation. For instance, a study by Abdenna, (2013) shows that crops, as maize and sorghum are (major cereal crops in the area), are growing under sub-optimal soil conditions. Soil degradation and termite infestation were severe environmental problems, and in some places, farmers have abandoned their land as it failed to support agricultural production. In addition to this, recently the spread of weed locally known as *degsa* (literally mean impoverishing) was also reported by households in the lowland areas to be a severe problem that affects crop productivity.

The other important element of financial capital was access to credit. Access to this service is sources of financial capital for rural farming households to access loan needed to purchase agricultural inputs and run a small business. Because of less liquidity of the assets owned by rural households, the loan from credit services was necessary. Access to credit was more difficult

for female-headed households. On an inquiry whether men and women have equal access to credit services, the response of nearly half 190 (48.7) of the study household indicates that men and women not treated equally in the provision of credit. This can be understood from the number of female-headed households reported to access this service was 47(35.3%) compared to 140(54.5%) male-headed counterparts (Table 4.12).

Though female-headed households have less economic status compared to male-headed households, the proportion of those who reported accessing loan from rural financial institutions was lower. The percentage of female-headed households who were denied access to financial services from the local microfinance while they were in need of it was higher than that of male-headed households. This indicates, in addition to the poor rural financial service in general, the presence of a big difference in access to credit services provided by microfinance institution based on sex of households. Households have reported various factors which in relation to this problem among which failed to get acceptance by loan group, lack of collateral and fear of high-interest rate (Table 5.12) were the major ones.

Other than access, utilization of loans obtained from micro finances for productive purposes was also a big problem among female-headed households. These households reported that they invested the loan on lower return farm (purchasing input and raising small ruminants) and non-farm activities.

Table 4.14: Problems in accessing credit services by households

Credit	**Mhhhs**		**Fhhhs**		All together	
	Freq.	**%**	**Freq.**	**%**	**Freq.**	**%**
Access	140	54.5	47	35.3	187	48
Lack while in need	98	38.1	69	52	167	42.8
Problems on credit						
Lack grouping	39	15.2	31	23.3	70	18
Lack collateral	20	7.8	14	10.5	34	8.7
High interest	26	10.1	19	14.3	45	11.5
Inadequate	123	48	36	27.1	159	40.7

Source: Field survey, 2016

Petty trade, input purchase, and fattening were some of the purposes for which loan the loan from the micro finances was used (Table 4.13). Because of other productive resources particularly labor, they could not engage in activities like production of high-value crops and fattening. The case from Alami:

I did not take loan. My children prevented me from taking it because of the fear of loss of our farmland in case of default. It leads to losing land by many people in the surrounding. I cannot grow [diversify] different types of crops such as groundnut like men which will enable me to pay the loan.

This shows that availability of loan is not adequate as utilization of such loan for the intended purposes was still dependson the capacity of households to invest it on productive activities.

Table 4.15: Purposes for which loan from micro finance was used

Loan allocation	**Mhhhs**		**Fhhhs**		**All together**	
	Freq.	**%**	**Freq.**	**%**	**Freq.**	**%**
Social purposes	8	3.1	9	6.7	17	4.3
Purchase input	50	19.5	4	3.0	54	13.8
Ox/n-Fattening	31	12.1	10	7.5	41	10.5
Petty trade	69	26.8	22	16.5	91	23.3

Source: Field survey, 2016

Discussion with key informants (local administrative officials, loan service officers in microfinance) shows that loan taken from microfinance institutions was sometimes improperly used for purposes like paying the previous loan, cover expenses on wedding ceremonies, and others social objectives than being invested on productive activities. This, in turn, puts the borrowers into indebtedness. There was no intent and mechanisms for the loan providers to control such wrong acts of their clients.

4.2.5. Human capital

Human capital is crucial productive resource since it serves as the labor house for various activities carried by households. According to Odero (2014), it is the most important one as people are both object and subject of development. The household level of access to this

important capital is determined according to these authors, household size, skill levels, leadership potential, health status, etc. In the same way, in this study, the amount and quality of human capital possessed by households was measured in terms of farming experience, adequacy of labor, education attainment, skills on farming health condition of the head and household members, skill on making farm implements and others were measured to analyze the human capital of the study households.

The average farming experience of the study households was 22 years. On average, female-headed households have relatively higher farming experience of 24.89 years compared to 21.99 for male-headed households. About third of these households have farming experience of 20 years and above compared to 47.1% male counterparts. Most of them have farming experience which above the average. This is because a majority of them were widowed who have older age. This might have been useful in terms of having some knowledge of farming activities commonly carried by women.

Though long years of farming practice was assumed to result in cumulative knowledge/skills on farming and has a positive effect on the human capital of households, the relative long years of farming for female-headed households may not be the case. They cannot carry most of the labor-intensive agricultural activities.

Table 4.16: 1Households farming experience

Years	**Mhhhs**		**Fhhhs**		**All together**	
	Freq.	**%**	**Freq.**	**%**	**Freq.**	**%**
1-10	23	8.9	5	3.8	28	7.1
11-20	113	44.0	53	39.8	166	42.5
21-30	75	29.2	46	34.6	121	31.
31-40	37	14.4	21	15.8	58	14.8
41-50	9	3.5	8	6.0	17	4.3
Total	257	100	133	100	390	100

Source: Field survey, 2016

Discussion with female household heads was evident that their longer farming experience on important farming activities like plowing, clearing farmland, harvesting of some crops and other is practical only when combined with some male labor. The relatively higher farming experience

of female-headed households, in this case, was because of their relative older age as most of the female-headed households included in this study were widowed.

Adequacy of labor for farming was the other important productive resource to pursue different farming activities. Adequate labor enables households to use other resources such as land and oxen. From the study participants, only 97(24.8%) have reported having adequate labor. Regarding the gender of the household heads, labor seems more scares among female-headed households. About 21(15.8%) and 76(29.6%) of female and male head households reported having a scarcity of labor for different agricultural activities. A Chi-square test also shows a statistically significant difference (X2 =35.835a), p<.001.

Table 4.17: Labor adequacy and household members' health conditions

Adequacy of Labor & health	**mhhhs Frq. (%)**	**fhhhs Freq (%)**	**together Freq (%).**	**X^2 value**
Adequate labor	76(29.6)	21(15.8)	97 (24.8)	35.835^{a***}
Hhh in good health	223(86.8)	80(60.2)	303(77.7)	8.910^{a}**
Sick hh member	43(16.7)	38(28.6)	81(20.7)	7.466^{a}**

***, ** & * represents statistical significance at <1%,<5%, and <10% respectively

Source: Field survey, 2016

The health condition of members of the households was also important component of household labor. The proportion of household heads in good health condition among female-headed households was 80(60.2%) which is lower than that of male households 223(86.8%). Households headed by females also have a large number of 38(28.6%) members with health problem compared to 43(16.7%) male-headed households. This indicates that, female household heads were less healthy which may also compromise the labor supply to pursue various livelihood strategies than male-headed households.

The result of chi-square result on the gender of household and healthy to work was statistically significant. Male-headed households were more likely in good health condition Pearson chi-square test (χ^2 =35.835a, df=1, p=.001) than female-headed households. Similarly, household members in male-headed households had less health problem (χ^2 =7.466a, df =1, p=.006) (see

annex 3). A possible explanation for this may be related to their lower financial status to get medication.

The poor health condition of household (of both the heads and other members) has various implications on the livelihood and food security of households. First, unhealthy household heads cannot actively engage in production activities, labor exchange. Secondly, a cost incurred through expenses on medication diverts households' income from productive investments and food. In such a way, lack of adequate labor and health of household heads and members affects not only the short-term income/food production by households but also the sustainability of their livelihoods in some indirect ways.

Table 4.18: Educational status of household heads

Level of education	**Mhhs**	**Fhhhs**	**All together**	**t-test**
	Freq(%)	**Freq.(%)**	**Freq.(%)**	
No education	78(30.4)	103(77.4)	181(46.4)	
Primary	149(58)	29(21.8)	178(45.6)	
Secondary	28(11)	1(0.7)	29(21.8)	10.816***
Diploma & above	2(0.6)	0(0)	2(0.5)	
Total	257(100)	133(100)	390(100)	

***, ** & * represents statistical significance at <1%,<5%, and <10% respectively

Source: Field survey, 2016

Another critical element pertaining to human capital of the households was their educational attainment. This is important for rural farming households as educated farmers are more receptive to new ideas, agricultural technology. A substantial proportion of the participants 181(46.4%) have no important element of human capital. From the remaining 209(53.6%) have some formal education, the educational level of majority 178(45.6%) was limited to primary level. Thus, only very few of the households 31(7.5%) have educational level up to secondary and diploma level.

Regarding the gender of the heads of the households, more than third 103(77.4%) of the female household heads have no formal education compared to 78(30.4%) male heads. The proportion of female household heads with primary level of education was also very low 29(21.8%) compared to 149 (58%) male-headed households (Table: 4.16). The variation on educational attainment of households was examined, and there was high variation based on the gender of

heads of households. The result of the using t-test analysis shows that male-headed households have educational attainment (M=.568, SD=.1977) than female-headed counterparts (M=.392, SD=.1225) which was statistically significant t(375.684)10.816 p<.01.

Table 4.19: Households' skills on different farming activities

Types of human capital	**Mhhhs**	**Fhhhs**	**All together**	**X^2 value**
	Frq. (%)	**Freq.** (%)	**Freq (%).**	
Farming skills	254(98.8)	129(97.0)	383(98.2)	-
Ploughing	227(88.3)	24(18.0)	254(64.3)	188.732[a]***
Clear farm land	237(92.2)	69(52)	306(78.4)	84.388[a]***
Hoeing	242(94.2)	113(85.0)	355(91)	9.083[a]***
Planting tree	235(91.4)	112(84.2)	347(88.9)	4.669[a]***
Weeding	238(92.6)	120(90.2)	358(91.7)	.660[a]
Harvesting	244(95)	121(91)	345(88.4)	2.296[a]
Threshing	246(95.7)	100(75.2)	346(88.7)	36.913[a]***
sowing seed	241(93.8)	53(39.8)	294(75.3)	137.343[a]***
Fencing farm land	245(95.3)	85(64)	330(84.6)	66.470[a]***
Make livestock shade	244(95)	69(52)	313(80.2)	102.566[a]***
Bee hiving	151(58.8)	7 (5.3)	158(40.5)	104.058[a]***
Making farm implement	211(82.1)	5(3.8)	216(55.3)	220.107[a]***

***, ** & * represents statistical significance at <1%,<5%, and <10% respectively

Source: Field survey, 2016

In addition to the lack of accessibility of schools in the region (in the past), in-depth interview with female-headed household shows that, their low level of education was the result of the wrong perception of the community in general and their parents in particular that prevented them from attending education during their younger age. Girls have been restricted to travel to distant places for any purposes. Even when they were enrolled in school, they were overloaded with household tasks and could not properly use their time for their education as boys do. Recently, though there was significant increase in the enrolment of children including girls, alternative methods of education of farm households such as adult education are absent in the district.

It is evident that farming requires many skills to perform a series of tasks starting from the preparation of land up the final stage of storing the yield into the granary. In relation to these skills needed in different agricultural activities, nearly all 383(98.2%) of the heads of study

households have reported having some skills, and there was no significant difference concerning the gender of household heads (Table 5.17). This is because the term farming skill is a very general on which households who can perform only one or two of the farming activities affirmatively can respond like those who have adequate/many different skills on farming.

However, as the specific agricultural activities are concerned, the farming female-headed households do not have adequate skill on some agricultural activities such as ploughing, clearing farmland, terracing, sowing seed, fencing farmland, making livestock shade/stand, bee hiving and making farm implements compared to male household heads. Pearson Chi-square test also shows significant difference between male and female-headed households (p-value <.001) except on weeding and harvesting (Table 4.17). Households headed by a female have no adequate skills on some farming activities. Though women participate in most farming activities, some activities like land preparation by ploughing with oxen are perceived as exclusively men's activity.

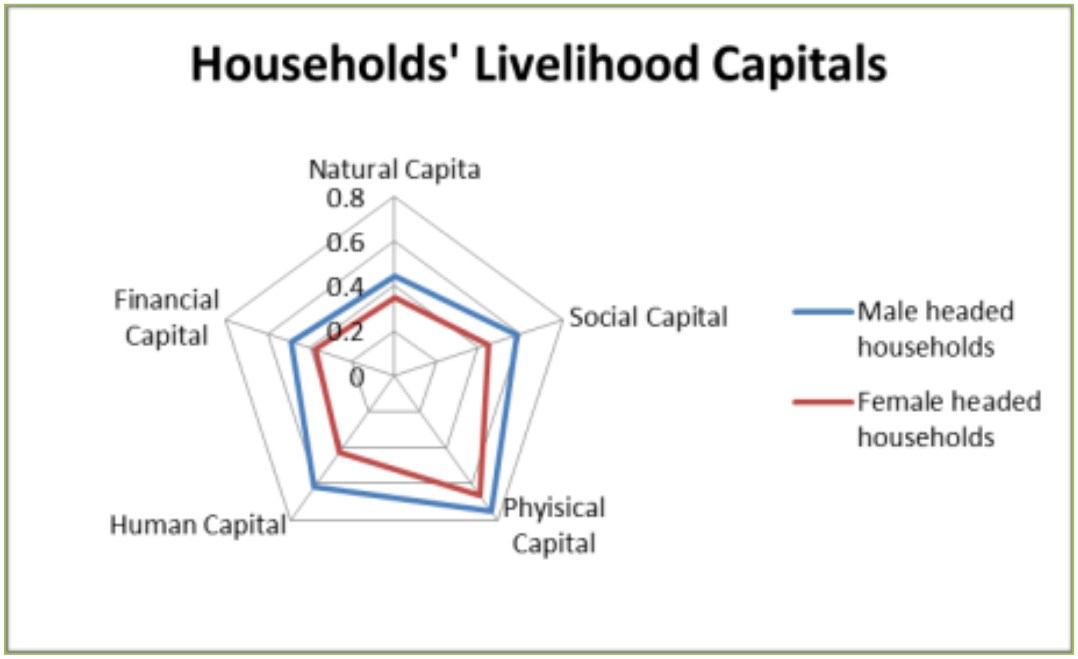
It is also considers cultural taboo for a female to plough land with oxen according to the local tradition. In addition to the lack of skills, according to some informants most of the agricultural activities-plow, clearing farmland, trashing, and fencing are labor intensive and too cumbersome for women in female-headed households who have no male labor. Consistent with this, from a study in Wolayita (Bereket and Degefa, 2016) shows that, women actively participate in all agricultural activities except ploughing. Poor access to to human capitals as educated, farming experience, farming skills, and health by female-headed households was also documented by (Messay, 2009).

4.3. The cumulative asset position of female-headed households

Based on the livelihood capital index, female-headed households have lower access to all forms of livelihood capitals namely, natural, social, physical, financial and human capitals compared to their male-headed counterparts. The average livelihood asset (livelihood asset index) of male-headed households in this study was 0.5489 while that of female-headed households was 0.4263 (Annex Cumulative Asset position). The type of livelihood capital on which female-headed households have nearly similar access with their male-headed counterparts was physical capital (except household equipment). The reason was that this capital was public property.

The finding obtained from the assessment on the livelihood capitals reveals that, female-headed households' exhibit lower livelihood capitals. For instance, female-headed households score significantly lower on the entire livelihood capitals as visually depicted on the asset pentagon (Figure. 4.1). There was significant variation between these households in access to land which is the key household asset in the study area where agriculture is the main source of income for the households. The average holding land holding size was 2.36 hectares for male and 1.58 hectares for female-headed households. According to (FAO, 2011) better access to and control over this resource (land) by women farmers has direct impacts on farm productivity and indirect implications for improving household welfare and women's status and influence in the community.

Figure 4.3: Asset pentagon showing households access to different livelihood capitals



Source: Field survey, 2016

There was also difference in access to important financial capitals such as crop production, livestock ownership and access to credit services between male and female-headed households. On tropical livestock unit average, male-headed households have more substantial livestock holdings than female-headed households. Female-headed households' access to credit services was limited by many factors like, lack of acceptance by loan groups, low asset position that can

be used for collateral and biases of the loan provision process which involves local administrators in the nomination of households to get the loan.

In particular, the livelihood resource variation seen on the human and social capitals (relatively important to engage in different livelihood strategies) was more extensive. Even on physical capitals on which female-headed households have relatively better access may be because most of the physical capitals (health institutions, road and transport, and others) are communal assets provided by the government, nevertheless, they could not fairly utilize them as such utilizations depend on access to the other resources.

For instance; using transport, health services and education of children depend on their financial capital. While stressing on the importance of social capital, (Grootaert & Narayan, 2001) argues that social capital matters more for the poor than the non-poor and has a more significant effect on household welfare than investment in primary education. Other than its importance as one livelihood capital, human capital according to (Šlaus and Jacobs 2011) enables making use of any other type of assets.

The result on the low level of access to productive resources in this study was consistent with findings from other studies conducted on female farmers in general. For instance, though there is a regional difference (FAO, 2011) found that, female farmers have less access to the productive resources such as, land, modern inputs, technology, education and credit services is a critical determinant of agricultural productivity and services required by agricultural producers. In particular, the low level of access and control of livelihood capitals by female-headed households in this study was consistent with a study by (World Bank, 2014) on six countries in which Ethiopia was also included (UN Women, 2014) shows that, women because of gender roles in agriculture and socio-cultural norms have unequal access to a variety of productive assets. Similar evidence by (FAO, 2011) indicates that, female-headed households fall back their male counterpart in access to and ownership of livelihood assets in rural areas as, land, livestock, modern inputs, financial services, extension services, and labor. Garedew (2017) argues that, ownership of these capitals particularly oxen and labor affects the crop productivity through their effects on the timing of cultivation.

What makes this finding unique with the previous results was the variation happens in the area where resources mostly natural resources as land are assumed to be abundant. The existing land is also of poor quality because of acidity and termite infestation. As female-headed households are concerned, other findings didn't say anything about the extent of variation on access to specific livelihood assets. Instead they most of the time indicate only the variation on all of the assets and some assets as, land, agricultural technologies, and credit which is important among rural farming households. But in this study, there was a wide variation in social and human capital and a tiny difference in physical capital.

4.4.Summary

In this chapter, households' access to the livelihood assets and some contexts that constrain the status of these assets were examined in detail. The political ecology approach primarily supported the analysis on the access to livelihood assets. The lower access to all of the productive resources by female-headed households was the product of the age-old patriarchic tradition which discourages equal access by women to most of the productive resources and the incapability of the local institutions in implementing policies. Lack of awareness among members of the society mainly women on gender equality has resulted in the continued mistreatment of women. The unequal access to resources was also caused by lack of empowerment and representation of women in both formal and informal local institutions (Chapter 5). Thus, the deep-rooted inequality between male and women in the community was also manifested in the lack of political commitment regardless of the various initiatives provided in the national constitution and many different policy documents.

Access to and ownership of livelihood assets/capital resources together with the existing transforming structure (Chapter 5) determine the options households have in pursuing alternative livelihood strategies, of course, with varying level of livelihood outcomes based on the capacity to utilize them. The analysis has revealed the significant variation in the level of access and control on the different types of livelihood capitals between male and female-headed households. Female-headed households have a lesser asset position with an average livelihood asset index of 0.4263 compared to 0.5489 for male-headed households (Cumulative Asset position). Female-headed households have less access and ownership of productive assets such as livestock, labor,

and input. In particular, the variation on livelihood capitals which are instrumental in the livelihoods of mostly the poor households such as social and human capitals was high. The human labor quality (male labor, education, head of household being healthy to work and health condition of other household members) of female-headed households was poor compared to male headed households. It was only on physical capital that female-headed households have relatively the same access to with their male-headed households.

The result also gives some insight on how the lack of access to one or more of the livelihood assets/capitals was connected to weaken the already existing assets in a complicated way. The weak financial (livestock) and natural (and land) resource of female-headed households which can be used as "collateral" and social capitals of female-headed households affected their access to loan service. Similarly, high illiteracy rate, lack of skill on farming, low health status, and others will unquestionably worsen the access to human capital by female-headed households undoubtedly impact their productivity. In addition to access, some of the livelihood capitals such as land and vegetation resources on which the livelihood of the study households greatly rely on is declining from over time because of adverse environmental factors such as, acidity of soil, infestation of weed, degradation of soil, termite infestation and deforestation resulted in the declining of agricultural production. The conservation measures carried to reverse the deterioration of these resources were inadequate. Lack of one of the productive resources reinforces the absence or appropriate use of the other. Given the fact that the rural households of the study area depend on crops and livestock as primary source their food and income, the declining yield has a negative implication on their livelihood and food security.

Chapter Five

The Role of Local Institutions in the Food Security and Livelihoods of Households

5.1. Introduction

While striving to achieve better livelihoods, households depend on different indigenous and formal institutions. These institutions can be formulated either through the local formal government structures and have written rules and laws or informal ones which have been passing from generation to generation and thus are based on an unwritten code of conduct such as customs, sanctions, and traditions that regulate the activity of the society. Whatsoever the form, these institutions according to Scoones (1998) have persistent and widespread use to peoples livelihood.

The food security status of a household is a livelihood outcome (as indicated in the conceptual and analytical framework of this work) reached after livelihood asset are combined in complex ways to enable households to pursue different livelihood strategies. These livelihood strategies operate under multiple local (both formal and informal) institutional arrangements which determine access to livelihood resources and interaction among members of society. A better understanding of these institutions, in turn, prepares the ground for an inquiry into the livelihood strategies and food security of the study households in the following chapters. To get a clear picture of the livelihood strategies and food security status, assessing how these local institutions through local customs/traditions, rules, and regulations (policies) affect the access to and use of resources by households is important.

It would be imperative to give some insight before dealing with the livelihood strategies pursued by households (Chapter Six); on the role of these local institutions (transforming structures) as they are linked in a complex manner to the livelihoods and food security of households, which is the theme of the research. Thus, the purpose of this chapter is to explore based on the Sustainable Livelihood Framework (SLF), the roles played by local social institutions (both informal and formal) which are thought to be more important in mediating access to productive resources

(particularly labor, credit, land, and agricultural extension) required to pursue different livelihood strategies so as to ensure food security.

5.2. Social relations and labor sharing practices

There were widespread indigenous social networks and traditional labor management practices in the district. These social networks can be established by relatives, neighbors, and residents of a village. The development of these institutions according to information obtained through discussion with the informants of the study *kebeles* is related to the nature of the livelihood of the rural farmers which require strong mutual support and cooperation.

Coffee drinking associations/groups were one of such social networks. It is formed by neighboring households (the number varies depending on the density of the village population) to drink coffee together in round. Information obtained from discussion with the informants in Angar village (Oda Guddina Kebele) and Janja (Galo Janja kebele) shows that coffee is important crop which in addition to its economic values also has different social values among the local community. One of the social benefits of coffee drinking group was the strong social interaction maintained through coffee drinking association. Similarly, information from also FGD shows that it strengthens the social bond among its members. According to the information from this FGD discussant, an individual member of a coffee drinking group cannot abstain from drinking coffee from the household with whom they are not in good relation or dispute. During every coffee ceremony (every day), elderly persons from the coffee drinking party make a prayer just before drinking the first cup of coffee as follows:

Afaan Oromo	English equivalent:
Ya waaq si kadhanna!	*Ho God we beg you!*
Biyya nagaa godhi	*Let peace be in our country,*
Kan qonne nuu magarsi	*Let abundance be in the market*
Gabaa quufa godhi	*Let what we grow productive*
Bunaaf nagaa nu hindhowatiin	*Please, God, do not refuse us coffee and peace*

Source: Abaya, an informant from Balo village (Sasiga District)

It can also be used as a forum where participants exchange different ideas. Coffee ceremony creates an opportunity for neighbors to gather under a single roof for a short time where they can share important information with each other while drinking the coffee. Elders also use it as a stage where they can transfer the norms and values of society to others. Coffee drinking group is the only social network in which women equally participate with men in sharing different information. It is thus, an important stage for women who have limited information because of tradition and domestic workload to learn what has been going on around them. Unlike most of the social networks, the coffee drinking group is less gender discriminatory, and hence female-headed households have also actively participated.

Nevertheless, some also criticize coffee drinking association to have an adverse effect concerning time management of the participants. This is because according to the tradition, an individual who drunk the tuna (the coffee boiled in the first round), no matter how much he or she would be busy; was forced to wait until the *baraka* (the coffee cooked on the second round) would be drunk and this may take up to half an hour or more.

Edir is an informal association organized by households living in the same or nearby villages. It is found in almost all the villages of the study district. Usually, as only heads of households become a member of these associations, they are dominated by males. Female-headed households become a member of local *edir* mostly when their husbands are unable or not alive. Depending on the bylaw of the *edir*, the members hold a regular meeting either in the house of members on turn basis or at a fixed place. During the meetings, they discuss and decide on various issues of their association. They also mobilize resources through a financial contribution to a common fund from members mainly for mutual support under certain bad conditions-commonly on the events of death. The amount of money regularly contributed varies between different *edirs* and is commonly less than ten ETB. Though may not be stable and sustainable compared to the ones formed by households heads, similar associations can also be organized based on age, faith, and gender backgrounds.

Edir associations are formed with the primary objective (but not limited to) provide burial services to their member households. Though it may vary from village to village, this service may include assistance in the form of cash to cover costs incurred in relation to death, provision

of food and drink during few days of such shocks, condolence, and labor on farm activities. In addition to burial services, in the study district, *edir* associations were active also in economic and social aspects. They provide labor support on agricultural activities to their members and also participate in settlement of conflicts among their members. In such a way, the benefits of *edir* associations are many folds for rural communities. Firstly, had *edir* associations are not there, alternative organizations which provide burial services are non-existent in rural areas. The moral and financial support and condolences at the time of death are essential for members to recover from the shocks and hopelessness created to them because of the occurrence of death. Secondly, they accommodate the marginalized groups who are not a member of the formal local formal institutions such as *Kebele* and structures below that. Thirdly, membership and active participation in such institutions are essential means of accessing livelihood assets as labor reciprocations, social capital (through networking) and social cohesion (settlement of conflict which may arise between members). But most of the *edir* associations were largely reactive in their approaches. Information obtained through in-depth discussion with members and their leaders indicates that; they were intended mainly to manage post crises issues mostly death. Only on a few occasions, they provide financial support for medical treatment of sick members.

Though *edir* associations were important local institution; women, in general, were not fairly represented; like in many other local institutions; both as a member and in its leadership. Female-headed households who were a full member were not actively participating and exercising any leadership role. This was because, in addition to the domestic work burden of female-headed households; of the local tradition which discourages women's participation in the community. In addition to their low participation in its leadership, women members could not get the required returns in the form of reciprocity like that of males from their *edir* associations. For instance, Alami Taye complained lack of expected benefit from the *edir* in which she was a member as follows:

The thatched house in which we live is leaking. Since my daughter has married last year, my younger son has been working on some farm labor to support the household. But he cannot cut and carry the bulk grass needed for thatching the roof. Either I could not manage to do it by my labor because I am sick. I do not have any person who can give me support. I am member of edir

association which I entered for the time of problem. Though I cannot participate in all the labor activities equally with men, but have been discharging my membership obligations of the monthly membership contribution (5 ETB birr). As my last alternative, I requested this edir in which I was a member to help me in the maintenance of my hut/house. But I could not get the support I expected from my edir.

This shows that, though female-headed households have active participation in the edir association found in their respective villages, they may not be reciprocated comparable to their contribution. But, regardless of such limited benefits, female-headed households participate in edir because it is not an option to be out of such membership more importantly because of its social benefits in other social aspects as burial services.

***Jaalaa*:**is a name by which children mostly boys call a person who held them when they are circumcised. In rural areas, most of the time young boys are circumcised at their childhood. At this time parents do not want to stay near their young boys because they cannot tolerate the pain felt by their young boys. *Jaalaa* who will hold the circumcised children with great care will be sought. Such practice is common almost in most parts of Oromia but may be named differently. In the aftermath of the circumcision, *jaalaa* who held the boy seated between his two legs considers the boy as his own child. Therefore, *jaalaa* is a local institution through which a close friendly relationship is established between young boys and individuals who hold them when they are circumcised called *jaala* in the study community.

The relationship starts immediately after the end of the process of circumcision as the *Jaalaa* frequently visits the circumcised child sometimes by carrying prepared food until he recovers. A few weeks later, when the wound of the circumcised boy is hilled, *jaalaa* invites the boy to his home with his families (usually his father and mother). This invitation or ceremony is known as *mana seenna* (entering home). After the boy and his parents are served food and drink at the home of *jaala*, the parents of the boy will return home while the boy stays for few days (two or more) at the home of his *jaala*. This symbolizes the *jaalaa's* act of taking the boy as one's own child and socialization with the family particularly the children. The friendship established through *jaalaa* last throughout the life of the boy and his *jaalaa* and their parents. Particularly, *jaalaa* is the one who will be responsible for caring for the boy in the absence of the boy's parent

because of death. It is almost equivalent with "*yakiristinaabat*" (Godfather). The same procedures have been applied to female children before the prohibition of female genital mutilation. Yaadatee Jiraataa; a woman living in Angar village of Oda Guddina, one of the study kebeles explained how relationship established through *jaalaa* tradition has enabled her to secure the expense required for the education of her elder son.

I am raising three young children on my own. As I am far away from where both my relatives and that of my husband live, I could not get adequate support when I am in need. The only help I get comes from Jaalaa of my elder son. This person covered all the expense needed for my elder son. He took him to his home where he provided him with all the material (clothes, food and other educational materials) required to pursue his secondary school education.

***Abbamichu/Michu*:**

Oromo communities of Sasiga have a strong mutual social and economic relationship with the neighboring Gumuz communities which they have developed over more extended period. Part of the present-day Benishangul Gumuz has been (before and during *Derg* regime) part of the administrative area of former Wollega province. In addition to such historical relations, a traditional friendship tie known as *michu* (friend) between the two communities was also instrumental in establishing strong social and economic interdependence through. The two individuals who become a friend in this way call each other as *abba michu*.

It is similar with local Oromo tradition of *abba harmaa* (literally to mean father of breast) through which two individuals establish friendly relation through a ritual known as *harmahodhaa* (feeding breast) where the outsider feeds on the breast of the other (whom he/she wants to make new father) to symbolizes the relation established between them to be like father and some/daughter. Similarly, a person from Gumuz community or Oromo feeds/suck on the breast or make a vow to the one with whom he wants to be a freeing/relative. The act of feeding on breast/vow is to symbolize the level of the relationship to be equivalent with the one having blood relation. Through such strong connections established between individuals from the two communities, an Oromo and Gumuz who wants to travels through or works in each territory shall get personal security and of his properties from his *abba michu* (friend) and vis-à-vis.

Socio-economic relation between the two neighboring Oromo communities of Sasigga and Gumuz of Belo Jigenfoy district through this tradition was important context worth consideration in relation to the access to land. Many inhabitants of northern part of Sasigga District who shares the same boundary with of Belo Jigenfoy, one of the districts in Benishangul Gumuz National Regional State have been and still sharecropping in and renting in land from farmers from Gumuze people. The friendly relationship through the tradition of *abba michu* has important role in such exchanges between the two communities. As a result, many farmers of Sasigga have agricultural land in the territory of Gumuz which they have been using for many years. Nevertheless, information from those who have such land in Balo Jigenfoy district have the problem of tenure security. This is because they do not have legal holding right on such lands as they are not member in *kebele* administration and hence uncertified. Such cross-boundary ownership of land was unsettled through formal administration except by local customs such as *abba michu*.

Figure 5.1: Gumuz community members at Balo local market (Sasiga District)

Source: Field survey, 2016

Gumuz communities use such relationships with neighboring Oromos not to participate in similar farming activities in Oromia; but rather to get access to markets found in Sasiga district or beyond where they can sell their agricultural products as, cotton, maize, sorghum, honey, and paper and buy consumer goods and clothes. Akuukku (Lagenaria abyssinica), fruit like a plant (having a spherical shape), is also an important item which they market to the highland people. It

is commonly used as a container of honey, dough and particularly for churning milk almost by all of the Highlanders including Sasiga.

With regard to gender, women rarely directly participate from either of the community, in such relationship. Women from both communities do not go into each other's' neighboring territory and establish friendship among themselves or with males through *abba-michu*. Instead, they may have friends in the form of a customer from whom they buy or sell goods to and vis-à-vis. Thus, like other social relations, this also discriminates women to involve in such relationships equally with males directly.

Abba michu is a unique institution which has been an important local tradition in maintaining a harmonious mutual relationship between the two communities. Gumuz and Oromo communities around Sasiga have been peacefully living with Oromos as good neighbors for centuries except for few hostile relations in the far distance times. However, according to informants from Balo and Shankora (villages found in *kebeles* neighboring Balo Jigenfoy District of Benishangul Gumuz Regional state) it is becoming loose since the early years of the 1990s. Frequent disputes have been occurring (with the 2008 and 2018 being the major one) between the neighboring Oromo and Gumuz communities mainly over claims of farmland (according to the same source), but need to be investigated

5.3. Local traditions, beliefs and informal institutions

There are long-standing indigenous local social institutions in the study district and its surroundings which the households are using to meet their diverse livelihood needs. These social institutions are designed to facilitate access to different productive resources (such as labor) and thus important in the livelihood of the study households. While most of these institutions seem to have a purely economic role, they are also important to enable households to cope with difficult social, economic and environmental conditions. Though there are various types of such institutions, in this study, only a few of the socio-economic and social based institutions were discussed.

5.3.1. Traditional beliefs

Jaarii: is a ritual carried by the local people every year with the onset of spring season. Its primary purpose is to have a prayer to *waaqa uumaa* (the divine creature) for the wellbeing of the community, timely rain of spring and summer months and plenty in the production of the next *afraasaaa* (farming season). It is very similar in nature and purpose with April *wedaja* practiced in Oromia Zone of Amahara region (Degefa, 2005). This ritual is practiced at a fixed place where all the members of only a given *warra* (lineage) living in the same or neighboring villages will be gathered usually under a big tree commonly called *muka jaarii* (a big tree designated for *jari* and hence sacred). Since it is assumed that everybody should get satisfied with his food needs on the day of *jaarii*, a large amount of food will be prepared under the *mukajaarii* through a contribution from each household members of the *warra*. At this place, the *gosa* (clan) elders make the prayer by holding in their hands; fresh grass called *coqorsa* (synodon dactylon) and a small leafy branches of *ulumaayii* (clausena anisata), *abbayyi* (maisa lanceolata), *urgeessa* (permna schimperi), and a stick made of *waddesa* (cordial africana) anointed with butter on its top. After the end of the prayer, all the food and drink will be consumed. The holding of green leaves and fresh grass held during the ritual are to wish rain which brings pasture and water for livestock for their livestock and grow crops.

Although the festivity on the ritual compromises the utilization of food, *jaari* has an important role in the conservation of the environment. This is because, the entire biophysical environment where the *jaari* ritual practices are viewed as a sacred place and hence protected from any disturbance by a human. Like many other cultural traditions in the area, the practice of *jaarii* also declining and observed by few people. Some of the observant of the tradition of *jaari* attribute all the problem of hunger to the denial of people of the area to follow the codes of *jaari*.

Atete is another ritual practiced exclusively by women. The ritual is held where women from the village are gathered to pray accompanied with songs and dance praising the *attete* spirit and sacrifice to call it to come/appear on a woman who sows *atete* (*ateetee facafatte*) and worshiped. It is a ritual held by women in the neighborhood who wish to have children. This is similar in some aspects with *fatimaye* (Degefa, 2005). In the present study, though the prayer is mostly for those women who are infertile locally called *dhabdu* (the one who doesn't have any child) and

want to become pregnant and those who want more children, it can also conducted when some natural disasters occur mostly untimely rain and health problems of both human and livestock. The ritual is important for women to include female-headed households to get along with fellow women in the village which may contribute to their social capital.

How does subordination of females develop in the community?

In Ethiopia, women constitute nearly half of the population. In the study area too, women represent 48.7% percent of the total rural population. Because of different traditional norms and cultural practices, women occupy a lower status in the community. They are coached to be submissive and dependent on the male for resources and most decisions. The gender bias against females is marked by the *illillee* (a shouting in an expression of joy with the new baby by mothers gathered during the delivery) immediately on the birth of children. This *ilillee* (shouting with happiness) is repeated five times when the newborn baby is female and ten if it is male. The newborn babies are also given different tool called *mutaa* (a niddle like equipment made of metal and used by women to make a handcraft by sewing a trade like thin plant fiber) for female and spear if male. This is to symbolize the assignment of women to domestic activities and males to tasks outside the home, respectively. It also tells which assets male and female can access.

It can be evidenced from discussion with key informants that, starting from early childhood, girls and boys are told to behave in some way desired by the society. Girls are trained mostly by mothers to be expert in the household tasks such as, collecting fuel-wood, fetching water, cooking, washing, cleaning and childcare and a good mother in the future while boys too are trained by fathers and members of the community on their expected roles as; herding, plowing using oxen and extra farming activities as hunting. These social expectations determine which materials boys and girls are to use starting from childhood to begin to apply to work/familiar with. In general, girls grow under heavy surveillance both by parents and members of the community concerning their personality of mainly feeding, relationship, dressing, and many others. In an attempt to make them selfless and be concerned about their family in the future, what, when, how and how much they need to eat is controlled. The local Oromo proverbs "*Durbaa fi jiboota garaa duwwaa leejjisu*" meaning; girls and bulls shall be tamed empty

stomach/unfed and many others are instrumental in educating girls to withstand starvations and challenges.

The only room where the local culture gives due respect to female is in their reproductive roles. They are viewed as the one which connects two different clans through marriage and sustains the bloodline of the husband's family by giving birth to children. More than anything, bearing male children on whom the future generation of the clan depends increases their power and acceptance in the clan. It is for such values that women even after the death of their husbands are inherited by brothers or someone in the lineage of the deceased husband through remarriage locally known as *dhaala* (inheritance). According to the information obtained through discussion with one of the informants at *arategna* in Oda Guddina *kebele*, recently such traditional practices are becoming unacceptable because of both religion (mostly among Christian religion followers) and the prevalence of HIV/AIDS. Instead, the widows mostly stay within their husband's clan where the children and the properties of the household mostly land can get protection without remarriage?

In such a way, the social construction of gender has resulted in a sizeable gender-based inequality in the area which is still manifested through unequal access to and control of resources which farther reinforce such disparities. Gender-based differences are evident on the social, economic and political life of women of the district. From my observation during the survey, village names in most of the study sites are called by the name of male ancestors. According to the tradition of the study communities, men and women are entitled to own and control over different types of productive resources. Males are entitled to inherit their families' properties including land. Only rarely females either inherit land from their parents or allocated by the local administration. The varying level of access to productive resources such as land, livestock and other valuable resources between male and female-headed households is primarily located in the local tradition by which male is given the upper hand in control of these resources.

5.4. Role of local social organizations and institutions in the livelihoods of households

Usually, rural households have different local institutions which are important in their daily economic activities. Degefa (2005) argues that these types of local institutions (informal) which

are functioning at community level play an important role in maintaining food security both at an individual and household level. As the livelihood of rural households was based on agricultural production, the analysis under this sub-heading also focuses on most of the local institutions which are important in mediating access to productive resources needed in the pursuance of agriculture.

5.4.1. Production based institutions: labor sharing practices

The study households have a number of traditional labor cooperation mechanisms organized mostly on agricultural activities. Especially, mutual labor supports are arranged on many different activities as cattle herding, protecting crop fields from attack by wild animals, construction of houses and others. These labor networks have different names at different places. *Dabo*, *dado*, *dugda* and *dabare tikaa* are some of the labor reciprocations practiced by the local community.

It is common to see the cooperation of labor on many activities. *Dugda* is one of the mechanisms through which rural households mobilize labor. It is a temporary labor group established by two or more individuals to reciprocate in labor on a turn basis. In this small labor network, the labor is reciprocated immediately or within a few days. The purpose was to get moral strengthen and ease immediate labor shortage on a specific task. Sometimes, human labor is also exchanged for using oxen, pack animals and other resources in the form of *dugda*. For instance, a person may work with his labor for some specified day/s (based on the agreement between the parties) for someone who would give him oxen. Dado is immediate labor reciprocity institution like *dugda*. But when compared to *dugda*, it is relatively more abundant in the number of people participate in it.

Debo is another local institution on labor but slightly different from both *dugda* and dado. Mostly, it is organized to execute tasks which cannot be accomplished by the efforts of a few individuals. It is thus a means to lessen the burdens of work of individuals/households particularly at peak times of agricultural activities, construction of houses, fences, clearance of farmlands and others. Its other difference with the former ones is it requires the provision of food and drink of special diet for those who come to provide labor on occasion. The labor provided on

debo is also reciprocated but it may take longer time and may not be on precisely similar task. This institution has rarely used by female-headed households because of the high financial costs it involves for preparation of food and drink to be served on the occasion. A study by (Bereket and Degefa, 2016) also indicates that only the well-off households can mobilize labor this mechanism.

The people of the study area commonly practice *Dabare tika* (a rotational cattle herding group). This is also a form of labor reciprocity designed to solve the problem of assigning family member by a household to herd a few sizes of cattle on a daily basis. Through this system, neighbors pull their cattle population to be herded by a single herder on a rotational basis. This enables the households to use the labor saved in such a way for other production purposes.

Though important to the livelihood of the households, most of these traditional labor sharing practices are highly gendered. Information from discussion with the community members (from Galo Janja and Haro Lalisa which are near to the zone capital) indicates that most of these traditions of sharing labor have been declining. The rise in the marketability of the labor and increased dependence of the poor on it has been the driver in the in the change of the traditional labor sharing practices including dabo. As labor seen easily exchanged for money, people become less willing to render such labor supports freely like in the past. Labor is essential resource particularly at pick agricultural activities which people are less willing to share. The opportunity of getting access to and level of participation in labor exchange depends largely in addition to socio-economic status, on one's gender and capability to reciprocate an equal amount of energy and work. The free labor support of widows, elderly and others is rarely accessible.

Hidhata (pairing oxen) is a traditional local institution by which two individuals pair their oxen and use it to farm their land with the paired oxen on a turn basis. Through this method, each companion uses the paired oxen for two consecutive days on one's farm on rotation. In case one of the partners cannot use the paired oxen either because of lack of labor (mostly of male) or lack of inputs or both, the paired oxen shall be used by the other person including the companion based on some arrangement mostly in return for a fixed amount of in-kind payment of grain locally known as *dawulla* (grain payment in return for using ox/oxen) for utilizing the ox/oxen for a given growing season.

Ox sharing: sharing oxen to some who is in need is a common practice among the study community. It is an important mechanism to cope with the shortage of draft power. This practice has different forms. The dominant kind of ox sharing is *ergisa* (borrowing oxen) to those who do not have their oxen to farm their land for growing crop. In this case, oxen and if necessary with all farming equipment that is needed to till the land with oxen are given to the borrower. The other type of ox sharing takes the provision of oxen with the full package of plowing equipment and the labor needed to work with the oxen. This type of ox sharing will be provided to households (mostly female-headed) who do not have male labor to use the borrowed oxen. It was partly because of the ox sharing (as indicated in Chapter 5) that many households who have no plough oxen were growing crops. Households, who do not have draft power, depend for the entire crop production on ox sharing for the many rounds in the preparation of land before seed. Of course, farmers who have oxen may also use this mechanism under some situations mostly when their ox/oxen is/are sick or when they need additional oxen. But this one is temporary (limited to a few days).

Jarsa biyya also called *jarsa araaraa* (local elders) is a traditional local institution used to settle a conflict. It is one of the many old age traditional institutions found in the study area. Information obtained through discussion with the key informants indicates that, most of the time disputes arising between people on land (boundary), grazing, and other resources and other matters are commonly settled through this traditional dispute settlement mechanism before they are taken to the formal courts The action can be set in motion by either of the disputants and sometimes by elders (third party). The elders who settle the dispute are appointed from individuals who have a good reputation, knowledgeable, and thought to be impartial.

Though significant in the process of resolving conflict, this institution has some limitations concerning gender. When the issues of women are entertained through this institution, the *jaarsa biyyaa* (local elders) are influenced by specific implicit rules (deep-rooted patriarchal tradition) which make their decision partial. Decisions on disputes arising between men and women on resources such as land (which are traditionally perceived as men's property), favors males over women. In this way, women are denied justice against facts on the ground and hence are forced

to compromise their interests because of fear of the sanction imposed by the elders and community if they refuse the verdict passed by this body.

Box 5.1: Dispute on land settled by *jaarsa-biyya* (traditional conflict settlement method)

Rumiya is 30 years old woman heading a household of six members. She has a complicated health problem which was perceived as bad luck by her husband. This has finally resulted in their separation settled by *Jaarsa biyya* (local elders). In the process of settlement of the dispute on the land between the two, the *jaarsa biyya* (local elders) decided that the two hectares of land they had to be equal equally shared each takes one hectare. It was also agreed that her x-husband support for their five children (all of who opt to stay with their mother). According to the arrangement made by *jaarsa-biyya*, he has agreed to raise the children particularly by providing labor to farm on the share of land given to her. The *jaarsa-biyya* did not consider the number of children while making such a decision on the stock of land. But later he refused to provide any material or labor support to the children and the *jarsa biyya* (local elder) do anything either.

The other problem is, most of the time women are not a member of the *jaarsa biyya* (local elder) including at times when their issues are entertained. In such a way, they are forced abide by a decision given by a body in which they are not represented. In addition to this, the *jaarsa biyya* (elders) either do not have sufficient skills on most of the issues they deal with or juridical power to enforce their decision. How *jaarsa biyya* (local elder) has favored Rumiya Jamal's x-husband on their divorce is expressed as presented in (Box. 5.1).

Though the patriarchal traditions mostly influence the decision of *jaarsa biyya* (local elders), gender biased and there is also wide gap (particularly on the right of women) between the formal legal procedure and the practice of resolving the conflict by the (local elder). Nevertheless, the method of settlement of disputes minimizes time, energy and cost involved in settling conflict through formal means.

5.5. Formal institutions on land: access, use and tenure security

With limited income from non-farm sources, land is a crucial resource in the livelihood of rural farming households who depend on agriculture. Cognizant of the importance of land, the

Regional National State of Oromia has issued a number of proclamations at different times regarding its administration, access, and use. These proclamations on land use and administration were set to institutionalize the access, use, and security of tenure on rural land by farmers and pastoralists as provided in Article 40(4-8) of the constitution (FDRE, 1995). The land use and administration proclamation 2002 which was issued by the regional state council was the first legislation which was committed the ownership of land and its use for different purposes.

Regarding access to land, article 5/1 of proclamation No.130/2007 allows any resident adult whose age is 18 and above to get access to rural land free of payment as long as he wishes to base his livelihood primarily on agriculture. The access to land is thought to be realized through acquisition in the form of donation, hire and allotment by the government (Megeleta Oromia, 2007). Gift and hire are common means of access to land in the study area. However, access to land through this means is less practical because of different factors. Firstly, because of cultural tradition, donation and hire are gender biased in the study community. Secondly, according to the article (14/1) of the same proclamation, allotment by the government is also set as conditional on the availability of vacant land. The same provision prohibits redistribution of land except for unoccupied pocket lands, irrigation land and abandoned state farms). Under such situations, the provision under article 5/1 of proclamation No.130/2007, "any...gets rural land free of payment as long as he wishes to base his livelihood primarily on agriculture" (Megeleta Oromia, 2007) is merely a promise and less practical. The provision failed to realize as promised access to land 11(2.8%) of the sample households though they are basing their livelihood on agriculture.

Various use rights including lease, transfer to family members/hires and also sell, exchange or transfer of property thereon are guaranteed by article 10(1) of the proclamation No.130/2007. It may seem those holders are given many different options on how they can use their land. But the size of land to be rented from one's holding was limited by this article. This has negative side effect particularly on female-headed households who are most of the time forced to rent/lease sometimes their entire land holding as they lack male labor or cannot afford to hire labor to farm the land on their own. The most likely strategy used by female-headed households is renting of their entire holding which is restricted according to this provision. The good thing was, though this article puts a limitation on the households in the amount of land to be rented, the local

authority does not implement it. Hence, any households including female-headed are left unchecked in the size of land they can rent out. The other use right which may work against the interest of unable people including female-headed households is article 6(16) of the same proclamation which restricts leaving one's holding uncultivated (for one growing season) without adequate reason.

The same proclamation has also restricted the sale of fixed assets/perennial crops on one's holding. The provision of the proclamation was separately designed for western Oromia region in which the study area is also part. The rationale behind it was the eviction of farmers by urban bourgeoisie who provide a loan to the farmers when they are in a bad financial condition in return for the sale of a coffee plantation on a more extended contractual basis. The sale of a fixed asset is thus allowed only under two exceptional circumstances; when the fixed asset (perennial crop on land) to be sold should not occupy more than 50% of the total production on ones holding and when the agreement on the sale does not extend over three years.

This provision limits the use right (renting out) of land by female-headed households. It restricts the social and economic benefits that could be enjoyed by these households who do not have other options than using their land only through lease their entire holding or may leave such land uncultivated. The provision which sought as a solution to prevent the impoverishment of the farmers (a specific region) because of the sale of assets (coffee plants), did not consider the fate of female-headed households who have limited access to alternative financial sources (credit) particularly than selling the property on their land including coffee. Hence, it limited their coping mechanisms by disposing of their fixed assets as coffee when they fail to access alternative financial resources through other means.

In practice, regardless of such attempts to protect the tenure and use right of holders through the various provisions in the proclamation, the expropriation of farmers produce is continuing in the study area through informal local institution (market). *Liqii baalatiti* is one of such system by which farmers though may not sell their assets such as coffee plantations on their land, are exploited by local money lenders. Local money lender mostly traders extend a loan to farmers when they are in a dire financial situation with the agreement to return it in terms of agricultural products (crops mostly cereal and coffee). Under such case, the farmers cannot sell their

agricultural products at market price but instead give it to the money lenders as payment on the rate agreed when they took the loan. A similar type of agreement may be made on loan for land. In this case, local money lenders extend the loan in return to use some amount of land of the borrower in the next production season.

In general, the different proclamations on land administration and use focus on ensuring tenure security of households on the plots of land they already own than enabling access to land by those who do not have land as provided in the EPRDF constitution and the same latest land use proclamation No.130/2007 of Oromia National Regional state. The paradox is, while many people have no land for agriculture and still large numbers of people cultivate small plots of land in the study district, there was wide area of land reserved for investment which only employs periodically few people from the local people as laborers.

5.6. Local formal structures for the livelihood of households

Organization refers to the structures also called as "hardware" in SLF and includes both private and public ones who deliver ranges of services and thus affect livelihoods of the households. These organizational structures as stated by (Kollmair & Gamper, 2002) are crucial in access to livelihood capitals, to pursue different livelihood strategies and hence shaping the livelihood of households. Though there were many such organizations which were important in the livelihood of the study households, under this sub-heading, the analysis was limited to microfinance, NGOs, district agricultural extension department and women, and children affairs office which seem to have more importance in the livelihood of female-headed households.

5.6.1. Micro finance

A number of sources indicate that rural financial institutions have been increasing in Ethiopia. According to Ebisa, et al., (2013), the number of these institutions legally registered by the National Bank has reached 31 by 2012. According to these authors, most of these financial institutions which have significant market share both in borrowing and provision of loans are owned by the state. They target poor sections of the urban duelers and rural farmers. They have an important role in the livelihood of rural households of the study area who are constrained by collaterals and other requirements to access financial services from formal financial institutions.

Many of the study households were beneficiaries of financial services provided by Oromia Credit and Saving Share Company (OCSSCO), the only formal financial institution found in the district.

The result of the analysis on the financial services to the households' shows that, access procedures followed in the process of selecting a potential recipient, adequacy of the size of loan and terms of payment were frequently reported by households as the limitation of the microfinance institution. The variation in terms of access to the credit service on the basis of the gender of heads of households was high (Chapter 5, Table 4:12). While the microcredit lending programs were supposed to target women, this principle was not strictly enforced by those who involve in the provision of the service. As a result, female-headed households have by far less access to this service compared to male-headed counterparts. The major reason for less access to credit by female-headed households was their weak asset base. For instance, provision of loan for agricultural inputs was linked to the land endowment and other resources as livestock which is viewed as "collateral."

In addition to this, information from discussion with informants (officials of OSSCO, local leaders and farming households) indicates that the process of loan provision passes several stages of screening in which the committees from local administrators involve in determining who is illegible to get the loan. The procedure was very subjective and biased as the nomination of an individual for credit sometimes goes beyond the evaluation of his economic background to repay the loan. For instance, in a group loan screening process, though an individual member has got acceptance by his group members, his/, her loan request will be realized only when local/*kebele* administrators approve the same application. The local administrators, in turn, give such approval not based solely on the evaluation of important issues such as being a legal residence and other factors related to such person, but rather his/her participation in meetings and local development activities.

In general, because of the various problems (both from the side of the borrowers and the financial institution) indicated above, the effect of the services the financial organizations on the livelihood of the study households was not going beyond relief to immediate financial need. In particular, female-headed households could not get equal access to the financial services

provided by microfinance because of their socio-economic situation created which is the product of the deep-rooted gender inequality.

The result of this study also conforms with the finding by (Ayalew, 2014) which indicates that, the proportion of divorced and widowed women who access loan was very low compared to women who were married (in the household headed by males) for a reason as lack of acceptance in the loan group or fear of repayment of loan. A study conducted on the impact of microcredit in Amahara and Oromia regional states by Desai, et al, (2006) also shows that, regardless of increase in the chance of borrowing and the loan size, evidence on the rise in households' income and improvement in school attendance or empowerment of women in household decision making due to the program was limited.

5.6.2. District Agricultural Extension Department

Currently, it is firmly believed that agricultural extension is instrumental in realizing agricultural productivity. Following the decentralized federal administrative structure, the office responsible for the implementation of the agricultural extension strategy was organized according to IFPRI, (2010) under the Ministry of Agriculture and Rural Development. The district Agriculture and Rural Development Office is the executive unit arranged under the zonal Agriculture and Rural Development Office. In the study area, agricultural extension service is provided to farming households through a line department set under the District Agriculture and Rural Development Office.

The mode of delivery of the service is mostly based on extension workers' visit to farm households, which is frequent particularly during land preparation, planting and harvesting seasons. Occasionally, training to farmers on new agricultural technologies (mostly inputs how to use seeds with fertilizer and pattern of planting) by arranging a public meeting at demonstration plots managed by extension workers at FTC were also used.

It was evident from information obtained from discussions with informants (farmers, extension workers and district Agriculture and Rural Development Office head) that, the provision of agricultural extension in the district had a number of problems such as, limited coverage,

extension workers turn over, shortage of logistics, limited agricultural technologies, resistance from farmers to adopt new technologies, favoritism in the service of the extension workers to well off households and many others. The extension programs were limited to extend new agricultural knowledge and technologies mostly inputs which were experimented through research. Nevertheless, all the agricultural tools and practices by farmers including those who had better access to the extension services were traditional ones. The agricultural technologies mostly inputs (fertilizer, improved seed, and pesticide) are used more traditionally. This is because of the failure of the extension system to detach the farmers from the conventional mode of production.

The result of the study (Chapter 4) shows a wide gap between male and female-headed households in access to agricultural extension services. From dissuasion with female-headed households, the agricultural extension workers most of the time pass over them or visited them only rarely. Some of the biases by extension workers against women are associated with the perception that female-headed households do not use most of the agricultural technologies (largely inputs) which are channeled through them. Another possible reason for ignoring female-headed households was their internal view of better performance being linked with overall productivity gain in agricultural production the large proportion of which is contributed by the well-off farmers. By the district agricultural extension department, extension workers' performance evaluation was also seen mainly against the amount of agricultural harvest by farmers whom they have been providing technical service. In addition to this, information from discussion with district extension and Agriculture and Rural Development Office heads shows that, the extension workers tend to serve more the well-off households who could provide them food when they stay the whole day to carry their duties in the remote rural areas where they cannot find any food even to buy for money.

Women and female-headed households cannot fully utilize most of the conventional technologies even when they are accessible. This is because of lack of other resources as labor, land, credit, others which are needed to utilize the conventional agricultural technologies (seed and chemical fertilizer) mainly on cereal crop production. Agricultural techniques fit to the particular interest of women were minimal. Other than the main crops, women need technologies

which enable them to grow food on smaller land, require less labor, input and farm management. Traditionally, production of crops like, vegetables and spices on the garden are said to be for women activities. But as the primary focus of the agricultural extension program was mainly to boost production of major crops particularly, cash crops, technologies on these areas were absent.

The finding in this study corresponds with previous studies (World Bank Group, 2017, Ragasa, 2012, Ragasa et al., 2012). For instance, a finding by (World Bank Group, 2017) indicates that the extension program could not reduce the preexisting gender gap in the agricultural outcome. Similarly, a finding from another study by Ragasa et al., (2012) also shows that female-headed households' access to extension service (through extension workers advice and visit) was lower as compared to headed male households. This result is still consistent with a finding by Kasa & Degnet, (2004) which indicates that extension agents tend to work very closely with middle-income farmers and pay little attention to the resource-poor farmers. In other finding based on his reviews of the extension systems in Ethiopia under successive regimes, (Kassa, 2003) noted that, the different extension approaches adapted to this time have benefited not all the potential users of the services. The present approach is not free from similar problems particularly as related to gender.

5.6.3. Children and Women's affairs office

It is evident that, in Ethiopia, women had lived under difficult social, economic and political conditions. They occupy a lower social status in the community because of gender inequality which is reinforced by culture. Studies (ESPS, 2008) show the existence of a significant gender gap in literacy, educational attainment, occupation, access to media, age at first marriage, type of work for earning and others. To solve such gender-related problems, the constitution of (FDRE, 1995) under article 35 has set a provision which entitles women to affirmative action to remedy the legacy of inequality they have been suffering. Some policies and programs were also designed to ensure the different provisions of the constitution of which the establishment of an office directly working on the problems of women in the formal government structure from federal to district level is part of such moves.

Sasiga District Women and Children Affairs Office was also established for similar purposes. The office was organized with the general objective of empowering women. Information obtained from consulting the documents (in the form of video records and written reports) regarding the activities of the office shows that it has an important contribution in the improvement of the livelihood of a number of women in the district. Some of the achievements by the office in the economic empowerment of women organizing women to do some works as, wavering cotton, cooperate on farming activities, and making fuel-saving stoves (a locally produced stove) with the provision of small credit can be scaled up.

However, the attempts of the office had only limited success in improving their social and economic problems of women. This was for two main reasons. Firstly, the office has focused its attention on routine problems women such as sexual violence, early marriage, rape, female genital mutilation, abduction, conflicts arise between husband and wife and related issues. Strategically working on the root cause of gender inequality through education was given less concern. Broader issues related to the livelihood of women (except some attempts of organizing women on small businesses) were absent in the activities of the office. Secondly, the staffs who were working in the office have a low level of knowledge of the issue of gender and how it deals with technically. This can be understood from the unrelated fields of study of the staffs. The office was staffed by seven workers who have no related educational background to gender/women.

The office lacks a separate plan for a disadvantaged group of women such as female-headed households who have a unique problem. Some of the economic empowerment activities of the office (mentioned above) also targeted only those women who are living in towns and nearby rural villages. Failure to integrate their operations with other institutions in the district which are working on development issues such as, extension, credit and other activities has also limited to accomplish some of their goals.

Poor resource both human and logistic allocated to the office was another problem. According to the head, the office is disconnected mainly because of the problem of logistics from kebeles where the difficulties of gender are widespread. As a result, they were restricted to nearby areas of the district. The office was given less emphasis, and it seems that it was established merely to

form an office responsible for women as provided in the structure of the district. Because of this, there was a loose relation between the office and women of the district.

5.7. Summary

This chapter dealt with the role of local institutions which shape households' access to different productive resources. There are diverse local institutions (both formal and informal) which are used by the study households for labor cooperation, settlement of disputes and access to and use productive resources in the study area.

The indigenous practices like, *jaarii*, and *atete* are traditional beliefs by which the local people express their wishes of a better future in their livelihoods. They have many implications for the social cohesion of the community. The prayers for peace, abundance in agricultural production and best wishes in the life of the society put strong aspiration in the mind of the people and commitment in their endeavors to realize such desires by exerting more effort in their work. Of course, some of them also have considerable adverse effects as the practices of the rituals involve a considerable amount of expenses for the preparation of food and drink.

The mutual labor reciprocations (*dabo, dado,* and *dugda*), sharecropping, *jaarsabiyya* (elders' council) and paring oxen are important in the livelihood strategies of households. In addition to access to resources, these traditions are still important in cementing the social relation of the observant of the tradition. Some of the livelihood benefits obtained from these traditional institutions are unique and rarely provided through the formal institutions. However, because of their partiality on the basis of gender (which is the major limitation of all/most of these institutions), they have an adverse effect on the food security and livelihood of female-headed households. For instance, women participation in decision makings concerning them (in the resolution of conflicts through *jaarsa biyyaa*) is still less because of the dominance of men and less interest from women themselves because of local traditions and work overload.

The provisions of rural land use and administration 2007 regarding access to land which states access to agricultural land free of payment for those who wish to base their livelihoods on agriculture is far from practicality because of lack of vacant land to be allotted and other

provisions of the same proclamation and laws on redistribution of land. The implementation of these provisions is not free from prejudice against female-headed households. This is because the land legislations are implemented in the community where gender inequality is deep-rooted. Thus regardless of the enactment of series of proclamations by the regional state and other laws to execute them, there is a significant variation based on gender on access and use on land. The relatively low access to and use of land by female-headed households is the cumulative effect of the local intuitions (both formal and informal). In the face of such discrimination, the instrumentality of formal local laws -rural land use and administration enacted by the regional state in promoting equitable access, use and tenure on land regardless of gender is indisputable.

Still provisions on the land use which puts limit on the amount to be rented from one's holding, appropriation of land left uncultivated for more than certain years, and prohibition of sale of fixed assets on one's land (a law applied to specific areas as southwestern Oromia) restrict the use right of female-headed households. Such provisions are barriers to the coping strategies to food insecurity and optimal use of such resources by households-particularly female-headed. For instance, the law which prohibits renting out more than half of the total land under one's holding is against the interest of female-headed households who cannot cultivate any parcel of their land by their labor or use hired labor unless they rent it to others.

Agricultural extension and microfinance were few of the local formal organization structures providing different services to the study district. The provision of extension service was not accessed by the study households equally. Mainly the variation based on gender was high. Such biases against a specific group of people or locations either in the planning or their implementation of the agricultural extension have been inherent in the agricultural extension system of Ethiopia. The effect of the financial services provided by microfinance institutions was also not praised by the households as a tool to overcome the socio-economic problems. This may be related to the size, terms of payment, bias in the selecting borrowers, poor utilization by the borrowers and the less productivity of the agricultural on which the households invest the loan.

Chapter Six

Livelihood Strategies of Households and their Viability

6.1. Introduction

Achieving sustainable livelihood at household level requires engagement in diverse livelihood activities and strategies. This chapter deals with the households' livelihood activities and strategies specifically on, the pattern of livelihood strategies, access to different productive resources, level of diversification and viability of the livelihood activities and strategies with particular reference to gender.

6.2. Livelihood activities and diversification as strategies

Rural livelihood diversification is defined by (Ellis, 1999), as 'the process by which households construct a diverse portfolio of activities and social support capabilities for survival and to improve their standard of living.' The various livelihood strategies pursued by rural households to improve their livelihoods are grouped into three broad clusters (Degefa, 2005; Goodrich, 2001; Scoones, 1998) as, intensification/extensification, livelihood diversification, and migration. As is the case for most rural parts of Ethiopia, nearly all of the study households are also highly dependent on a mixed crop and livestock production for their livelihood. They also combine verity of other non-agricultural livelihood strategies with crop and livestock production. The choice of these strategies is determined by the resource base of the households and the local institutions, which mediate access to and use of these resources. Boundaries between the different strategies are hardly drawn as households are switching from one to the other livelihood strategies either as a mechanism of survival at the time of shortage or creatively combine different activities to supplement income.

Of course, there has been an extensive debate between scholars on the relative advantage of diversification of livelihood as compared to specialization. Those who argue in support of specialization as noted by (Degefa, 2005) underscore that, through share of labor into non-agricultural activities, diversification negatively affects the growth of agriculture and indirectly

the economic growth of the country which is highly based on the sector. Even though the answer to whether income diversification provides better livelihood perspectives compared to economic specialization is not straight forward, however, there is a strong justification based on empirical findings in developing countries which supports it.

A study by Hussein & Nelson, (1998) suggested that livelihood diversification into non-agricultural activities is reasonable for most people in the majority of rural areas of developing countries and are central to the construction of sustainable livelihoods. In the same way, Tassew (2000) also shows that, in an environment where agriculture is risky, and the credit market is non-existent, diversification increases farm households' capacity to undertake risk at the farm level. The comparative advantage of diversification was stated in what Ellis, (1999) has stated as "livelihood systems are less vulnerable than undiversified ones; they are also likely to prove more sustainable over time precisely because they allow for positive adaptation to changing circumstances." The same author highlighted that diversification of livelihoods is motivated by several factors as, from a desire to accumulate to invest, to spread risk or maintain incomes, to a requirement to adapt to survive in eroding circumstances, or some combination of these. According to this author, local level policies and projects that were insensitive to local priorities and wrong in their understanding of the key income sources of poor people were created to the neglect of the diversified nature of rural livelihoods in the past.

The prevalence of diversification of rural livelihood activities is well expressed by Degefa, (2005) as, "it was difficult to identify households that exclusively depend on a single type of livelihood activity." The result of the present study also depicts the fact that diversification of livelihood by rural households is instrumental in attempts made at attaining sustainable livelihood. I believe people still struggle to attain it.

6.2.1. Intensification of agricultural activities

On-farm strategies, crop and livestock production

In the study area, crop and livestock production activities were once carried on the basis of extensification. Some crops like maize and sorghum have been grown through expansion of

agricultural land to free and unoccupied lands. A sort of semi-pastoral livestock rearing locally known as *daraba* has also been familiar to the study area a few decades before. However, the extensive system has now become impractical because of the socio-economic and political changes that the inhabitants have undergone. Thus, currently, the mixed crops and livestock production based on intensive farming has become the dominant livelihood strategy. Development interventions in the form of input supplies, extension services and credit provision on agricultural activities are witness to the alignment of the services of the local institutions with this strategy.

Households in the study area are commonly engage in mixed farming activities. There are strong reasons for the pursuance of the mixed crop-livestock as a dominant livelihood strategy for the study of rural households. Firstly, this is because the two activities are interdependent. Livestock contributes to crop production in various ways. Most agricultural activities such as draft power for plough and threshing and pack animals for transportation of crops from farm to home and from home to market are dependent on livestock. Livestock products like milk and its byproducts are important ingredients consumed jointly with other foods made of cereals in the food habit of the study community. In the face of a shortage of food (of crop source) during summer time and the better production of animal products as milk during this season as pasture is improving, combining crop and livestock is important in the sustainability of access to food by households.

Secondly, other than such direct relationship, livestock products are also crucial in the production of crop through their dung- organic nutrients which contribute (depending on the size of the herd) to the soil fertility management mostly on garden plots. Farmers apply manure on their farmland by rotating cattle's stand on the farm plots before it is ploughed to grow crops. In the same way, crop production also contributes to livestock production. When crop is harvested, livestock is released to feed on the crops residue left on the field.

Thus, crop production and livestock rearing strategy are perceived as the appropriate livelihood path to be followed. Other than such economic purpose, access to crop and livestock has important indicator of social status. Ownership of a relatively large amount of livestock and stock of grain in granary is perceived as a sign of self-sufficiency and hardworking farmer

among the study community. Of course, there is a tradeoff between the production of crop and livestock as they are competing for the land resource to be used for cultivation and grazing land.

As shown in Table 6.1, results also indecated that the mixed crop-livestock strategy is the principal source of income for a large proportion of households engaged in agricultural activities. About 318(81.5%) of the study households have combined crop and livestock to make a livelihood. Regarding gender, 91(68.4%) of female-headed households compared to 227(88.3%) male-headed households, drive a significant part of their livelihood from this strategy. This is to mean, nearly all of the households that rear livestock also engage in the production of crop and vis-à-vis.

Table 6.1: Distribution of households by adopted livelihood activities and strategies

Livelihood Strategies		**Mhhh(N=257)**	**Fhhh(N=133)**	**Total**
		Freq. (%)	**Freq. (%)**	**Freq. (%)**
On-farm Intensification	Crop only	27(10.5)	39(29.3)	66(17)
	Crop & livestock	227(88.3)	91(68.4)	318(81.5)
	Labor others farm	181(70.4)	97(73)	278(71.3)
	Petty trade	132(51.4)	58(43.6)	137(35.1)
Non-farm Diversification	Selling firewood	1(0.4)	4(3)	5(1.3)
	Pottery	-	2(1.5)	2(0.5)
	Making hair	2(0.8)	1 (0.8)	3(0.7)

Source: Field survey, 2016

Crop production: Nearly all 384(98.5%) of the households produce one or more types of crop mostly for subsistence. Producing crop as the only on-farm activity was reported by 66(17%) of households mostly based on rain-fed. Reliance solely either on crop or livestock as a livelihood strategy was rarely practiced. Households depend on only crop or livestock when they lack some productive resource. The proportion of female-headed households who grow crop alone was higher 39 (29.3%) when compared to 27 (10.5%) male-headed households. Discussion with key informants shows that reliance particularly on crop alone as a livelihood strategy is a sign of poverty. Though its contribution to the livelihood of the households was insignificant because of small size, close to half 174 (44.6%) of households grow some vegetables and maize by using

traditional irrigation. In addition to the food crops, households also produce market-oriented ones like coffee, groundnut, sesame, and nigerseed.

The use of modern agricultural inputs in the production of crops is common practice among households. The survey result shows that 38.7%, 31.5% and 27.4% of households were using modern agricultural inputs as chemical fertilizer, improved seeds, and herbicides, respectively. There was a notable difference based on the sex of heads of the households in using these modern agricultural inputs. For instance, the proportion of female-headed households who have applied chemical fertilizer, improved seed and herbicide was lower 21.1%, 10.5%, and 6.8% compared to 48%, 42.4% and 38.1% male-headed households, respectively. It can be easily understood that this variation in the use of these inputs also results in the variation in the productivity of the households.

Though sought as desired livelihood path, the study households frequently reported that crop production is challenged by the acidity of soil and infestation of termite. Still, informal discussion with the district agriculture and rural development office also indicates that the poor soil conditions and infestation of termite on crop field are critical problems on crop production. According to the information from the district agriculture and rural development office, various attempts have been made to improve the soil condition through series of natural resource conservation programs one of which was application of soda. But there was minor success. This is because of the large size of soda required per hectare to treat/recover the soil which was less feasible to be done on the labor of the farmers. Other than this, farmers were annually planting eucalyptus seedlings on such lands and gradually turning it into eucalyptus plantation. The move at conservation through forestation of degraded land by eucalyptus trees need to be handled with care as it may risk the sustainable use of land for crop production.

For female-headed households, the gender-based division of labor was one obstacle in pursuing crop production. Agricultural activities are highly gendered in the study area. While both sexes perform most agricultural activities (sowing/planting seeds, weeding, harvesting, threshing and storing of crops and rearing animals), but because of local tradition some of the agricultural production activities like, clearing farmland, tilling land using oxen, fencing crop land, sawing

seeds of some crop types, bee hiving and others are considered exclusively as men's tasks. Therefore, women are restricted to do these activities. Women's engagement in tilling land using oxen drawn power was reported as unacceptable practice according to the local tradition/culture by 99.5 % of the study participants. In addition to the cultural tradition, some of the agricultural activities are also difficult for females as they require strong physical fitness. Thus, even when they have access to important productive resources needed for crop production like land and oxen female-headed households cannot utilize them by their own because of such perceptions. The case of a female-headed household from Handhura Balo:

Box 6.1: How utilization of productive resources are limited because of other resources

Alami Taye is a female-headed household who lives in a small village called Aserenga (village 10th in Amharic). She has been heading a household of four members though her daughter got married a year ago. She has two hectares of land and an ox. The ox was bought with an income obtained from the sale of some crop (from the 2006 E.C crop production year) and income earned from her daughter's wage employment. As she could not tame the young ox, she has cultivated a garden plot by sharing oxen from others and digging the land using a hoe on which she has grown some maize. She has also sharecropped out about two timad (about 0.5 hectare) of her land. A substantial amount of her land was left uncultivated because she could not carry labor-intensive farming activities because of sickness. Her elder son too has a health problem. She said, "my elder son cannot work either for him or the family." The crop obtained from sharecropped out land together with the one obtained from the garden plot could cover the food requirement of the household only for about nine months.

As Box 6.1 depicts, female-headed households who have land and oxen which enable them to engage in agriculture agricultural production fully, were unable to produce adequate food because of lack of labor, particularly of males. This finding is similar to that of Abate& Tessfaye, (2015) in the Amahara Region which shows that 88% of the farm tool preparation and 85% of plowing are carried solely by men. A study by FAO, (2011) also shows that labor constraints which are directly linked to socio-cultural norms of engendered labor are one of the major factors for the productivity gap between male and female-headed households.

Even when women sometimes carry the land preparation and associated activities by breaking the local tradition, it was challenging for them because of the strong physical strength required to carry these activities. Consequently, some female-headed households were using simple tools such as a hoe which are used to cultivate a small area of land to grow crop while they have ox/oxen.

In relation to lack of labor, nearly about a quarter 92 (23.6) of the households reported to have plots of land ought to be cultivated in the 2015 growing season, but left uncultivated because of lack labor. The proportion of female-headed households who encountered such constraint was higher 50(37.6%) compared to 42(16.3%) male-headed households. As a result most female-headed households were dependent on support from relatives/friends (which is rarely obtained/mostly arrives lately) and labor of their children on activities which require male labor.

This points that, only access to some of the productive assets (land and oxen) is not sufficient for female-headed households to achieve better livelihood unless it is effectively used. Access to a nearly similar amount of land and oxen could not enable the female-headed household to obtain a comparable amount of crop production with male-headed households. This finding is consistent with a result from a study by (World Bank, 2014) which shows that women receive lower returns than men to an extra hectare of land because of difficulty in managing farm labor and other problems. Regarding the importance of use of such key productive resources (Messay, 2009) argues that, granting a piece of land by itself could not end the food insecurity problem of female-headed households as these households are constrained by lack of access to important factors of production such as labor, plough oxen and credit and other agricultural.

Livestock: The study households raise different types of livestock. Cows are the dominant livestock type followed by chicken, goats, donkey, sheep, and mule. Cattle are important in terms of their direct contribution to food/income of the households and pursuance productivity of other activities as crop production. Income from sale of heads of cattle, the sale of milk products, draft power, and manure are the major purposes for which cattle are reared. Other livestock types such as sheep, goats, and chicken are raised for various purposes. The well off households raises these livestock; either on their farm or on others farm (mostly poor farmers or their children) through a local institution known as *ribbi*; to generate additional income needed for different

purposes (agricultural inputs, clothing, and the like) and avoid the sale of cattle for such purposes. Through this local institution known as *ribbi*, an individual/a household take small ruminants and chicken mostly female from someone to manage on one's farm where the offspring will be equally shared. Unlike the well-off households, the poor households use the income from the sale of these livestock to buy food. At times when access to food is not a problem, income from small ruminants may be invested to buy cows.

Though livestock production is important in the livelihood of rural households, but not all those who have cattle can obtain the expected gains from their livestock resources. Female-headed households could not adequately benefit from their livestock products. Except for milk and its products and income through the sale of livestock are still important, they could not use oxen equally as males. Particularly, the benefit from their oxen is through an indirect ways by sharecropping. The other factor which compromises the productivity of the livestock resource is their poor traditional management system. Provision of additional feed (according to information from extension workers) by stocking harvested grass, crop residue and buying commercial feed to cattle was a recent experience which was adopted by few households from people who settled in the district in 2003 from Hararge.

Beekeeping is also another livelihood activity with high potential in relation to the flora of the district. But it is practiced only by about 68 (17.4%) of the households. In terms of gender of households, only 4 (3%) of female-headed households have participated in this activity compared to 64(24.9%) male-headed households. Male-headed households almost exclusively dominated this activity. The traditional bee hiving system is challenging particularly for women because of lack of skills needed to make hive and difficulty of some of the tasks involved in bee hiving such as climbing big trees to suspend and drop it back to collect the honey. The modern hive though easily manageable for female-headed households compared to the traditional one, but it was practiced only by fewer households because it was less affordable for the households in terms of cost.

In general, the finding shows that there was a significant variation between households based on the gender of the heads in the total values of crop and livestock production. This was mainly because of the big variation between male and female-headed households in access to key

productive resources. The poor access to extension, credit services, labor, (Chapter 4) and other local institutions (Chapter 5) by female-headed households compared to male-headed households has hindered their options to intensify their farming in some productive ways. With this regard, a study by (ECA /Economic Commission for Africa, 2004) shows that, although the agricultural activities and other livelihood options are affected by various factors (climatic conditions, markets, infrastructure, physical conditions), unequal access to land and insecure land tenure have the most profound effect on the livelihoods of smallholders in Africa.

6.2.2. Diversification through farm labor and non-farm activities

While crop-livestock was indeed the dominant livelihood strategy among the rural households of the study district, it is also often combined with a range of other farm-related and non-agricultural livelihood activities away from own farm. On the importance of non-farm income Ellis, (1999) argues that, although still important, farming on its own is increasingly unable to provide a sufficient means of survival in rural areas. Studies by Ellis, (1999), and Tassew Woldehanna, (2000) conducted in different sub-Saharan countries shows that the contribution of income from non-farm strategies into rural households livelihood is also vital. From study in Ogun State, Nigeria (Shittu, 2014 Okere & Shittu, 2014); 10.0%, 20.0%, 7.1% and 4.3% of the households participated in non-farm such as, artisanship, trading, paid employment and other activities respectively which together accounted for 37.1 percent of the farm households' income.

The different motives/incentives why households diversify their activities into non-agricultural strategies can be broadly categorized according to (Sosina et al., 2014; Losch et al., 2012, and Stifel, 2010) into push (negative) and pull (positive) factors. In other words, diversification into non-farm activities adapted either to survive the economic difficulties caused by push (negative) factors or to use the opportunities created by pull (positive) factors. Assan, (2014) denote this as survival and accumulation strategies. Push factors are the low performance of agricultural production as source of sufficient and reliable income for food and non-food needs. The low productivity in on-farm strategy can be caused by factors such as lack of access to adequate productive resources to pursue on-farm activities, a decline of agricultural production because of environmental shocks and other factors. Various scholars viewed diversification as a temporary

form of adaptation to risk and thus employed as a survival strategy than an accumulation of wealth. Davis, (1996) is among those who related the nature of diversification with survival. On the contrary, under pull factors opportunities of a higher return to labor and capitals encourages individuals to engage in non-agricultural activities (Sosina & Barrett, 2010) in this sector.

Participation in multiple income-generating activities other than agriculture was widespread among the rural households of the study district. Wage labor on others farm, petty trading, fuel-wood sales, making household tools and similar activities were non-agricultural employment opportunities commonly adopted by the households. Though not large in number, still some households also had participated in non-farm activities to generate an additional source of income. Majority of the study households, particularly female-headed households have reported to engage in diversified activities other than one's farm mainly being pushed by an inadequacy of income from agricultural activities.

Wage labor on others farm

The result of the study reveals that along with the production of crop and livestock, which is practiced on own farm as the main source of livelihood, a large number of the study household also seasonally engage in wage labor mostly on agricultural related activities as a strategy to generate income. The dominant farm of labor opportunities for the majority of the households was related to crop production including seedbed preparation, weeding harvesting and threshing on farms of individual farmers and private investors during pick times. Discussion with informants indicates that, farm labor opportunities are not easily accessible to all households.

Third of the study households 280 (71.7%) reported that some member of their household participates in the farm labor activities. The proportion of male and female-headed households engaged in this activity was 181(70.4%) and 97 (73%), respectively, with a slight variation. Though the variation seems to be small in terms of the proportion, there is a big difference between the two households with regard to the types of labor they participated in and duration of time the engaged in these activities. The proportion of individuals who take part in farm labor activities was higher in female-headed households. This is because their on-farm activity is low and off-farm strategy is means of survival. Female-headed households also participate for a

longer duration on wage labor on others farm than male-headed households. On average either the head or someone from the households headed by females participate work on others farm for about 4.74 months of the year compared to 3.83 months for households headed by males.

In addition to this, though female-headed households highly depend on farm labor, the opportunity is not always open except on some tasks. This is because of the physical strength, age, and sex preferences of those who provide farm labor employment. Thus, while both male and female (in productive age) have relatively similar chance of employment on some of the farm activities such as, seedbed preparation, planting, hoeing and weeding, however, males have more opportunity on clearing farmland, harvesting and threshing activities which require much physical strength. When the farm labor is on individual farmers, agricultural equipment as sickle, hoe, and others needed to carry out the tasks are additional requirements which the farm labor seekers have to access to get the opportunity. Once the opportunities are secured, the works will be carried out as per the agreement entered between the parties on the terms of payment-amount (type and time) and expected standard of accomplishment. Payment is commonly made either on a minimum daily rate which was ETB 30-40 (which of course varies based on seasons and the nature of activities) or fixed amount of money in return for the accomplishment of a given agreed amount of task. When the agreement is on daily labor, the labor providers will carry the activity under close supervision by the employer or his/her agents. On the other hand, when the agreement is made as a specified amount of pay for the accomplishment of a given task, the work will be done with minimum supervision on the quality of the job.

Reasons for participation in wage labor on others farm by households is shown on (Table 6.2.) Some households participate in farm labor activities to fill the income gap created because of the lack of productive resources and marginal productivity of these resources to produce sufficient on one's farm (crop production and livestock). In line with this, about 36.4% and 25.6% of the female and male-headed households respectively, have justified their participation in farm labor activities because of low production from on-farm and inadequacy of farmland respectively (Chapter 5). Still, about 21% male and 34.6% female-headed households took labor employment on others farm because of inadequate farmland. This finding obtains support from (Bereket and Degefa, 2016) which shows that majority of those who participate in labor employment on others

farms due mainly to insufficiency of the agricultural product earned from their own farm to meet the food demand their households.

Chi-square test was run to see if livelihood capitals such as land size and oxen which are important in pursuance of on-farm activities make any variation on households' participation in farm labor activities and the result was statistically significant (Pearson Chi-Square14.925a, df. =1, 2-sided, p=000, and 9.732a df. =1, 2-sided, p=002) respectively.

Table 6.2: Distribution of households by reason for off-farm strategy

	Mhhhs	**Fhhhs**	**Total**
	Freq.(%)	**Freq.(%)**	**Freq.(%)**
Income of off-farm attractive	76(29.5)	10(7.5)	86(22.5)
Farm land inadequate	54(21)	46(34.6)	100(25.6)
Low production from on-farm	84(32.7)	58(43.6)	142(36.4)

Source: Field survey, 2016

This shows that few farmers mostly male-headed who have sufficient production on their farm also participate in different farm labor activities most likely to supplement their income from agriculture while female-headed households use it as a means to survive food shortage. Though large numbers of households pursue some farm labor activities on others farm in addition to on-farm activities, for additional income, a large proportion of them have adopted the strategy being compelled by adverse factors.

Labor on others farm is a low return livelihood activity pursued to ease acute shortage of income and food by the poor households mostly female-headed households, who could not engage in on-farm and productive non-farm activities. This is because wage labor does not require high investment capitals and special skills. This study also conforms with the finding by Kibebew, (2014) which shows that poor households pursue the strategy of combing farm labor activities with on-farm activity. Because of lack of some of the capitals to be used on one's farm, such activities remained important for female-headed households who rely on wage on others farm

where they can utilize their labor- the capital at their disposal particularly during the shortage of food.

Petty trading

Petty trade remains important non-agricultural activities in which large numbers of the study households have diversified their livelihoods in addition to wage labor on others farm. More than 137(35.1) of the study households reported to participate in this activity. There was no big variation between households based on the sex of heads in terms of participation in petty trading as depicted on (Table: 6.1) as male and female-headed households accounted for 132(51.4%) and 58(43.6%), respectively. The variation was instead on the items with which they trade. Asset-poor households particularly females primarily dealt with items which do not require large start-up capitals. Some of these households bought cereal crops, pulses, coffee, fruits and small livestock like chicken and livestock products like butter from local markets which are held weekly and sold them at Gallo- district capital and neighboring towns such as Diga and Nekemte. The domination of small items trade by women was also reported by (Bereket and Degefa, 2016).

On the contrary, male headed households deal with relatively gainful trading goods. In addition to crops which are traded mostly by women, male traders buy oxen, sheep and goats for similar purpose mainly from Balo Bareda, Arjo Guddattu and from individual farmers using their long-established social networks. While most of the time the livestock will be fed for some time (weeks or months) in order to fattenthem before they are resold, but other traders also resale the livestock immediately.

In addition to other factors such as, lack of elementary business skills, access to information regarding market, gendered activities and access to credit as source of startup financial capital were important factors which influenced households' decisions and choice of trading activities. The amount of financial capital needed to participate in this sector varies depending on the nature of the activities. The cost of investment in crop and livestock product trading was estimated to be up ETB 1000 and above and sometimes could be financed by the households themselves.

Table 6.3: Access to credit and participation on petty trading

Response	Mhhhs		Fhhhs		All together	
	Freq	%	Freq	%	Freq	%
Yes	86	33.5	25	18.8	111	28.5
No	46	17.9	33	24.8	79	20.3
Total	132	51.4	58	43.6	190	48.7

Source: Field survey, 2016

However, the financial cost needed as a startup capital in livestock trading was higher. It was estimated to be from ETB 500 to 2000 to buy a sheep or goat and from 5000 to 12000 to buy an ox, which is less affordable for households with low income unless they can have access to credit. About 111 (28.5%) of the study households who participate in petty trade have access to formal credit service. Based on the gender of heads, males have better access to this service compared to female-headed households the proportion of which was 86 (33.5%) and 25 (18.8%) respectively. Larger proportion of female-headed households participates in petty trade but have no access to credit service (because of various reasons discussed in Chapter Five) as compared to their male-headed counterparts (Table 6.3). This might have influenced the materials with which they were trading.

Female-headed households were constrained by lack of financial capital and local tradition to engage in relatively better return trading activities such as livestock. This is because of the local tradition which holds that livestock is owned by males and the physical/energy required in managing to market livestock. Let alone trading, women cannot take their livestock to market without the assistance of men because of the physical requirement. Other than this, even trading with the one which they were familiar was also not safe for female-headed households as it involves frequent movement from place to place. The nature of some of the non-farm activities such as, sell of food and drink though suitable for females to make use of their skills but not inconvenient because of sexual harassment. Iftu Kebede, who has been heading household since 2006 at Gallo Janja kebele narrated how a non-farm based livelihood is jeopardized because of lack of personal security follows:

I have been heading a household since the death of my husband in 2006. I am raising six children. Two of them are step children whose mother also died. At the time when my husband died, I have a hectare of coffee plantat, an ox and a cow and four heifers. My family depends on the income obtained from the sale of milk products of the cow, grain obtained in return for renting the ox locally known as "dawulla" and some coffee product from the farm. I have also been selling local drink (areke). Income from these sources has been sufficient for subsistence life. Though the income obtained from selling local drink used to be a valuable supplement source of my income,I could not continue relying on it because of the exposure of my daughter to sexual harassment, who has now grown up, to those who come to buy/drink.

This clearly shows how female-headed households were confined to low returns trading activities due to financial barriers and also cannot purse some activities because of personal and family security.

Fuel wood: Fuelwood is an important source of energy and income for rural households. The study district is one of the important sources of firewood for the inhabitants of the nearby town of Nekemte (headquarter of the zone) where the large population of the town creates enormous demand for this product. Rural household of Sasiga particularly the poor households is highly engaged in the sale of fuelwood. As shown in (Table 6.1), a very low number of the study participants reported selling firewood. However, FGD and key informant interview and the researcher's observation during the survey indicates that a large number of people (mainly those close to the zone capital) frequently transport fuelwood on pack animals and sell it to get income.

Handcraft: Most of the tools used in their daily production activities of rural households are made by local people from locally available natural resources. Making these tools is a means of income and exchange of labor for a small number of individuals who are skilled in the area. Experienced individuals make household tools used for purposes such as a container (of milk, water, floor), cooking (mitad, pots), plates, farm implements, home furniture, and many others. In line with this, though the number was few 2 (0.8%) male and 1 (0.8%) of female-headed households reported that someone from their household earns some income by making hair.

Box 6.2: How lack of raw material for making handcraft limits survival of households

Yadate Jirata is a female-headed woman. She lives with three orphaned grandchildren. She has (0.25 hectare of farmland) occupied with coffee which is the only productive asset she owned. The household depends on an income earned by Yadate by making household tool known as hodha/safed (a traditional tool used for various purposes including winnowing, refine/clearing grain from the chaff, holding cooked food and others) which is made of grass. She produces about four of this tool per week. The unit price of each was estimated to be ETB 20 -30 based on its quality and market situation. She complained that the shortage of raw material used to make this tool (natural resources mostly grow on uncultivated land) is disappearing because of the expansion of farmland.

Pottery Making was exclusively left for females. It is also practiced only by few of the study participants because of the local tradition. Making other locally produced household tools as sefet (household tools made of thatch like a plant) and spinning cotton for making *shamma* (cloths made of cotton) too are females' tasks. The practice of spinning and making of *shamma* has now almost non-existent because of lack of demand.

6.3. Migration

Empirical evidence (Goodrich Rosalind 2001) shows that migration plays an important role in the livelihoods of rural households and communities both rich and poor. Migration as a livelihood strategy was not familiar among the study households. Only 17 (4.4%) of them reported members of their household had left home to other places in search of income opportunities during the study period. Information obtained from key informants from Gallo Janja *kebele* and Handhura Balo shows that there was high population movement within the district or adjacent ones that however does not last for long months to be called as migration. The reasons for less proportion of households who adopted migration seem to be related to the availability of seasonal (autumn) farm labor employment opportunities in the area which does not require staying long time away from home.

The type of migration in the study area has a unique feature. Large numbers of people move to the lowland areas where they carry agricultural activities either on their land, which they have in these places or sharecropped in from the local people. Others also move to lowland areas to get labor employment on individual farmers' farm or private investors. In both case, they stay mostly for a few weeks or months before going back home because of the short distance between the places. However, because of the cultural tradition and domestic responsibilities, women, in general, do not take part in this strategy. Females including from the male-headed households rarely move from midland to participate in the farming activities on the farm of the household which is found in the lowland. It is worked on mostly by male members of the household. Migration to the neighboring lowland area either to work on ones' land or seek labor employment is difficult for female-headed households.

Level of diversification

The analysis on livelihood activities shows that the study households engage in different income generating activities. But because of various reasons, not all households were able to involve in some of the activities equally. Like in the case of access to livelihood assets, gender is always one of the factors which make much difference. Male-headed households are more likely to combine the different livelihood strategies than female-headed counterparts. Nearly more than half of the study households of which 134 (52.1%) were male and 65 (48.9%) female-headed have reported to participate in at least two or more activities in addition to activities which were carried on their farm. On average male-headed households were engaged in 1.31 different activities compared to 1.26 activities that of female-headed households. Male-headed households have relatively diversified their activities than their female-headed counterparts. This is result was consistent with findings from a study by Woynshet, (2010) which revealed that male-headed households have diversified into non-farm activities than female-headed households.

Other than the number of activities, female-headed households also dominated in low return activities like fuel wood, local food and drink, labor on others farm, retail in cereal crops, and others. This was not as means to increase income from these activities but rather, because of lack of productive resources as male labor, land, oxen, credit, extension services, fertilizer, and others; obtain income from on-farm activities as male-headed households.

Table 6.4: 1Range of activities in which households participate other than on own farm

Number of activities	Mhhhs		Fhhhs		All together	
	Freq.	%	Freq.	%	Freq.	%
One	63	24.5	34	25.6	97	24.9
Two or more	134	52.1	65	48.9	199	51
Descriptive Statistics						
Max	4		4			
Mean	1.31		1.26			
Std. deviation	.859		.887			

Source: Field survey, 2016

This study shows that female-headed households tend to participate in strategies with a low return as they were constrained by poor access to various productive resources (land, labor, credit) compared to male-headed households. This conforms with the finding from a study by Sosina & Barrett, (2010) and Woynshet, (2010) which also shows that women were more likely to participate in the nonfarm sectors which require low investment and have lowest entry barriers. Gautam & Andersen, (2016) identified that ability to diversify is based on access to assets. According to them, the resource-rich households expand into high return sectors and substantially improve their well-being while the resource-poor households are forced to continue their low return diversification as they lack the initial capital to invest in the high return activities.

6.4. Viability of the farm labor and non-farm strategies

Farm labor and non-farm strategies are important in the livelihood and food security of rural farm households. The result of the study shows that these strategies are pursued either as survival option for those households whose on-farm activities are not dependable because of various factors or to generate supplementary income. When evaluated based on discussion with key informants, on-farm strategy is most acceptable strategy among the local community. The desire of most households is to obtain adequate product for one's family from own farm as much as possible. Participation in some non-farm activities as petty trading during slack agricultural activities carried with the purpose to generate additional income to supplement farm income by utilizing ones spare time is also acceptable. But very few people plan to engage in activities other

than own farm to generate income. In this case, pursuance of non-farm strategies can be described as the fall-back option for those who do not readily have access to the productive resources or unable to use it because of different factors. These views constrain the viability of the strategies. The negative attitude of the local community particularly labor on fellow/neighboring farmers also demoralizes the participants when they seek/take labor employment on others farm.

Most of the daily labor opportunities such as land preparation, weeding, and harvesting on the farms on private agricultural investors and other farmers are available mostly during summer and autumn seasons when the households and their members are preoccupied on their on-farm activities. Most of the households reported to participate in farm labor employment activities at times including pick agricultural activities on their farm. As these households say, they are forced to take part in these activities in critical times to get income (for a shot time) needed for food.

Participation in these activities during pick agricultural seasons creates a vicious circle of low production/food insecurity on the poor households particularly female-headed households in such a way that, food insecurity forces member of the household to seek farm labor employment to cope with the shortage of food. This, in turn, results in withdrawal of critical labor input away from family on-farm activities, which finally leads to insufficient production on one's farm where the household finally left food insecure and so on. A study by Shittu, (2014) conducted to examine the influence of off-farm labor supply among members of rural farm households on their production efficiency in Southwest Nigeria revealed that increased involvement in off-farm labor activities leads to the reduction in production in-efficiency among the rural farm households. Female-headed households seem to be more vulnerable to such problem as large number of their members (50.4% female compared to 30.7 % male-headed households) reported to engage on farm labor activities in May, June, and July, the season known as pick agricultural activities.

The farm labor is also characterized by little payment. Payment on farm labor does not match the labor the participants' provide. The amount cannot enable households to generate sufficient income to improve their livelihoods. The low rate of payments on farm labor was related to the

level of agricultural productivity and local economy of the study area and its surroundings than the supply of labor. In addition to this, it was also reported by majority 63.2% of the study participants that the payment on farm labor was discriminatory based on sex. In addition to this, FGD and informal discussion with key informants shows that females (particularly younger ones) face personal insecurity when they participate on off-farm activities which most of the time require traveling to distant places where the opportunities are available.

A large number of households also engaged in non-farm activities. The type of non-farm activities in which the study households participate was mostly petty trading on livestock (mostly goats, sheep, and cows) for males and retailing consumer goods in local weekly markets for females. Some of the non-farm activities such as the sale of fuel wood also have an adverse effect on the sustainable use of natural resources and the productivity of agricultural activities. All households pursue not all of these non-farm activities. This is because of entry barriers and also local tradition particularly as related to the division of labor based on gender. They are also not equally rewarding. Activities with a higher investment like trading livestock; though involve more risks; are more rewarding than those who have fewer entry barriers. Because of lack of start capital and the influence of local tradition female-headed households engage mainly in the trading of crops and consumer goods which do not require large capital and also involve lesser risk but have less return on investment. With regard to low paying non-farm activities,a study by Garedew (2017) states that, even though the income from rural non-farm activities are important, it is dominated by traditional activities with low productivity and have limed potential in generating income. Similarly, findings from a study by Sosina & Barrett, (2010) also shows that, such activities adopted by participants of the sector as the only non-farm options accessible for survival and not likely to save and accumulate.

Farm labor and non-farm strategies are crucial in the livelihood of the study households because production from on-farm alone was not adequate to sustain the family. Despite the competition for on-farm labor, however, participation in activities other than ones far are still important for the productivity of on-farm activities. This is because, though most of the households invested the income from non-farm activities for food, still substantial number of households who pursued the strategy to supplement their agriculture production than surviving immediate shortage of

income/food as they used the incomes from such sources to purchase inputs. Thus when the income from non-farm income is reinvested on inputs, it means, it contributes to the enhancement of productivity of crop per unit area.

It is also apparent that, for a better life, rural farm households have to diversify their source of income. However, participation in various non-farm activities alone is not sufficient. The contribution of such activities to the livelihood of the households is conditional on the return from the activities. With regard to this, finding from a study on some countries of sub-Saharan Africa (Matshe, 2009) shows that the ability of smallholder farmers participation in farming and remunerative off-farm activities are the basis for realizing the potential of food and agricultural production for reducing poverty and hunger. Contrary to this, these strategies were pursued by most of the study households' particularly female-headed households as a coping strategy to the shortage of income from on-farm activities. Being restricted by lack of startup capital, mobility, local traditions, and domestic activities most female-headed households engage in low return activities of the non-farm only few female-headed households engaged in these activities with the objective to generate supplement on-farm income.

Livelihood strategies other than activities on one's farm have no formal institutional support. Development interventions through local organizations which provide agricultural extension services and credit services have a keen interest in the diversification of agricultural production mainly crop production. But similar support services (either in the form of skill or finance) are missing/very limited particularly on non-agricultural activates. Because of the division of labor which is reinforced by the local custom, women are restrained from carrying some agricultural activities such as plowing land, sowing seed, constructing huts, protecting animals and crop field during night time and others. In addition to on-farm, this division of labor is also reflected in non-farm activities. This is consistent with a finding from a study conducted in Ghana by Assan, (2014) which revealed that, specific combinations of activities are associated with either male or females.

Female-headed households are not only responsible for the provision of labor required to produce food on one's farm and participate in other income generating activities (off-farm and non-farm), in the absence of male breadwinner but also carry domestic activities needed to the

daily life of their families. Contrary to the experience of most African countries where diversification into non-agricultural activities are initiated by the adverse effect of climatic changes (such as low and unreliable rain and drought) and productivity of the sector, the result of the present study indicates that, diversifications in to non-agricultural (mostly wage labor and petty trade) activities are initiated by/the result of inadequate access to and quality of productive resources.

Although diversification into activities other than on farm was thought to achieve sustainable livelihood and food security among households, this study shows that the benefit of diversification was less likely particularly for households headed by females where diversification was taken as a means of survival. Livelihood diversification leads to the wellbeing of rural households only when such activities to which the households diversify into have a relatively better return.

Generally, female-headed households seem to have been engaged in farm labor employment as a daily laborer and trading least price commodities. This could be taken as a base to argue that, diversification by female-headed households into farm labor employment and other non-farm activities in the context of the study households shall be considered as survival strategies rather than generating supplementary income. Exceptions are few non-farm activities carried by few male-headed households. Bereket and Degefa (2016) have also found that are adapted by the poor and destitute who have limited access to livelihood assets.

6.5. Summary

In this chapter, the viability of different livelihood strategies adopted by the study households and the variation of the strategies seen in terms of male and female headship were analyzed. The study households pursue a mix of livelihood activities of which on-farming (based on mixed farming) activities was predominant and also perceived as the desirable livelihood strategy. The productivity of this strategy was determined by a number of factors of which access and level of use of the different productive resources were necessary. Female-headed households had a low level of pursuance on on-farm strategies. The reason was not merely tied to their poor access to productive resources compared to male-headed households (chapter four), rather inability to

make use of the resources at their disposal both because of personal and cultural reasons. Hence, the productive resources such as land, oxen, and other owned by female-headed households could not contribute to the livelihood of this group equally like in male-headed households. This shows that nearly "equal" access to productive resources between male and female-headed households does not yield equal output in the on-farm strategy. The on-farm strategy was thus more feasible for male-headed households than their female counterparts.

A significant number of households also participate in some income generating activities away from their own farm. Opportunities other than one's farm were very narrow. The limited sources available were not always positive because of the big tradeoffs involved with these activities. Farm labor employment, the major opportunity available only during pick agricultural activities competes for family labor to be allocated on own farm. Households can participate in these activities only by reducing the labor required on one's farm which compromises the productivity of on-farm activities. Because of fewer requirements of skills, a large number of members of households headed by females were engaged in the less productive off-farm labor activities. The same was true in non-farm activities. Constrained by financial capital which is needed to start self-employment in non-farm activities, female-headed households were engaged in the less productive activities mostly petty trading.

The finding further show that most of the strategies were not gainful particularly for female-headed households because of lack of various resources (skills, availability of labor, and finance) and some of the strategies are lesser open to them. For instance, strategies like migration were very rare in the context of the study households. These households cannot completely leave on-farm activities and depend on non-farm income strategies as they have no skill except that of agriculture, and cannot entirely depend on non-farm strategies (which require unskilled labor) as these opportunities are also limited. As a result, female-headed households who struggle to secure food for the household without support from male breadwinner, have limited access to livelihood resources and limited opportunities except seasonal labor employments on others farm for diversification of livelihoods and cope with shortage are thus more vulnerable to food insecurity.

Chapter Seven

Food security status of households and its determinants

7.1. Introduction

This chapter makes the grand theme of the study- food security of households which is basically a livelihood outcome. It was set to address at least three issues concerning study households' food security. Firstly, it assesses the food security status of households where an attempt was made to examine the food security situation by different indicators. Secondly, it was used to examine the coping strategies used by food insecure households. Finally, the factors that determine food security of households were also examined. The main essence of the chapter is to make a comparison of the differences between male and female-headed households based on all the issues mentioned above.

7.2. Food Security status of households

Of course, the food security of households is the function of several factors which are directly related to the demographic and socio-economic characteristics of the households and other broader issues which are beyond the control of the households. This makes researchers in the course of analyzing the food security of households, unable to have a single tool, which can capture the multidimensional nature of the issue. Therefore, an attempt was made to assess the food security status of the study households by four different indicators (self-report, HFIAS, HHDDS, sanitation and CSI).

7.2.1. Food security status based on households self-report

Households' self-report result shows that 156 (40%) of the study households were food secure. (Table: 7.1). In the same way, the proportion of households whose own production suffice the consumption of their households was 36% almost close to the proportion of those who were food secure. This figure was relatively better as compared to the one from a recent study by (Getachew *et al,*2018), where 26.5% of households meet the food requirement of their households from own production throughout the year. The proportion of male and female-headed

households who were food secure from own production was 48% and 12.8%, respectively. By comparing the percentage of food secure households based on self-evaluation, it can be understood that only very few of the female-headed households ensured food security from own production.

Table 7.1: Household food security status and consumption from own production based on respondents' self-evaluation

Self-report	**Mhhh (N133)**		**Fhhh (N257)**		**All hhh (N390)**	
	Freq	**Percent**	**Freq**	**Percent**	**Freq**	**Percent**
Food secure	131	51	25	18.7	156	40
Food insecure	124	48.2	109	82.0	233	59.7
Do not know	2	.8	0	0	2	.5
Own production/yr	123	47.9	17	12.8	140	35.89

Descriptive statistics consumption from own production

	Mhhh	Fhhh	Both
Maximum months	12	12	12
Mean	9.03	6.35	8.0
Std.	3.363	2.812	3.427.

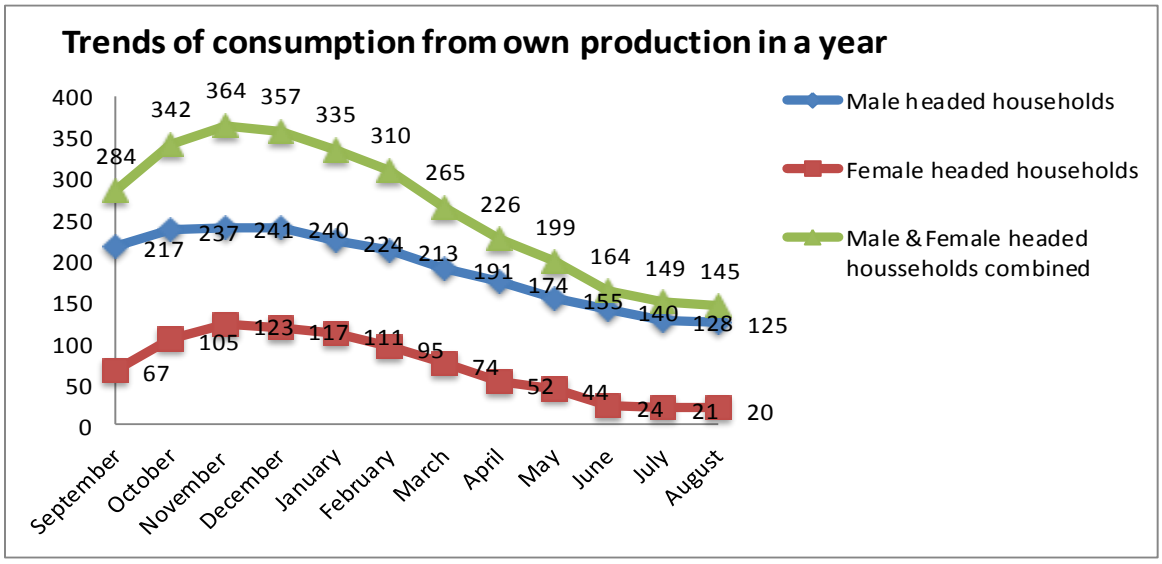
Source: Field survey, 2016

On average, the households consume from own production for about eight months. Thus, for most of the households, the time from early months of autumn up to the beginning of summer season is free of food shortage. There was a significant difference based on the gender of heads of households on consumption from own production. Male-headed households consumed from own production for about nine months compared to six months in the female-headed households (Table 7.1).

As depicted in (Figure 7.1), the period from autumn throughout the dry months of the year was reported to be almost free of hunger. The remaining months of the year usually starting from the onset of the spring season are when households had no adequate food from own production. The peak of the food shortage is in June, July and August marked by rising price on food crops in the market as the farmers (who have been selling crop in the same year for various purposes) also start to purchase from the market. The shortage begins early in the female-headed so earlier than

in the male-headed households which would suggest the disparity of the status of food security by gender.

Figure 7.1: Months of the year when households consume from own production



Source: Field survey, 2016

As it is based on subjective and the perceptions of the household heads, self-reported food security may contain some weaknesses. Because in the first place, the households' perception of food security was to a large extent related to food self-sufficient from own production and being free from purchasing grain for food from the market. Secondly, it was a very general and close-ended question and does not give the respondent a room to provide a further explanation. As a result, an individual might report an occurrence of food insecurity to his/her household while the same household, might appear to be food secure with his/her responses on HFIAS or HHDDS or vice versa. Though the result may not objectively show the food security status of the households, it has indicated variation in food security status between households based on gender.

7.2.2. Household food access and level of vulnerability

In this study, the Household Food Insecurity Access Scale (HFIAS) was used to assess households' ability to access food. As explained in (Chapter Three), this technique is used to measure food security (access) of households by measuring households' reaction to the shortage

of food such as anxiety and uncertainty on supply, insufficient quality, and quantity of food. From the surveyed households, about 62.39% gave an affirmative response on all of the nine generic questions of HFIAS. Of these households, the greater majority 57% has experienced the problem sometimes and or often while the remaining 43% reported only rarely. Disaggregated by gender of heads of households, (79.8%) of female-headed households gave an affirmative response on all of the 9 HFIAS access conditions compared to (53.4%) male-headed households.

In addition to occurrence, the frequency with which female-headed households have faced the problem worth noting. The proportion of female-headed households who reported to face the problem rarely, sometimes, and often was (33.8%), (39.8%), and (22.2%) compared to (46.8%), (30.93%), and (17.4%) male-headed households, respectively.

As suggested by Coates, Bilinsky, & Coates (2007), three specific food insecurity access conditions were summarized from HFIAS questions as, domains, scale, and prevalence. Domains noted simply further categorization of the nine HFIAS questions into three domains such as; anxiety (question 1), insufficient quality (question 2, 3 and 4) and inadequate intake of food and its physical consequences (question 5,6,7,8, and 9) to facilitate the analysis of varying level of access conditions and obtained better understanding on the characteristics of food security of the surveyed household.

In terms of domains, the result (Table 7.2.) shows that, 322(82.5%) of the households have experienced worry /anxiety on access to food of course with varying level of frequency as, rarely by (32.5%), sometimes by (43.4%) and often by (24.1%) of the surveyed households. But this does not mean that all of them face the other access problems. Disaggregated based on the gender of heads of the households, 126(94.7%) of female-headed households and 194(75.5%) of male-headed households have experienced worry on access to food. The frequency of the occurrence of the problem was reported as, rarely, sometimes and often by 23%, 45% and 32.0% of the female-headed households against rare sometimes and often by 39%, 42% and 19% of the respondents in the male-headed households respectively. This shows the problem of anxiety on access to food was more frequent among female-headed households.

The result on the other access condition denoted as, insufficient quality was also summarized from households response to HFIAS generic questions number 2, 3 and 4. The proportion of households who have altered the quality of their food because of, inability to eat preferred food, eating a limited variety of food and foods that are not wanted was 74.3%.

Table 7.2: Occurrence of food insecurity in the study household and its frequency as measured by HFIAS

In the past four weeks		**Occurrence**	**Frequency of occurrences %**		
		Yes	Rarely	sometimes	Often
Worried there is no enough food	Mhhh	194(75.5)	75(39.0)	82(42.0)	37(19.0)
	Fhhh	126(94.7)	29(23.0)	57(45.0)	40(32.0)
Unable to eat food preferred	Mhhh	180(70.0)	75(42.0)	70(39.0)	35(19.0)
	Fhhh	124(93.2)	31(25.0)	63(51.0)	30(24.0)
Have to eat limited variety of food	Mhhh	170(66.1)	88(51.0)	48(28.0)	43(25.0)
	Fhhh	122(91.7)	41(33.6)	38(31.2)	43(35.2)
Eat food do not want to eat	Mhhh	155(60.3)	74(48.0)	63(40.5)	18(11.5)
	Fhhh	119(89.5)	36(30.2)	50(42.0)	33(28.0)
Eat smaller meal than needed	Mhhh	154(59.9)	54(35.0)	56(36.4)	44(28.6)
	Fhhh	118(88.7)	21(18.0)	55(46.0)	42(36.0)
Eat fewer meals in a day	Mhhh	144(56.0)	70(48.6)	54(37.5)	20(14.0)
	Fhhh	117(88.0)	53(39.8)	41(30.8	23(17.3)
No any food to eat at all	Mhhh	88(34.2)	53(60.2)	32(36.0)	4(4.0)
	Fhhh	85(63.9)	40(47.1)	27(31.7)	18(21.2)
Go to sleep hungry	Mhhh	80(31.1)	47(59.0)	26(32.5)	7(9.0)
	Fhhh	77(57.9)	36(46.7)	28(36.3)	13(17.0)
Went whole day without eating	Mhhh	70(27.2)	42(60.0)	21(30.0)	7(10.0)
	Fhhh	67(50.4)	36(53.7)	21(31.3)	10(15.0)

Source: Field survey, 2016

When disaggregated in terms of the sex of the household, the alteration of quality of food was higher among female-headed households 91.47% compared to 65.49% male-headed households. The frequency of occurrence of this problem was reported to be rarely 46%, sometimes 35% and often 19% among females and rare 30%, sometimes 41% and often 29% among male-headed households.

Reducing consumption (the third domain) which is extreme conditions of access to food indicated by eating smaller meal than needed, fewer meals in a day, have no food to eat of any kind in the house, go to sleep hungry and staying whole day without eating (as summarized from HFIAS questions 5,6,7,8 &9) was reported by 51.3% of the sample households. Like the other access problems, the proportion of female-headed households who have experienced the extreme access condition marked by reduced consumption was also higher 69.7% compared to 41.7% male-headed households. The frequency of this problem was reported as rarely 40.1%, sometimes 37.1% and often 22.8% among households headed by females compared to rare 49.6% sometimes36.19% and often 15.29% in the male counterparts.

With regard to the other measure of HFIAS which is scale, the study participants access to food was also analyzed based on the work of FAO, (2008) by summing the frequency of the response of households on the occurrence of access problems (HFIAS generic questions) to construct a continuous scale ranging from 0 to 27. On this scale, 0 means "no" response to all HFIAS occurrence questions and denotes no access problem while 27 means "often" response on all occurrence questions and thus indicates an extreme food security problem. Using this scale, a dichotomous indicator of food security was created using HIFIA score of 17 as cut off point based on a study conducted in Mozambique (FAO, 2008). Based on this scale, 279(71.5%) households participated in the study were food secure while the remaining 111(28.5%) were food insecure. The food security status of the study households was related to a recent study (Getachew *et al*, 2018).

This scale was also farther broken by FAO (2008) into three smaller scales as, 0-11, 12-16 and 17 or above to categorize the level of access by households as "most food secure," "medium food secure" and "least food insecure." Based on the analysis made on the HFIAS score (Table

7.3.); 232 (59.5), 47(12%) and 111(28.5) of the households were categorized as most food secure, medium food secure, and food insecure, respectively. This technique is used merely to classify the food security situation of the households who scored less than 17 on the scale (which is HFIAS cut off point).

Table 7.3: Food security status of households as measured based on HFIAS

HFIAS	**Male hhh**		**Female hhh**		**All households**	
	Freq	%	Freq	%	Freq	%
0-11 food secure	181	70.4	51	38.3	232	59.5
12-16 least secure	26	10.1	21	15.8	47	12.0
≥17 food insecure	50	19.5	61	45.9	111	28.5
Total	257	100	133	100	390	100.0
Descriptive statistics						
Maximum	27		27		27	
Mean	8.14		13.86		10.1	
Std.	7.074		6.944		7.527	

Source: Field survey, 2016

Though the measurement is not based on the same indicators, the food security status of the households in the present study was better compared to most of the previous findings (Meskerem & Degefa, 2015; Misgina, 2014; Degefa, 2005) in north and north-central part of Ethiopia and (Degye, Belay, & Mengistu, 2013) in central Ethiopia and Hararge highlands and (Jamal Abafita &Kyung-Ryang, 2014) in Ethiopia which show higher proportion of food insecure households. Of course, there are also studies which show a similar level of food security of the households in Becho district-central highland of Ethiopia (Furgasa & Degefa, 2016).

The food security status of the study households was also better compared to the finding from a study by (Guyu, 2014) in the adjacent district of Balo Jigenfoy (Benishangul Gumuz) where the access to productive resources such as land was by far higher than in the present study area. The contradicting relation between relatively better access to productive resources and lower level of food insecurity was because of the ethno-cultural background. This was also indicated by the author that the indigenous ethno-culture (Gumuz) have higher food shortage compared to non-indigenous ones. However, the food insecurity in this study was somewhat higher compared with few studies (Garedew, 2017). This may be because, the study was conducted in an area which is

characterized by production self-sufficiency and situated in central Ethiopia with access to market and other income opportunities. Other than this, the main purpose of the study was to investigate the contribution of cooperative membership to households' food security and wellbeing than studying food security as a critical concern of the study community.

When disaggregated based on the gender of heads of households, the finding shows a large proportion of 61(45.8%) of the households headed by females were food insecure compared to 50(19.5%) households who were headed by males. The difference in food insecurity between male and female-headed households was statistically significant (Pearson chi-square 30.022a two-sided df=1, p=0000). In terms of the severity of the problem (categorized based on HFIAS), 51(38.3%), 21(15.8%) and 61(45.9%) of the female-headed households were most food secure, mildly food secure and food insecure compared to 181(70.4%), 26(10.1%) and 50(19.5%) male-headed households, respectively. Female-headed households have higher HFIAS mean score of 13.86 which shows that they are more food insecure compared to male-headed households who have average HFIAS score of only 8.14 (Table 7.3). This indicates that households headed by female were more food insecure than those headed by males.

Table 7.4: Prevalence of food access by households as measured by HIFA

Access problems	**Frequency of occurrence**								
	Rarely			**Sometimes**			**Often**		
	Mhhhs	Fhhhs	Ahhs	Mhhhs	Fhh hs	Allhh	Mhhhs	Fhhs	Ahh
1a	138	36	174	82	57	139	37	40	77
2a	75	31	106	70	63	133	35	30	65
3a	88	41	129	48	38	86	34	43	77
4a	74	36	110	63	50	113	18	33	51
5a	54	21	75	56	55	111	44	42	86
6a	70	53	123	54	41	95	20	23	43
7a	53	40	93	32	27	59	4	18	22
8a	47	36	83	26	28	54	7	13	20
9a	42	36	78	21	21	42	7	10	17

Source: Field survey, 2016

Keyes	
7.7%	Food secure
33.56%	Mildly food insecure
32.33%	Moderately food insecure
26.40%	Severely food insecure

This finding conforms to many previous findings of some sub-Saharan Africa such as, Modirwa S. and Oladele O. I. (2012) including Ethiopia by Meskerem & Degefa, (2015) which reveals a higher prevalence of food insecurity in households headed by females than in their male counterparts partly due to uneven distribution of resources. Nevertheless, this proportion of food insecure female-headed households and variation based on the gender of heads of households can be taken as moderate when compared to a finding by Messay, (2009) where 91.5% of female and 89.7% male-headed households were food insecure respectively.

The HFIAS score was also used to categorize households based on their food access prevalence as food secure, mildly food insecure, moderately food insecure and severely food insecure summarized from access conditions, the experience of alteration of quality and quantity and reduced consumption of food. Accordingly, 33.56%, 32.33% and 26.40% of the households had food security prevalence of mildly food insecure, moderately food insecure and severely food insecure respectively (Table 7.4.). Only 7.7% of the households have either did not experience any of the access problems or faced it only rarely and thus were food secure.

When disaggregated based on the gender of heads of households, 3.74%, 30.97%, 34.72% and 30.56% of female-headed households were mildly food insecure, moderately food insecure, and severely food insecure respectively compared to10.6% 35.48%, 30.56% and 23.32% male-headed households. The analysis on the HFIAS data shows that the daily life of the poor rural female-headed households was highly filled with concerns about the food of their households than male-headed counterparts. This may seem because of the lack of producing enough food either on-farm is low income obtained from non-farm activities.

7.2.3. Household food security as measured by HHDDS

HHDDS is used to measure access to food based on the assumption that households who have the means to acquire it would diversify their consumption. Dietary diversity score is computed based on a simple count of the number of food or food groups prepared and consumed by household members in the past 24 hours as reported by a person responsible for preparing food in the household-head of the house (FAO, 2011). In the present study, seven days recalling period was used with the assumption that rural households may not change their diet either

because of being busy after farming activities or lack of frequent physical access to the market. In such a way, it was employed as an indicator to assess households' access to food from the diversity of intake which is the economic access of households to a variety of food but not necessarily quantity.

Food habit of the study households was mainly cereal-based which is *injera* (pancake-like thin bread), bread and also porridge made of mainly maize, sorghum, and *teff* are commonly consumed. The quality of these foods is determined in terms of the sauce which is made of either animal products (meat, egg, and milk and its by-products or a mix of milk products with pulses) in the well-off households or pulses among poor households. When food consumed from own production, the study households reported to rarely seek for other food items than what they have produced on their farm except for those food items which are used as condiment/ compliments. In such a way, households consume from limited types of crops and diversification of diet in rural areas is much related to agricultural production.

As indicated on (Figure. 7.2), cereals (100%), condiments (100%), oil (91%), pulse (84%), vegetable (70.3%), milk and milk products (46.2%), and white tubers (35.6%) were the most frequently consumed diets by the majority of the households. Other diets as fruits (21%) and sweets (27.7%) also constitute a significant proportion of the food consumed by households. But the consumption of foods made of animal products such as, fish (1.02%), meat (3.6%) and egg (9.5%) which have better nutritional values was reported by a very small proportion of the households.

Table 7.5: Distribution of food groups consumed by the study households

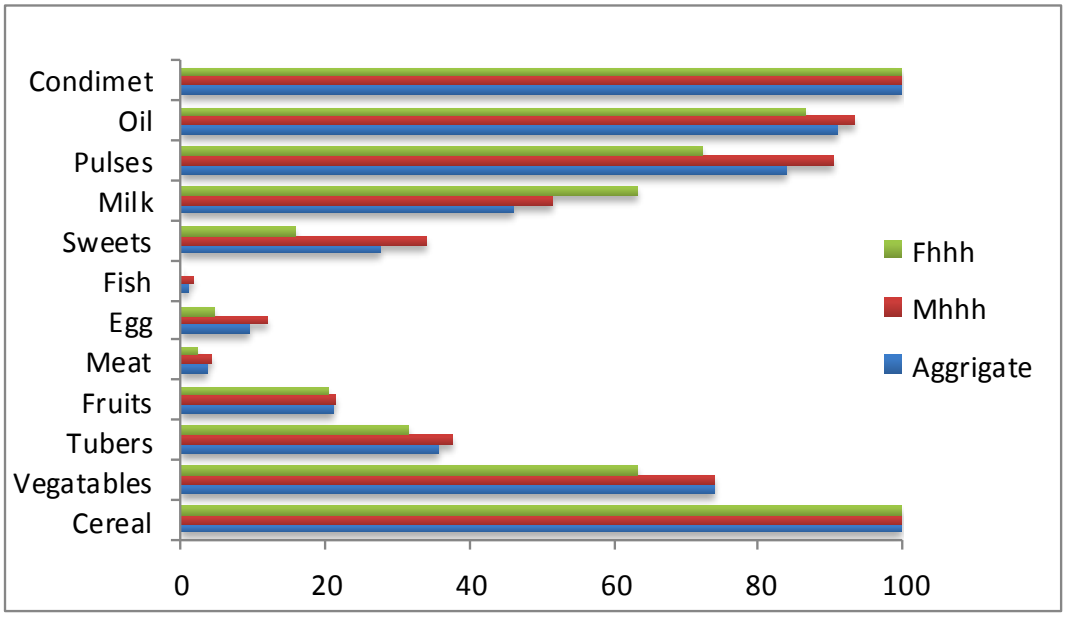
	Descriptive statistics						
	Max	Min	Mean	Std.	DD,</=5	DD =6-7	DD 7 +
All hhs	12	2	5.90	1.648	72(18.5%)	199(51%)	19(30.5%)
Mhh	12	3	6.19	1.594	28(10.9%)	133(51.8%)	96(37.4%)
Fhh	11	2	5.34	1.609	44(33.1)	66(49.6%)	3(17.3%)

Source: Field survey, 2016

As in the table 7.5, the average food items consumed by households were 5.90. The difference among households was very high with 12 food groups as maximum and only two food groups consumed by few households. Based on the mean dietary score, the households were assigned into three groups with the population in the second quartile taken as a reference group. Accordingly, 72(18.5%) of the households consumed five or fewer food groups and thus had poor dietary diversity, 199(51%) consumed six to seven food groups having medium dietary diversity while 119(30.5%) consumed seven or more food groups and hence high dietary diversity. The dietary score of the households seems better where only 72(18.5%) had consumption score less than the average.

As depicted on the figure 7.2, there was a significant disparity on the household dietary diversity score based on the sex of head of households. Male-headed households have relatively better mean dietary score of 6.19 compared to 5.34 for female-headed households. Households headed by males who consume five or lees food groups (low dietary diversity) account only for 28(10.9%) while that of households headed by females was a little more than one third 44(33.1%).

Figure 7.2: Distribution of households' consumption by different food groups



Source: Field survey, 2016

From households headed by females, only 23 (17.3%) reported consuming seven or more food groups (which is high dietary diversity) compared to 96 (37.4) households headed by males. Alemseged (2016), who measured food consumption score of households, has also reported the significant variation exists between female-headed households and male headed households. The same source indicates that households headed by female had poor diet compared to their male headed counterparts.

Regarding the average food groups, there was also a big variation in terms of the different food groups/types consumed based on the gender of households. Food made of cereals, vegetables, fruits, pulses, and condiments were consumed almost both by male and female-headed households with a slight difference. But animal products like meat, egg, milk, and fish were less consumed by female-headed households. The only animal product that both male and female households had relatively similar access was milk byproduct which is used as a sauce. Milk and butter are less consumed by households since they are sold in the market to get income needed for non-food expenses. Because of the relative price of butter, households who produce some milk would also use edible oil.

From the finding, the percentage of the households' access to the different food groups may seem to have fair diet diversification. But in reality the figure on some food groups, for instance, vegetable was high due to the households' frequent/higher consumption of some locally available vegetables which are abundant (seasonal vegetables) in the area. Some of these foods are also perceived as a famine food by the study community. Thus, they are not consumed with the intention to maintain the diversity of diet, but instead, they are mostly used as famine food on which households rely during a shortage of food. Some of these food items are accessed with low cost and sometimes obtained freely from others farm. Taking sex of the households into consideration, some of the frequently consumed food groups (potato, cabbage, pumpkin and other) from vegetables by female-headed household can be taken as a means of coping to a shortage of food. Other than their moderate nutritional value, these foods are mostly consumed without proper mix with their compliments and less portion size to satisfy the needs of consumers.

Based on the number of food groups consumed and the mean value, one may judge the dietary diversity of the study households to be good, in general. In reality, however, it is very low. This is because, the average is for extended days (seven days) against 24 hours which is commonly used in other studies. Still concerning the different food groups, the result on HHDDS in this study revealed that the diet of the rural household was dominated by cereals, condiments, oils, and vegetables. Poor consumption of animal products has been frequently reported by a number of studies. The low consumption of animal source foods as meat, egg, and fish which are nutritious food group was also reported by (Kaleab, Nigusie, & Cherinet, 2014; Degefa, 2005; Taruvinga, Muchenje, & Mushunje, 2013). Hence, this finding was consistent with findings from many of the previous studies except very few cases like (Alemseged 2016)which reports the consumption at least one of the four animal source food (meat, egg, chicken and fish) by about 69.7% of the participants of the study in the reference period.

7.2.4. Food Utilization

Utilization of food is the ability of households to utilize the food accessed during a given period. It encompasses the nutritional quality of the food and individual's ability to convert (biological) the food consumed and meet their nutrient and health needs has been traditionally measured using an anthropometric method. But this method has limitations (Bashir and Schilizi 2012) because of its time and monetary requirements and also influenced by other factors than food. Therefore, in this study, utilization was measured based on the health condition of household members, knowledge of nutrition, usage of available food properly and sanitation aspects.

Problems related to utilization of food such as, prevalence of disease, lack of clean water, poor sanitation, lack of knowledge on nutrition and extravagance were reported by 107 (43.5%), 1126 (68.7%), 166 (42.5%), 257(65.8%) and 184 (47.2%) households, respectively. When seen in terms of the gender of households, the prevalence of disease, lack of clean water and poor sanitation were higher among female-headed households like other food security problems. This is related with the poor access to clean drinking water and sanitation were also were reported in (Chapter Four) and the lack of exposure to nutrition-related information.

Concerning the utilization of food, about five different factors were presented to the households to be ranked in terms of their adverse effects on the utilization of food. Accordingly, lack of clean water was rated first, a critical problem both by male and female-headed households in utilizing food. Access to safe drinking water is essential for human health and preparation of food. Other than its use for the preparation of food, water is also essential for hygiene practices. Information from the District Water, Mineral and Energy Office (2016) indicates that out of the total population of the district 53.5% are supplied with potable water. The distribution of the water services was uneven and concentrated in some villages which have a relatively large population. In most of the study *kebeles*, it was reported by informants and participants of FGD, that water is commonly fetched from unprotected streams on human labor and also pack animals to be used for various purposes including drinking. A woman from Handhura Balo reported that "we know unsafe water causes a health problem, but we are using it since it is impossible to live without water."

Lack of knowledge about nutrition was the other problem constraining the utilization of food and was ranked as a second and third most critical problem by male and female head households respectively. This can be associated with the high illiteracy rate among the study households and lack of exposure to information on nutrition. The lack of integration between the agricultural and health extension programs may also be the other reason.

Table 7.6: Selected factors affecting the utilization of food as ranked by the households

Utilization Problems	**Mhhhs (N=257)**			**Fhhhs(N=133)**			**All**	
	Rank	Freq	%	Rank	Freq	%	Freq	%
Disease		56	21.8		51	38.3	107	43.5
Clean water	**1st**	170	66.1	**1st**	98	73.7	268	68.7
Poor sanitation		91	35.4	**2nd**	75	56.4	166	42.5
Nutrition knowhow	**2nd**	166	64.6	**3rd**	91	68.4	257	65.8
Extravagancy	**3rd**	119	46.3		65	48.9	184	47.2

Source: Field survey, 2016

Poor sanitation was not a critical problem related to utilization among male-headed households but rated as second most critical by 47 (35%) of female-headed households. Similarly,

extravagance which was identified as a third critical problem by male-headed households was not in the list of the three most critical issues of utilization among female-headed households though reported as a problem by 48.9%. Informal talks with female-headed households indicate that, the reason for not having toilet facilities which are instrumental in sanitation was related with lack of such labor for needed to dig a deep hole which is difficult to be done by women.

Discussion with households and extension workers (informants and FGD at each study *kebele*) indicates the coverage of toilet facilities has reached some good level through consecutive "campaign" carried in the last few years intended to improve health problem among the rural population through sanitation. But its utilization by households was not as desired since the people were mostly unable to use their toilet. This was because the rural communities are most of the time stay away from home working on their farm. Still, lack of access to other facilities such as water to use their toilet was also mentioned.

Pos-tharvest losses of food crop because of lack of proper storage facilities, damage by insects and extravagant use of crops for various purposes other than food were also identified as important factors constraining utilization. Maize and sorghum, which are the major source of food in Sasiga district, can be stored by households only for few months as they are prone to damage by weevils *(dana'o*) in the store. Because of strong need for cash income for non-food purposes, some of the nutritious foods (mutton, chicken, egg, butter) produced by households are not consumed at home except during few occasions such as holidays. Instead, people mostly sell these products to get cash income and use their substitutes such as edible oil and other items for consumption. Allocation of large amount of grain for preparation of food and drink during important occasions (wedding, *jaarii*, *dabo*, and other festivals) also affects appropriate food utilization by each member the household.

7.2.5. Coping strategies employed by households to overcome food shortage

Coping strategies to overcome shortage of food was also used as an indicator in analyzing the food security situation of the households. These strategies/mechanisms are grouped into food based which is immediate and short term alteration of consumption patterns and long term alteration of income earning or production (CARE, 2008) and two of them were thus termed

food based and non-food coping strategies. This categorization was merely to understand the severity of the problem as felt by the households. In another word, in using these strategies to analyze the food security situation of households, the non-food based coping strategy indicates relatively more undesirable condition than that of the food based one as it compromises the asset of the households.

Food based coping strategies

As suggested by the pioneers of CSI, an attempt was made to assess households' behavioral response to a shortage of food. It was found that the study households used different types of coping strategies. As depicted in Table 7.7, the average CSI of the study households was 36.03. The minimum and maximum coping strategy index score were 8 and 67 respectively. About 181 (47.2%) of the household had scored above average on the CSI. In terms of gender of heads of the households, 79 (59.4%) of the female households had CSI score above the average compared to 105 (40.9%) male-headed which shows their more vulnerability to food security problems.

Because of different strategies have varying level of severity, the general CSI alone tells little about the food security situation of the households. For instance, households who have a similar score on the CSI may not have the same level of food security condition as the different strategies have varying level of severity and nature. Thus, in addition to the average CSI which was combined from all the strategies employed by the households, individual coping strategies adopted by households were also regrouped into four as identified (CARE, 2008) to examine the severity of food security problems as felt by households. Accordingly, different coping strategies like consumption of less preferred food, increasing short term supply of food, reducing the number of household members and rationing were used by 46.2%, 25.8%, 16.03 and 29.3% of the study households (Table 7.7).

Like in the case of the average CSI, there was high variation in coping strategies based on the gender of the household heads. Households headed by female have a higher level of response on all the different strategies except the short term measure of decreasing the number of households to feed in the household. They had a high score on the remaining three groups of coping strategies including rationing which is the most sever strategy of coping.

Table 7.7: Major food related coping strategies based on gender of households

Statistics	Mhhh(N=257)	Fhhh(N=133)	Together (N=390)
	%	%	%
CSI >average 36.03)	40.9	59.4	47.2
CSI<average (36.03)	59.1	40.6	52.8
Minimum	20	20	20
Maximum	84	78	84
Mean	36.03	43.5	39.3
Std. deviation	13.442	12.824	13.560

Source: Field survey, 2016

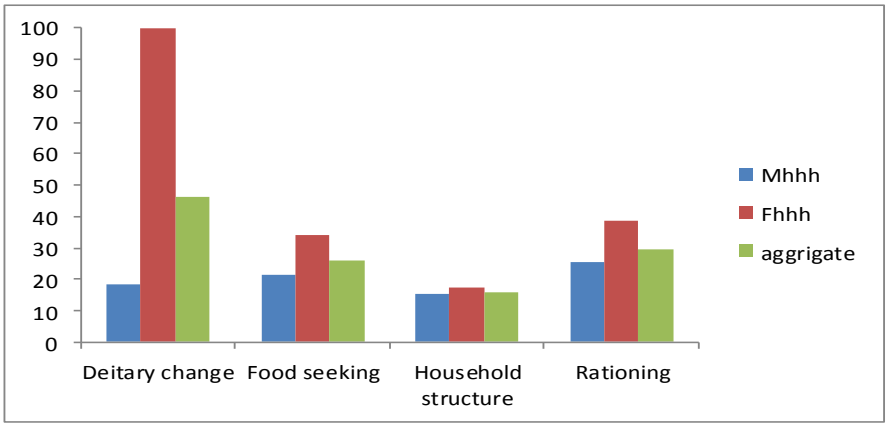
Severe coping strategies like the consumption of less preferred food was used by all of the female-headed households compared to only 18.3% of male-headed household counterparts. Similarly, rationing which is the worst coping strategy was also employed by about 39% female-headed households compared to 25.7% male-headed ones (Figure. 7.3).

Female-headed households tend to utilize all of the coping strategies than male-headed households. Reliance on less preferred food and a small portion of food on meal were the two strategies frequently adopted by female-headed households. Informal talks with the food insecure households show that they often depend on *kursii bunna* (small amount of food such as a slice of bread, roasted or boiled maize, etc.) served on coffee ceremonies. The lunch and the dinner too were not of appropriate portion size and quality. An interesting evidence to confirm this problem (though this was not assessed throughout the survey) was my encounter at a village called *sedestegna* (a village in one of the study *Kebele*) during the collection of data.

While the researcher was on the field for the survey together with the enumerators, a woman (head of household we have been interviewing) noticed that the team was tired of the day-long field work and hungry. But she was afraid to give us some food because she felt that it was of poor quality. She perceived that the food they eat is of less quality and not appropriate one with the local food habit. She asked us "*waan nu nyaannu yoon isniif kenne nyaattu laataa*?" (Do you eat if I give you the food we eat?" to which we positively responded. After we had the food made

of sorghum devoid of sauce, taste, and texture, we have realized that she was reasonable to have such worry. We ate the food, but it is difficult to depend on such food often.

Figure 7.3: Consumption based coping strategies used by the study households



Source: Field survey, 2016

The different indicators used to assess the status of households' food security were correlated with each other to see their relationships. As expected, the HDDS was negatively correlated with CSI and HFIAS. The lower consumption of dietary groups was associated with the higher response of coping (CSI) and lower access to food (higher HFIAS). CSI and HFIAS which indicate a shortage of food were both positively correlated. The relationship between the three indicators was significant at ($p<0.01$).

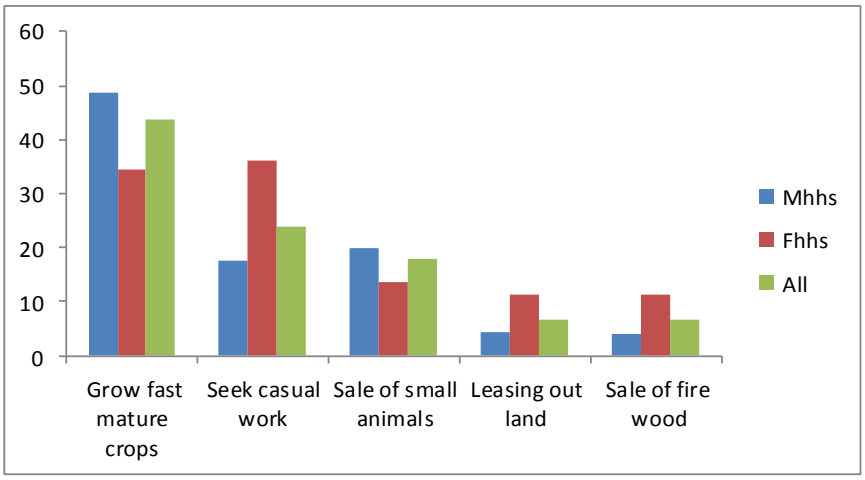
Nonfood coping strategies

Growing different crops, seeking employment, leasing out, and sale of some assets were the most preferred nonfood coping strategies. The result of the analysis of data on these types of coping strategy also reveals that 43.8% 23.8% and 17.7% of the study households have grown fast maturing crops, sought casual employment, leased out land and sold off small animals respectively (Figure 7.4).

Regarding the gender of the household heads, female-headed households were dependent more on casual employment (36.1%) followed by the sale of firewood and leasing out land as a means

of survival. On the other hand, nearly one-third of the male-headed households used growing fast ripping crops and sale of small animals such as, sheep and goats.

Figure 7.4: Non- food coping strategies employed by the study households



Source: field survey, 2016

The types of coping strategies reported by female-headed households are informative about the high food security problem faced by this group of people. These strategies appear to correspond well with the livelihood assets of the households. Sale of small animals were practiced by male-headed households as coping strategies who had better asset position and used as a shield against the sale of big assets but less used by females.

Leasing out land (important productive resource) and engaging in casual works (by taking labor off one's farm) to increase short term supply of food indicate severe food security problem among female-headed households. Information obtained from key informants show that these strategies are used when assets to be sold are less. Households headed by females tend to use both food and non-food coping strategies more frequently than male-headed households. Coping by leasing out land (nonfood strategy) was a severe strategy as it compromises the next production of food by the household which in turn puts the households in the trap of food shortage.

7.3. Determinants of household food security

Once the food security situation of households was known, identification of its determinants is also equally important in dealing with the problem. To capture the determinant of food security of households, which is the result of interplay of complex factors which have direct and indirect impact, household's self-evaluation and econometric model were used one after the other.

Household's self-evaluation: aware of the substantial negative impacts of different problems that affect the production agriculture, households were selected from some shortlisted problems perceived to constrain production and productivity of their agricultural activities.

The responses of the study participants show that, in their order of importance, lack of oxen 115 (29.5%), shortage of labor 108 (27.7%), inadequate land for agriculture 102 (26.2%), and lack of input 90 (23.1%) were the most important problems negatively influenced their production. These factors were related mainly with limed access to productive resources (Table 7.9).

Table 7.8: Constraints that affect food security based on perception of respondents

Constraints of food self sufficiency	Mhhh(N=257)		Fhhh(N=133)		All(N=390)	
	Freq.	%	Freq.	%	Freq.	%
Lack of input	34	13.2	56	42.1	90	23.1
Lack of adequate labor	35	13.6	73	54.9	108	27.7
Health problem	7	2.7	20	15	27	7
Lack of oxen	50	19.5	65	48.9	115	29.5
Lack of adequate land	55	21.4	47	35.3	102	26.2
Crop disease	10	3.9	3	2.3	13	3.3
Improper use of wealth	14	5.4	2	1.5	16	4.1
Lack of non-farm income	29	11.3	18	13.5	47	12.1

Source: Field Survey, 2016

The nature of agricultural production which requires the combined use of two or more of the factors identified above as constraining factor worsens the livelihood of the households, which converge with some factors identified earlier (Furgasa & Degefa, 2016). In addition to these, about 47(12.1%) of the households related to the production problems on own farm to lack of income.

Logistic Regression Analysis Results

Logistic regression was conducted to identify the determinants of household food security. An attempt was made to meet the assumptions of logistic regression model by testing multi-collinearity between independent variables included in the model (see annex 5) by using the values of collinearity diagnostic where tolerance was >0.1," and variable inflation factor VIF was <10 (see annex 6). The other equally important test for the assumption of logistic regression, Hosmer and Lemeshow test has a sig value (0.779) which was much higher than p>0.05. The omnibus model summary test was statistically significant at x^2 (df=1, N=390) =4.138, p<0.05. The model explained between 22.2% (Cox & Snell R2) and 31.9% (Nagelkerke R2) of the variation in the households' food security and correctly classified 75.3 % of the cases.

The model was fitted for thirteen independent household variables to identify their effect on food security of the study households. These variables include sex of household head, age of household head, household size, education level of household dead, land holding size in hectares, participation in nonfarm activity, access to extension services, ownership of livestock, amount of fertilizer used in quintile, production of crops using irrigation, membership in cooperatives, access to nearest road/transportation, and access to credit.

Table 7.9: Determinants of household food security: Binary Logistic regression

Variables	B	S.E	Sig.	Exp.(B)
Sex	-.482	.270	.047	.617
Irrigation	.888	.286	.002	2.431
Land holding size	0.860	.362	.018	2.362
Non-farm	-.647	.266	.015	.523
Age	-.024	.012	.044	.976
TLU	.260	.075	.000	1.297
Constant	.292	.599	.238	

Source: Field survey, 2016

The HFIAS score of 17 was used as a cutoff point to create a dichotomous dependent variable. Six of the variables (sex and age of household heads, use of small scale irrigation to grow crops, land holding size, participation in nonfarm activities, and livestock ownership in TLU) were found to be statistically significant different between food secure and food insecure households.

Sex of head of the household: as hypothesized in the model, sex of the household has found negative and significant ($p<0.05$) relationship with household food security. Being headed by female decreases the odds of a household's by .617 times less likely to become food secure than male-headed households. It shows female-headed households were less food secure than male-headed counterparts. This is because female-headed households have lower access to productive resources including land, livestock, agricultural extension, and credit. Particularly, lack of male labor hindered them from properly using the resources at their disposal. The local culture which impedes females to carry some livelihood activities is also others important challenge on female-headed households in improving their food security by participation in different livelihood strategies.

Use of irrigation: use of small scale irrigation in growing crops was assumed to have a positive and significant relationship with food security of household. In the same way, the model shows that it has positively affected food security of households which is statistically significant at ($p<0.05$). The coefficient indicates that households who grow some crop using small scale irrigation were 2.431 times more likely to become food secure than those who do not use irrigation. This is expected because in the area with rain-fed rely on single-season harvest, it enables households to grow crops both for food and additional income and hence increasing the probability of a household to become food secure. This finding conforms to study by Alemeseged (2016) that concludes irrigation access helps to reduce food insecurity.

Land holding size: is an important productive resource in agriculture. In the hypothesis, it was assumed to be one of the important livelihood resources which positively contribute to the food security of households. In this study, it was positively and significantly associated with the food security status of households. It was significant at 5%. This shows that keeping other factors constant, an increase in the size of cultivated land by a hectare increases the odds by 2.362 times more likely to be food secure. The possible explanation for this is, households with relatively adequate land size have the opportunity to grow more crops and raise livestock both for household consumption and generate additional income. In addition to such economic purposes, land also has important social values. It is also a means to access other technologies as fertilizer and improved seed. This finding conforms to a finding from a study conducted by Alemseged, (2016), Aidoo & Tuffour, (2015), Misgina, (2014), and Fekadu & Mequanent, (2010). However,

the relative poor access by female-headed households to male labor to utilize this important productive resource in the production of food compromises its important potential in positively contributing to their food security.

Age of household head: was thought to have either positive or negative effect on food security of households. In this study, its relationship with the food security status of households was inversely and significant at 5%. The odds ratio decrease by 0.976 times less likely in favor of food insecurity of food security of households. This means, other things being the same, an increase in a year in the age of the head of a household decreases the food security of female-headed households by 97.6% than those who are younger. The possible explanation for the negative relation of age of the head of household and food security of the household could be related to their limited engagement productive economic activities and hence, less productive. This finding was in line with the hypothesis and some findings in previous studies. For instance, finding from a study by (Alemseged, 2016, Messay, 2014) shows that households with older heads have poor food consumption score and more food insecure. But this finding was also contrary to findings by (eskerem & Degefa, (2015) which show that households headed by persons who were in the age range of 50-69 had higher dietary energy availability compared to those who were headed by whose age range between 30-49.

Nonfarm income: was expected to positively contribute to the food security of households by diversifying the source of income. But against such expectation, it has a negative relationship with food security of households. For households who participate in off-farm activities, the odds of becoming food secure decrease by .523. This indicates that who participate in nonfarm activities are less food secure. It implies that households who engage in nonfarm activities were less food secure. This was contrary to study by Aidoo & Tuffour, (2015) in Ghana (Fekadu & Mequanent, (2010) in Ethiopia which shows the positive contribution of nonfarm income to the food security of households.

The fact is not because nonfarm income is negatively related with households' food security status; rather because the households participate in nonfarm activities which have low return as they were constrained by lack of startup capital to engage in nonfarm activities which have an attractive return. In turn participation in less productive nonfarm activities also compromises the

labor of household members to be used on one's farm. Few empirical findings also highlighted the conditionality of participation in non-agricultural and the attainment of food security in rural households. In line with this Degefa (2005) has explained that the contribution of nonagricultural activities to food security in rural settings is based on the type of activity, the amount of income to be obtained and the sustainability of the activity.

Livestock ownership: was assumed to have a positive effect on households food security. This is because of the multipurpose livestock resources have as a source of income, manure, transportation, and draught power. As expected, livestock ownership was positively and significantly associated with household food security at 1%. An increase in the ownership of TLU by one unit increases the odds ratio of a household to be food secure by 1.309 times more likely. It was also positive and significant ($p<0.05$) and odds ratio of 1.297. This finding supports the idea that livestock ownership is important in the food security of households. In addition to its contribution to households' income through sale, livestock plays an important role in the production of crop, transportation and maintain the fertility of soil. This finding is corroborated by other sources (Misgina, 2014; Fekadu & Mequanent, 2010).

7.4. Summary

The food security status of the study households was relatively moderate which was not the case for most female-headed households. The proportion of food insecure female-headed households is not far from other areas said to be prone to famine. The result obtained from all indicators used in this study to assess the food security status of the study households' indicate that female-headed households were more food insecure than male-headed households. The self-assessment shows that only few of the study households were able to continuously met the consumption of their household members from own production. For the large majority of the households own production suffice the food needs of their household from autumn up to some months of spring. Starting from fall of May, the availability of food from own production declines throughout the summer season. The months of consumption from own production was shorter among female-headed households. During these months, foods mostly come from purchase. Dependence on food purchased from the market during the summer season is again a challenge because of lack of gainful income source outside own farm (Chapter six) and the high price of food.

On the other hand, the food security problem as measured by HFIAS was also higher among female-headed households than their male-headed counterparts. The proportion of female-headed that have reported to feel anxiety on access to food, altered quality of their food because of lack of income and reduced consumption (the extreme access condition) was higher among female-headed households. In terms of access prevalence which categorizes households into food secure, mildly food insecure, moderately food insecure, and severely food insecure, the number of female-headed households who fall in the moderate and severely food insecure category was higher than that of a male-headed counterpart.

In the same way, the result on the HHDDS which was used as a proxy indicator of access to food also shows that cereals, oil, pulses, vegetables, milk, and milk products were food groups frequently consumed by the households. From the analysis of the dietary score in terms of average obtained from a simple count of the number and types of food groups consumed, the size of households was lower among female-headed households. They also had less access to food items made of animal products. All these together indicate that female-headed households have lower dietary diversity score and consumption of micronutrient food groups compared to male-headed households.

Female-headed households were also rated lower by utilization of food which was measured in terms of health and sanitation which in turn determine the ability of household members to use the food they accessed during a given period adequately. This is because, though faced by the majority of the study households, all problems of the prevalence of disease, lack of clean water, sanitation (lack of use of latrine), and post-harvest losses were higher among these households. Female-headed households also use more copings to the shortage of food including the severe ones such as leasing out farmland which could be used for own production than male-headed counterparts. These indicators show that female-headed households were more vulnerable to food shortage than their male-headed counterparts.

Chapter Eight:

Synthesis, Conclusion and Recommendations

8.1. Introduction

This chapter was intended to conclude the whole chapters by summarizing the main findings of the study highlighting the knowledge and theoretical contribution of the dissertation to the ongoing academic discourse on the issue of household food security and give some recommendations. It has four major focused purposes. Firstly, it linked the thematic case studies with each other to demonstrate the extent to which access to and utilization of livelihood resources, being supported by transforming structure/institutions, enable households to pursue certain livelihood strategy to ensure food security depicted in the SLF which was used as both conceptual and analytical framework on the study. Secondly, the key findings on different aspects of households' food security were compared and explained in relation to the gender of the household heads. Thirdly, the knowledge and theoretical contribution of the dissertation in food security were specified. Based on the main findings of the research, lastly it draws conclusion which in turn allows suggesting the ways forward on how policies and strategies should be aligned to tackle the food security problem and improve the livelihood of female-headed households. Potential areas of future research were also highlighted.

8.2. Synthesis: theoretical and methodological reflections

Major (cross-cutting) issues on livelihood and food security of households

Several points were persistent throughout the study as a cross-cutting issue. In the first place, gender inequality was the major one. The local social relation based on gender shapes access and control of the various livelihood assets including the status and role of women in the study community. Because of the deep-rooted gender inequality, women assume a lower social and economic status in the study community. The second was the low level of access to and control on livelihood assets/capitals by female-headed households. Access to the livelihood capitals was important in pursuing different livelihood strategies and hence determines the livelihood and food security situation of study households. Nevertheless, there was significant variation between male and female-headed households in accessing livelihood capitals. I argue that such

varying access to these resources was explained by the prevailing gender inequality which is often reinforced by the patriarchal tradition anchored in the community.

Third, local institutions were not aligned with the needs of women in general and of female-headed households in particular. The different informal local institutions were based on the dominance and more interest of men. The formal institutions (agricultural extension, credit, and others) too have also strategies which are based on the assumption that rural farming households are socially homogeneous and can be equally served by generic development program. As a result, agricultural technologies, extension services, and credit schemes were not designed to meet the unique needs of these groups. Fourth, though access to livelihood capitals was a problem to make note of, it may not lead female-headed households to a serious problem. The problem rather lay in the ability of optimum utilization of the available resources. Fifth, the different livelihood strategies were not viable for female-headed households. These findings were farther explained and related with empirical literature in the following section.

8.3. The major findings of the specific research themes in detail

In chapter five, the level of access to livelihood assets by study households was assessed. Access to and distribution of productive resources needed for livelihood strategies in the study community is profoundly shaped by the local social relation which is mainly based on gender. Though female-headed households are of course free from intra-household domination by males in controlling productive resources and household decisions as they are heading a household without the interference, but not free from the implicit pressure from the community members which has a negative influence on equal opportunities in accessing productive resources. As a result, most productive resources are highly biased against households headed by females. Because of imposed low social and economic status ingrained within gender inequality, women in general and female-headed households, in particular, have little access to productive resources particularly land, information, inputs, credit, labor, among others, which are significant factors in the pursuing agriculture and other livelihood strategies.

In chapter six an attempt was made to investigate the role of local institutions in the food security and livelihood strategies of female-headed households. Most of the local institutions (both

formal and informal) have huge limitations particularly concerning how they treat people based on gender. The informal institutions are based entirely on the dominance of male. The formal local institutions also have no differences as they are embedded in the informal institutions. While discharging their regular duties, most of the formal institutions accept (though not explicitly), a farmer is always male which was imposed by local tradition.

One indicator for this acceptance of the local tradition was lack of differentiation in the provision of services which suits to the interest of female-headed households. As a result, the services provided by local formal institutions were based on the assumption that, farming households to have homogenous needs which are wrong in reality. These agricultural technologies provided by local institutions as, agricultural inputs and extension services are designed to serve those who have a full package of resources including land, labor, oxen and other and hence favor the well-off households. In such cases, the purpose of these local institutions is less fit to the needs of female-headed households who have poor access to the productive resources to be aligned with their services.

The few attempts made by the formal local institutions taken to solve the problem happened to women because of gender were also less likely to address the issues of female-headed households for two reasons. First, it assumes all women have similar problems regardless of their marital status with the women in male-headed households who face fewer challenges. Secondly, the approach of the institutions focuses on solutions to the practical difficulties and no attempt on long term strategies by working on the root cause of the problem that is gender inequality.

Some of the services provided by the local institutions were not affordable for farming households. The households use this service not because it is feasible but rather because of the lack of other options. For instance, loan taken from micro-finance is commonly invested in agricultural production which is characterized by a low return. The return from the capital invested in such activities was the inconsistency with the overall gain in terms of productivity and market price. The price of the agricultural products is meager. This is because, the farmers are forced to sell their agricultural products at a lower price for three reasons. First, the farming households were urged to sell their agricultural products immediately after harvest when the market price is very low. The local institutions do so to collect different input costs, loans, rural

land use taxes and other contributions due by farming households to the local administration, cooperatives, and micro finances. The second reason was the nature of their agricultural product (maize and sorghum the dominant agricultural products) which are susceptible to damage by insects. Because of all these, there was a lesser opportunity for the households to get a better price from their produce.

In chapter seven, the different livelihood strategies pursued by households and their viabilities were dealt. The study households engage in diverse livelihood activities to ensure their food security. But there was a significant variation based on the gender heads of the households. Firstly, engagements by women in some of the livelihood activities are sanctioned by local tradition. Plowing land using oxen, the important task in the production of crop through on-farm is said to be exclusively males' role according to the local tradition and thus prohibited to be done by females. With this regard, female-headed households tend to use some of their productive resources like land and oxen through renting/sharecropping out where they can get a fewer portion of the product obtained from their land.

Secondly, some of the strategies they adopt such as labor on others farm, petty trading do not enable female-headed households to be food secure. One reason for this was the interdependence of some of the productive resources in the pursuance of livelihood activities. In particular, the lack of access to male labor by female-headed households was the major problem in utilizing resources like land, oxen and the like in pursuing on-farm activities. Because of this access to productive asset as land by female-headed households may not be sufficient by itself mainly when resources required (male labor) in using it is not adequately accessed. When lack of access to these resources is difficult, land and oxen which are the major productive resources in agricultural production are most of the time used through arrangements as sharecropping, rent, etc. where those who possess these resources fail to enjoy the premium. For this reason, male and female-headed households having nearly fair access to the same amount of access to productive resources shall not be compared with some of the resources used as land, oxen, etc.

Thirdly, the livelihood activities in which the study households have been participating were of low return ones. In particular, because of lack of resources, female-headed households were engaged in low return nonfarm activities compared to male-headed households. In addition to

their temporary and low paying characteristics, the livelihood activities in which these households have participated other than own farm had big trade-off because of their competition for households' labor supply on own farm.

Fourth, their domestic workload also has a significant impact on their participation in productive activities. Female-headed households who had no labor support from their husband assume all the production responsibility on the farm operations starting from the initial land preparation throughout harvesting and post-harvesting activities. Allocation of an interrupted labor flow on these activities is impossible because of their workload on domestic activities.

8.4. Knowledge and theoretical contribution

Concerning the existing body of knowledge in the study of food security study, I argue that, this study informs on the livelihood and food security situation of rural farming households with a particular emphasis on those headed by females. Mainly, the work has brought to academic discussion the food security issue of the study area which has been overlooked with the assumption that it is endowed with natural resources and hence self-sufficient in agricultural production. The study set to make inquiries on how livelihood resources were accessed by households to pursue different livelihood strategies to ensure the food security of one's household and the role of local institutions in doing so. In the empirical chapters, it is well documented that from the existence of significant variation among households based on the gender of heads, how inequality in the level of access to livelihood capitals, ability in making use of the capitals and types of relations with local institutions because of gender affects the food security and livelihood of households differently. Though the findings were based on information from a single study district, they are important in providing insights on how female-headed households who are though struggling every day to secure food for their families but fail to realize it because of unequal access to resources, lack of institutional services that fit their needs. It informs that, residing in resource endowed areas is not sufficient condition for food security of households.

Areas of convergence and divergence between the finding and theories

Food security studies have been based on different theories and others which have been taking prominence one after the other. An attempt was also made to check whether the finding of the study converges or diverges with these core theories (FAD, FED, Political economy) which are frequently used in food security studies. The study demonstrates that theories and concepts used and the empirical findings resonate the existence of theoretical and methodological contribution of this study which goes beyond the study district. Both types of relations were evident.

Food Availability Decline (FAD) approach

Different sources indicate that Ethiopia has frequently been experiencing food shortages. Traditionally theorization of famine in Ethiopia has been related to natural factors as, bad weather conditions as drought, degradation of soil were frequently mentioned in the food security studies in Ethiopia. Most food security studies and aids have been concentrated in parts of Ethiopia which are termed as famine prone because of their exposure to the adverse weather conditions (drought and degradation of land) and population pressure.

The analysis on the access to natural resource base (one of the five livelihood capitals) of households and the nature of this resource in chapter 5 indicates the nonexistence of natural hazards which can cause acute reduction of food. The quality of soil was of course frequently mentioned by the study households as a serious problem in crop production. From this, it may seem that the FAD approach still provides a partial explanation on famine analysis in areas where food production is highly dependent on the degraded natural resource bases such as land but may be free from natural hazards as drought. Though the impact of the degradation of the agricultural land on the food security of the households cannot be undermined, it is difficult to attribute the food security of the study households on this factor.

The less rationality of natural hazards as a causal factor for food insecurity is also supported by researchers on Ethiopian food security (Degefa, 2005, and others). This is because, according to this author, with the existence of better knowledge about such hazards, the disasters caused by natural hazards could be overcome or managed by putting relevant policies and strategies. He has also equated the central argument which relates land resource degradation as a principal

cause of food insecurity with what he called “a degradation school of thought” Many pieces of evidence can be mentioned that the problem of food security in Ethiopia also lies outside the “degradation school of thought” indicated in (Degefa, 2005). The cause of the food security problem of female-headed households thus goes beyond environmental factors.

The finding indicates that the food security problem of the households was because of unequal distribution of the productive resources and the varying level of utilization of these resources between male and female-headed households. It has been viewed that access to productive resources is a condition for food security. But these resources are not fairly accessed by all households who live in the resource-endowed region. In the study area, most household assets are controlled by males in the male-headed households and decisions too are made by them. In particular, because of low access to human and social capital (lack of male labor and networks), female-headed households could not use some of the productive resources like land, oxen, and others to their potential. Return on some of the productive resources among female-headed households was very low. This is in line with findings by Ellis, (1999) and The World Bank, (2008) which indicate that, differences in access to and control over key productive resources as, assets and services between men and women because of gender inequalities negatively affect women’s food production. Specifically, Campbell (2011) stated that female-headed households are disadvantaged in access to land, livestock and social service as health care, markets and extension services.

Thus it is argued that, what matters is not how productive resource which is defined by Sen, (1981) as, the set of alternative commodity bundles is available in a given area but rather how different social groups (women in general and female-headed households in particular) are entitled to this resource in pursuing their livelihood. Alongside the works of Devereux (2000) and Sen, (1981), the entitlement failure can better explain this problem. Female-headed households were unable to command over sources of food while participating in production, trade, labor and transfer using the entitlement relations operating in that society depending on its legal economic, political and social characteristics. The varying level of entitlement to resources between male and female was shaped by the gender inequality which is reinforced by the age-old patriarchal relation.

The general observation of the study can be comprehended within the political economy explanation. Of course, though the degradation of farmland and entitlement failure can be taken as the immediate cause of the food security problem, nevertheless the root cause of food security problem of the households was situated in how local institutions which are the product of policies and strategies serve male and female-headed households. The finding indicates that the problem was primarily related to inappropriate and inadequate implementation of policies to correct inequitable access to different productive resources based on gender, optimal use of the available resources and create opportunities for female-headed households where they can generate additional income outside of own farm. The gender-based variation among households could have been tackled by arranging local institutions which ensure equitable access to different resources, align their interventions with the needs of a diverse group of people and practical local situations than conventional one. I argue that, being/living in resource endowment of natural resources as, rain, natural vegetation, and land is not sufficient for food security of households. Though available, these productive resources are not fairly accessed and controlled by female-headed households. The problem could have been overcome by ensuring impartiality in the distribution of these resources or ensuring fair access by farming households regardless of the gender of the heads.

Food security through livelihood lenses

All the factors (variables) identified by different studies as determinants of food security contribute to the problem by shaping, according to Yishak et al.(2014) farmers' choice of the most remunerative livelihood strategies such as, on-farm alone, farm and non- farm, farm and off-farm, and farm , nonfarm and off-farm. A study by this authors shows that a large number of poor households engaged in non-farm and off-farm activities in addition to agriculture. From this, it can be confirmed that basing food security inquiries on livelihoods of households than specific factors such as livestock, land, inputs, and others is appropriate.

8.5. Methodological contribution

A mixed (quantitative and qualitative) approach was adopted in this study. This was based on the suggestions obtained from a detailed review of research methodologies on social science in general and empirical literature on food security in particular which recommend such approach

due to the complex nature of the subject. Though the study was dominantly qualitative, still the synergetic benefit of the study by combining the two approaches was substantial. The following were to some extent, the methodological contributions of this work in furthering the on-going food security analysis:

The need to analyze cultural traditions: This is important in understanding how the age-old social inequality deep-rooted in the local socio-cultural traditions influences access to productive resources and pursuance of different livelihood strategies by different social groups in the community even in areas endowed with such resources. How male and female are; from their early childhood; brought up in the community in the local tradition and access to and control on different resources was analyzed. Interview with local elders who have been mediating distribution of resources particularly land and livestock and thus have rich experience of the local traditions indicates the significance of this approach than mare assessment on access to livelihood assets.

The need for incorporating people's perceptions in the analyzing food security status of households: This helped the researcher in understanding how the rural farming households view food security and identifying its causes as described by study participants themselves. In particular, the convergence of the result obtained from analysis on the quantitative data and perception of the households regarding the different factors that determine their food security informs the more significant contribution of incorporating the perception of households in studying the subject.

The need to treat disadvantaged social groups in the study of food security: This study departs from the previous approaches used by most food security researchers in selecting the site of study and the unit of analysis. Most of the earlier studies conducted on food security problem in Ethiopia were geographically concentrated on areas adversely affected by environmental factors (mostly weather conditions, conflicts, and degradation of land) and broader community and household in their unit of analysis. The prevalence of food security among female-headed households who live in the veer green environment and hence assumed to be self-sufficient production from the result indicates the need to consider certain disadvantaged social groups in food security studies.

8.6. Conclusion

This study was aimed at understanding the food security status of households, livelihood strategies of households and determinants of food security of households with a particular focus on female-headed households in Sasiga district of East Wollega zone, which is part of the evergreen environment of the southwestern region/part of Ethiopia. To this end, a broad set of issues concerning the food security and livelihood situations of female-headed households were noted in the statement and proposition parts of the study on the basis of which four specific objectives (in congruent with SLF components) were identified. These objectives were set to examine the level of access to livelihood assets (chapter 5) which are important in pursuing various livelihood strategies. Besides, analysis regarding how both formal and informal local institutions mediate access to resource and engagement in various livelihood strategies (chapter 6) followed by the examination of the viability of these strategies (chapter 7). Finally, the food security status of households and its determinants were assessed using relevant indicators including households' perception (chapter 8). The study was guided by SLF, employed a rigorous mixed method research approach in examining how livelihood assets enable households in pursuing ranges of livelihood strategies that are being transformed by local institutions to ensure food security using cross-sectional data. Based upon the major findings of the chapters, the following conclusions were drawn.

Resource access and distribution

The study revealed varying access levels to most productive resources among the study households. Wide variation was accounted for by difference of male and female households' headship. In fact, female-headed households have very low access to and control over resources as, land, oxen, labor, credit, inputs, extension services and others which are crucially important in livelihood struggles. For instance, land being the lifeline productive resource in the process of crop production was relatively abundant in the study district as compared to densely populated regions of the country. Female-headed households make little benefited from such abundance because local cultural tradition and even formal institutions (though not explicitly) give the primacy controlling land to males.

Following SLF as a conceptual and analytical framework, the study findings clearly reveal that female-headed households are constrained in access to almost all productive resources and control crystallized by the age old patriarchal relation that result in gender inequality weak social, economic and political position of women.

Local institutions

The findings indicated that the diverse local institutions operating in the area have limited role in positively influencing the food security status of female-headed households. Among these institutions, *abbamichu, jaala, and dabare buna* have important roles in social cohesion which cannot be replaced by the local formal organizations. Nevertheless, most of the informal local institutions create a context for women's poor access to productive resources particularly those who are heading a house. For instance, because of the negative perception towards women's labor embedded in most indigenous labor sharing organizations, there is rare male and female mixed labor network. Women have limited participation in the formation and leadership of informal local institutions involved in labor sharing organizations like *edir* which is important institution in labor mobilization and social capital development and *jaarsa biyya* that plays crucial roles in conflict settlement related and large to access and use resources. In such a way, most local informal institutions become rather sources of vulnerability of women.

As evident, the rural land proclamation issued by the regional government is important formal institution on land resource allocation. Access to land was clearly stated in article 5/1 of proclamation No.130/2007 that allows those who wish to base their livelihood primarily on agriculture- free access to land. But in practice, the rural land use proclamation is not different from the informal institutions on land. Albeit the formulation and revision of series of land use proclamation, there is big difference among farming households particularly based on gender in accessing land which is important livelihood asset among rural households. The focus seems not on guaranteeing access; rather on security of tenure. In particular, the provision on the amount of land to be rented restricts the right of female-headed households who do not have adequate labor to develop their land on their own. The poor implementation of this proclamation has appears to have created has direct negative economic impact on the land poor households.

The other institutional constraint on female-headed households was the provision of agricultural technologies which is based on the assumption that all farming households are homogenous in their nature and their needs can be met using same approach. Such conventional approach neglected the needs of female-headed households who because of lack of access to the technologies provided through agricultural services and shortage of other resources as finance and labor could not benefit from the technologies (farming technique, chemical fertilizer and seed) disseminated through agricultural extension service. Lack of alternative technology packages fitting/responding to the needs of the less labor endowed female-headed households (may be crops that can be grown with minimum input as labor, chemical fertilizer, etc) in addition to the conventional one focus on cereal crops has limited female-headed households use of modern agricultural technologies which in turn leads to declining yield of their agricultural production. Similarly lack of specific interventions designed to serve female-headed households in the area of credit has contributed to their food security problem.

Livelihood strategies

In what types of livelihood strategies the study households have engaged and how far the diverse strategies were viable for female-headed as compared to their male-headed counterparts is also an important point to be asked. The study households engage in on-farm, off-farm and non-farm livelihood strategies with of course slight variation. But for a number of reasons, the strategies pursued by female-headed households were not positively contributing to their livelihoods and food security. This is because, in addition to the inequality, the distribution of the productive resources and the capacity to utilize them by female-headed households was also very low. Thus, what matters most was not whether male and female-headed households had pursued different livelihood strategies or not, rather what was more important based on the finding of the study was their viability.

On-farm (production of crop and livestock rearing) strategy is the most preferred type of livelihood strategy by the study community and hence pursued nearly by all study households. The production of food for a household through this strategy is limited to single summer rain. The small amount of food produced during a single growing season is used over a longer period

when household members are not engaging in (few or any at all) productive activities during the dry season.

Still, women are forbidden to carry some of the on-farm activities as tilling land because of the division of labor (local socio-cultural practices). Plowing land using oxen which is an important activity in the production of crops is considered to be as the task of males' and thus perceived as taboo for women. Further, the labor requirement of the task of plowing is another problem. Hence, female-headed households cannot use productive resources like land and oxen by their own and thus compelled to use these productive resources through arrangements as sharecropping/renting out where the product is shared with others-males.

The study households also engage in different livelihood strategies other than only on-farm. Petty trading was pursued by a large number of both male and female-headed households. Nevertheless, the type of petty trading pursued by the households varies based largely on the gender of the heads of the households. Female-headed households; because of lack of startup capital and local socio-cultural traditions; engage in low return trading activities like sale of mostly food items as local drink, grain, vegetables, spices etc, small livestock as chicken while male-headed households engage in activities which have relatively better return as fattening and trading different types of livestock (goats, sheep, cows and other).

Both households have different purposes for engaging in different activities other than own farm. Some outside own farm (off-farm and non-farm activities) activities though commonly thought to serve as a means of diversification, do not serve such purpose particularly among female-headed households. They were instead, except for a few male-headed households who have a tendency towards diversification, pursued as a means of coping with the shortage of food/income. In particular, some activities such as, farm labor employment on others farm during pick agricultural activity puts female-headed households in a vicious food security problem by compromising family labor needed work on own farm.

Food security situation of households and its determinants

Albeit the assumption which holds that the southwestern part of Ethiopia where the study site is located is food secure because of its natural resources endowed and environmentally stable (free from drought), the study confirmed the prevalence of food security problem among the study households. All indicators of food security used in the study (chapter 8) show that female-headed households are facing severe food shortage compared to their male counterparts. A number of factors were identified as the causes of households' food security problem which can be categorized as, demographic, socio-economic, and agricultural technology. Accordingly, participation in non-farm income, age, and gender of the head of the household were the major factors which cause food shortage among households. Based on the perception of the participants of the study, lack of oxen, adequate labor and land for agriculture as well as inadequate input use were the major factors constraining production for food self-sufficiency. Environmental shocks and trends as termite infestation, the acidity of soil, the decline in availability of pasture, deforestation and weed infestation (minda) have also been frequently mentioned as underlying causes of household food security through their impact on agricultural productivity.

The findings indicate a higher level of food security problem particularly among female-headed households caused by factors other than climate which have been frequently identified by most of the previous studies on food security. The study area is located in a region which is endowed with natural resources like forest, rivers with adequate rain and hence conducive for agriculture (crop production and animal husbandry). Thus, the major problem is related more to gender which determines different level of access to and use of productive resources and involvement in varying livelihood activities between male or female.

8.7. Recommendations

The finding of the study has enabled us to identify some measures that need to be taken through policy interventions and development plans that impact the food security of female-headed households reside in environmentally stable areas.

Closing the gap on gender based variation in access to livelihood assets

From the assessment on the livelihood assets of households,' it is understood that there is a considerable variation in the level of access to productive resources among the households. The gap on the basis of the gender of heads of the households was so high. This is because access to and control of most of the resources as influenced by local cultural tradition is concentrated in the hands of males. As a result, female-headed households have a lower level of access on most of the livelihood assets/capitals except physical capital which is provided as public property. In particular, a variation on productive resources as land, labor, credit, and oxen emerged as was clear evidence of the findings. This has lead to a shortage of food by limiting the production options female-headed households could have pursued. Thus, though it may take a longer time to change people's perception of gender relations, working on the existing gender relations will be a priority area of policy intervention. In line with access to resource by female-headed households we recommend measures to be taken both at short and long term durations:

In the short term, actions shall be taken to improve female-headed households' access to productive resources by proper implementation of existing laws on resource allocation. In this regard, gender shall be mainstreamed in the process of provision of different social services. Access to labor, input, credit, land, and other important productive resources which are immediate problems of these social groups need to be improved.

In the long term, measures which are more strategic are also needed against the root cause of the hardship faced by women in general and female-headed households in particular which lies in gender inequality. Based on critical examination of socio-cultural barriers which impede women's participation in socio-economic development, there is a need to design and implement strategic action through long term and sustainable educational activities and awareness raising works to end discrimination based on gender. This reduces traditional customs that discriminate control over resources, the division of labor, and empower women in general and female-headed households, in particular, to actively participate in decision making and community particularly on those issues which concern them.

The need to enhance natural resource conservation by individual farming households

In addition to the unequal distribution of productive resources such as land, the findings also show that the situation of this resource (because of soil acidity and termite infestation) has contributed to yield decline. If the current situation of the farmland continues unabated, it will result in the considerable deterioration of farmland conducive for agricultural production. With the expected continuation of agriculture in the food security of the study community, natural resource conservation should be strengthened further. Therefore, in addition to the ongoing natural resource conservation through community based integrated soil and water conservation (water shade) schemes by the community (characterized by seasonality and done to meet a sort of annual quota), individual households are required to do sustainable natural resource conservation on their own farm to in order to improve soil and organic matters of their farmland.

Local formal and informal institutions and organizations shall be gender sensitive

Informal institutions on resource access such as, labor reciprocations, jaarsa biyya, edir, sharecropping, land rent *abbamichu*, *jaala*, *jaarii*, *dhaabbata dalla*, and *dabare tikaa* are operating in the study community. Some of these institutions have significant contribution to the livelihood and food security of households by mediating access to different resources. Particularly, they have important roles in filling the gaps of formal institutions. However, they have a number of limitations such as, in permanency/temporarlyness, lack of recognition and support from formal institutions, incurring extra cost and the like. For instance, the major weakness of labor reciprocation, *edir*, share cropping, and land rent are unequal treatment of people regardless of their differences on the basis of the economy, social status, age, and sex. Above all, women have weaker power to influence these institutions because they are highly gender biased. On the other hand, institutions as *abbamichu, jaarsa biyya*, and *jaala*, though have an important role in maintaining social cohesion and social capital strengthening but less recognized by formal institutions. In line with this evidence, we like to advance some arguments:

In the first place, the multidimensional role of the existing informal institutions in accessing resources like labor, social cohesion, and stability of the community shall be recognized and

promoted by formal institutions. They shall be capacitated to play these roles in a better way as follows:

- The indigenous institutions and local formal institutions should be empowered, and their activities shall be integrated with the formal institutions to synergistically enhance local communities' access to productive resources for improved livelihood and food security.

- Some of the poor extravagant practices and lack of accommodation of the interest of women shall also be improved through sustainable awareness creation by local development actors.
- Women shall participate in the leadership of the informal institutions which could also enhance their community participation and prepares them to take leadership roles in the formal institutions functioning at the grassroots level.

Land is a crucial productive resource among rural farm households. But inadequate access to this resource has a significant impact on the food security of many farm households. One of the major problems with this regard is how this resource is accessed and distributed by local institutions (both formal and informal). Important formal institution considered in this study was the regional government's rural land use proclamations (Megeleta Oromia, 2007). For instance, the series of proclamations were formulated by the regional council with regard to rural land use and administration in Oromia, focus on tenure security on previous holdings. These proclamations could not either correct the large unequal landholding among households created because of informal institutions or guarantee the right of access to land by a person whose age is 18 and above and wishes to pursue agriculture as his livelihood as included in all of them. The same proclamation also restricts the redistribution of land (article 14/1). As a result, in practice, some households do not have land for agricultural purpose at all while still many depend on small land size which is inadequate. In addition to this, the provisions of the proclamation also put a number of restrictions on landholders. One of these restrictions is the prohibition of the sale of fixed assets/perennial crops such as coffee on one's land(article 10/1). However, though the sale of fixed assets on one's land is prohibited, the illegal transaction of land and fixed assets on land could not stop because of lack of alternative source of access to loans to overcome financial shortage and the attractive loan money provided by relatively wealthier people on land.

Therefore, access to adequate and fair distribution of available land resource is mandatory to improve food production from own farm. To realize this, the provisions of the rural land use and administration on access to land shall be revisited in such a way that they can solve the problem of access to land including redistribution when necessary. The low level of access to land by female-headed households shall be improved. The restrictions on the sale of fixed assets on one's land would also provide alternative solutions to the problem so that holders do not miss the right to use their fixed properties as the last option.

A number of studies conducted in Ethiopia indicate that female-headed households have poor access to different social and economic services provided through local level formal structures (Garedew, 2017, World Bank, 2014, UN Women, 2014, and FAO, 2011). In the same way, the present study also shows that these social groups have lesser access to agricultural technologies (chemical fertilizer, seed, and on-field technical support from experts) and credit compared to male-headed households. Female-headed households are not able to use most of these technologies that could boost the yield of cereal crop even when they are available. It was found that most of the services do not fit to their needs. For example, none of the agricultural technologies recognized labor shortage (particularly that of males) on farming and domestic work overload of women in the female-headed household and tried to meet their demands. Because of lack of poor asset positions (land, livestock, and social capital) which are implicitly used as collateral for loans, female-headed households cannot fill most of the requirements set to be legible for credit/input supply services. In addition to this, the amount of loan, the rate of interest and the terms of payments make services unproductive which the households use just because of lack of choice.

Thus, agricultural extension service shall include in its package service fits the needs of female-headed households. There is a need to revisit approaches in the provision of different agricultural extension inputs to fine-tune with the needs of these households. This implies that, introducing technologies which responds to the needs of women in terms of labor, domestic work overload, shortage of land, and at the same time enhance productivity can solve the problem. Crops which can be grown on small area of land (garden) using human labor and require less input (fruits, vegetables, spices, *enset*, cassava and other) shall be included in the agricultural extension

package for female-headed households and others who have shortage of land and draught power after undertaking necessary feasibility studies in the local context. In the same way, credit services design a strategy to serve resource-poor households. The rate of interest on the loan which is very high compared to the rate charged by formal banks should be reconsidered.

Viable on-farm and non-farm livelihood options shall be sought for female-headed households

On-farm strategy is a preferred livelihood strategy in the study area for two good reasons. Firstly, it is because of the resources that households have such as land and livestock are interdependently used to produce the food requirement of households. The second reason is the lack of opportunities and skills other than in the agricultural sector. However, the on-farm strategy is constrained by lack of land, labor (for plowing using oxen), and oxen particularly among female-headed households. In addition to this, female-headed households because of culture and physical strength cannot do some of the farming activities and thus cannot produce enough from own production. With the same type of resource endowments, having similar resources with male-headed households, female-headed households do not adequately utilize available resources and produce the amount of food required for their families because of the lack of necessary labor and preoccupation by domestic activities.

Female-headed households shall be encouraged to engage in on-farm activities which require less labor, input, and land and can be managed on a small area in the backyard. On-farm activities as animal fattening which are recently introduced into the study area through settlers from Haraghe shall be scaled up through demonstrations with the provision of technical support and credit when needed.

Diversification into non-farm strategies can be sought as a possible solution to overcome food security problems when income from on-farm strategies cannot ensure the food needs of households and an additional source of income. But this is not the case in the context of female-headed households in the study area. Though large numbers of female-headed households engage in different activities outside on-farm activities, it brings no improvement to their food security. Instead, it puts them in a vicious food shortage due to two reasons. Firstly, female-headed households stuck into low return non-agricultural activities because of lack of access to

most of the productive resources. They were unlikely to be able to diversify into relatively high return livelihood opportunities effectively. They engage in petty trading and labor employment which are characterized by low payment. Secondly, some of the possibilities (labor employment on others farm) are available only when these households are busy on agricultural activities on own farm on which they can engage only by compromising family labor to be allocated on one's farm. This indicates the need for local development interventions should be sensitive to the livelihood of the poor in particular, their assets and activities.

In line with this, increasing the productivity of female-headed households on both on-farm and non-farm activities is critical to ensure their food security. Local culture which discourages the engagement of women in some agricultural practices shall be improved through awareness creation on the importance of active participation of both men and women on different agricultural activities regardless of gender. The physical nature of some of the farming activities (like plowing) shall be eased through introduction of technological innovation.

Other than strengthening their on-farm productivity through improving access to productive resources and inputs, income opportunities outside on-farm activities shall be created for female-headed households. Such opportunities shall be carefully designed to solve the problem of labor employment on others farm which is characterized by low payment, also compromise the use of family labor on one's farm during agricultural activities. Concerning this, there is a need to equip female-headed households with viable non-farm skills on income generating activities such as handcraft, trading activities and animal fattening with the provision of necessary inputs and creation of employment options where they can use their idle labor, particularly during autumn, winter and part of spring seasons. This is useful in enabling the households in making use of the long non-working months of the dry season.

Food security policies and programs shall target disadvantaged social groups

Usually, places with the evergreen environment have been viewed as an area of surplus production and hence food self-sufficient. The southwestern part of Ethiopia where the study site is located has evergreen environment. It also has enormous potential for agricultural production. With such understanding, it has been center of a series of resettlement program carried out by the

government. The development plan of the government in this area has been primed to boosting the production of cash crop such as coffee and oil seeds which are essential export commodities of the country. However, few available studies conducted in this part of the country (Guyu, 2016; Mequanent, Birara, & Tesfalem, 2014; Getu et al., 2014) including this one indicate the prevalence of food security problems against the long-held perception on the region to be free from such issues. Nevertheless, the policies and programs on agricultural production and food security have been biased towards areas said to be famine prone and where the problem affects a large number of population. As a result, certain disadvantaged groups particularly female-headed and poor households seem to be excluded in the government policy interventions.

Therefore, policy interventions and programs on food security should also take into consideration food security problem felt by the disadvantaged groups of society who live outside the officially acknowledged famine prone localities. Accordingly, it is important to identify different social groups as female-headed households, people with disability, youths, orphans, etc., who either have limited access to productive resources or unable to use the resources at their disposal to become food secure.

Recommendation to local stakeholders on food security and livelihoods

A. Agricultural extension

Not all farming households can access agricultural technologies provided through agricultural extension. Disadvantaged social groups as female-headed households are not users of such services because of the bias of agricultural extension workers against female-headed households. Likewise, still most of the time the technologies provided through agricultural extension services do not fit into the type of crops female-headed households grow. Thus, female-headed households cannot use such services even when it is available because of the lack of access to resources (finance, labor, information) which are needed to use these technologies, and domestic workloads. Hence, agricultural extension services shall design a package which meets to the specific needs these households in different contexts.

B. Women's affairs

Office of gender affairs is preoccupied with settling problems faced by women and girls from males in the form of sexual violence, abduction, rape, divorce, etc. Most of their activities

revolve on the issue arising on the relationship between male and female. The officers often do nothing concerning what women should get from local formal institutions including micro-finance, agricultural extension, health centers, and many others. Thus, dealing with the complex problems of women calls for the adoption of a holistic approach which includes economic, social, and political solutions and coordination with different stakeholders than narrowly focusing on problems related to male-female relationships. The holistic approach in addition to addressing the routine problems, shall also have long term awareness-raising programs on the root cause of gender inequality.

Areas of further research

Though the food security status of households may be the cumulative effect of a long time socio-economic and environmental condition, this study was based on cross-sectional data. In fact, information on food security and livelihood strategies of female-headed households demand longitudinal data. Thus, the problem shall be studied by taking panel data.

One of the critical areas identified concerning food security and livelihood strategies among female-headed households' was the absence of optimum utilization of the available productive resources. This was because female-headed households cannot use some of their productive resources such as land, oxen, and others due to households' internal limitations and local traditions. Local traditions that influence how these resources are accessed and distributed may take a long time to overcome. In such situations, approaches that ensure women's food security in general and female-headed households in particular within the context of local tradition is necessary. In this regard, further research is required to identify alternative strategies that suit the needs of these households. Actually, regional situations are available in both agricultural and non-agricultural sectors to improve the food security of female-headed households.

As unequal access to various resources was a significant factor in determining different livelihood strategies pursued by rural farm households to address their food security. Further, future research is needed in the case of other disadvantaged groups of the society such as households headed by youths and disabled people to support their effort to attain food security.

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Appendices

Appendix 1

Survey questionnaire

Dear respondent, the purpose of this survey is to gather data for a PhD dissertation entitled "Food Security and Livelihood Strategies of Farming Households in Rural Ethiopia; A Critical Analysis of Female-headed Households in Sasiga District, East Wollega Zone, Western Oromia Region" required for partial fulfillment of the Degree of Doctor of Philosophy in rural Development. Information you will give serve only the aforementioned academic purpose and thus your genuine response to questions is very important in achieving the goal of the study. Hence you are kindly requested to give information genuinely.I would like to thank you in advance for your cooperation and time to give information on this survey.

General Instruction: Please give your response by using a tick mark "☑"or writing the number of your choice from the different alternatives provided against each item for closed questions and by writing short notes on open ended ones.

Questionnaire for the structured household survey

Part I. General socioeconomic information of the household head

No	**economic characteristics of household heads**		
1	Age in years		
2	rience as farmer/farming experience in years		
3	f the household head	1 Male 2 Female	
		fhhh, how many years since you assume headship	
4	Marital status	1. Never married 2. Cohabitating 3. Married 4. rced/separated 5. Widowed 6. Spouse migrated	
5	Religion	Protestant 2. Orthodox 3. Islam 4. Waaqeffataa her specify	
6	Ethnicity	Oromo 2. Amahara 3. Tigire 4. Gumuz 5. , specify	
7	py current residence	Since birth 2 settled from other place	
8	of Education	No education 2. Primary 3. Secondary ploma 5. Degree Above	
9	r occupation	Crop production only 2. Livestock only 3.	

	d		
10	head of the household economically active?	Yes 2. No	
	ber of household members at the time of the survey	M male	
		Female	

Part II. Some socioeconomic characteristics of the permanent members of the household

pecific socioeconomic characteristics of members of the household								
	vith hold head		ucational status	omic activities		ot work		
				Grow crops Raising livestock	farm		ble	
	se							
	Non-relative							
	lired as farmer							
	Grandchild							

1. Daily laborer 2. Wavering 3. Pottery 4.Student 5. Carpenter 6. Retail trader 7. Selling fuel wood 8. Hairdresser 9. Collect wild food 10.Hunting 11.Blacksmith 12. Making home utensils

III. Livelihood assets and activities

A. Natural capital: access to, use and management of land, tree plants and forest resources

1. Are you a farmer? Yes [ ] No [ ]
2. If your response to question No. 1 is yes, do you have access to land for agricultural use? Yes [ ]No[ ]
3. If your response on question No. 2 is yes, please give full information on your land ownership

Land and various ownership types			Size in hectare
1	Land rented in	Yes [ ] No [ ]	
2	Land rented out	Yes [ ] No [ ]	
3	Land sharecropped in	Yes [ ] No [ ]	
4	Land sharecropped out	Yes [ ] No [ ]	

Information on your own land					
Total land owned	Total size in	In hectar	No of plots	Distan	Quality

					Soil	Slop
Cultivated					Fertile [ ] Medium [ ] Poor [ ]	Plain [ ]Gentile [ ] Medium [ ]Steeply [ ]

4. If you have a plot(s) of land, how did you acquire it?

   Redistribution [ ] inheritance [ ] purchase [ ] gift from relatives [ ]

5. What evidence of ownership/tenure do you have on your private land?
   Certificate [ ]letter of local administration[ ]letter of gift/inheritance [ ] other specify
6. What is your reason for renting/sharecropping in land?
   Land lessens[ ] inadequate land [ ]distance from own land[ ] other _____
7. What is your reason for renting/sharecropping land out?
   Lack of draft power [ ]lack of skill to farm [ ]lack of labor[ ] distance from homestead [ ]
8. What are the major problems constraining farm land in terms of their rank (indicate in numbers)?
   Runoff [ ]water logging [ ] termite infestation [ ] scarcity of water [ ] very steeply [ ]
9. Which are the methodsyou follow to support crop production? More modern farm implements (fertilizer, seeds, chemicals) [ ]traditional soil fertility management[ ] Using crop varieties on the same plot [ ] Expanding previously uncultivated land [ ] Crop rotation [ ] Fallowing [ ]

10. Would you tell us if you obtain the following natural resources from communally owned stock?

Types	Accessed from communal land		
Firewood for domestic purpose	Yes [ ] No [ ]	Timber	Yes [ ] No [ ]
Fire wood or charcoal for sale	Yes [ ] No [ ]	Wild fruit	Yes [ ] No [ ]
Farm implements	Yes [ ] No [ ]	Pasture/grazing	Yes [ ] No [ ]
Trees for fencing farm lands	Yes [ ] No [ ]	Wild honey	Yes [ ] No [ ]
Wood for making “house” livestock	Yes [ ] No [ ]	Water for irrigation	Yes [ ] No [ ]

Materials for construction of house	Yes [ ] No [ ]	Hunting	Yes [ ] No [ ]

11. Is the pasture accessed from different sources adequate for your livestock? Yes [ ] No [ ]
12. Tthe quality of pasture over time; why? same[ ] improving [ ] deteriorating [ ]
13. If deteriorating why?Increase in cattlepopulation[ ]expansion of crop land [ ]other[ ]
14. What are the coping mechanisms you adapt to deteriorating pasture in the locality?
    kaa'aa[ ]*iribbii* [ ]*daraba*[ ]keep small ruminants[ ] zero grazing[ ] use crop residue [ ]

B. Social capital and networks

1. Are you member of any local social organization? Yes [ ] No [ ]
2. If yes, tell us these organizations and your role

No	Institution	Member	Number of members in the organization	Have any leadership role in the organization
	Warra,	Yes [ ] No [ ]		Yes [ ] No [ ]
	Dabare Buna	Yes [ ] No [ ]		Yes [ ] No [ ]
	Edir	Yes [ ] No [ ]		Yes [ ] No [ ]
	Equb	Yes [ ] No [ ]		Yes [ ] No [ ]
	Dabareetikaa	Yes [ ] No [ ]		Yes [ ] No [ ]

3. How do you feel about status of your relationship with the neighbors/relatives and your family members? Very good relation [ ]cool [ ]isolated [ ]
4. Did you get any plough oxen sharing from neighbors/relatives 2007/08 EC? Yes [ ] No [ ]
5. Do you have someone who borrow you farm implements when in need? Yes [ ] No [ ]
6. If you participate in community labor exchange organizations/parties please tell us which ones?

No	Organization	Member	With males	With Females	Both
1	Daboo	Yes [ ] No [ ]	[ ]	[ ]	[ ]
2	Daadoo	Yes [ ] No [ ]	[ ]	[ ]	[ ]
3	Maheber	Yes [ ] No [ ]	[ ]	[ ]	[ ]

4	Religious association	Yes [ ] No [ ]	[ ]	[ ]	[ ]
5	Ekub	Yes [ ] No [ ]	[ ]	[ ]	[ ]
6	Dugda	Yes [ ] No [ ]	[ ]	[ ]	[ ]
7	*Hidhata*	Yes [ ] No [ ]	[ ]	[ ]	[ ]
8	Qite	Yes [ ] No [ ]	[ ]	[ ]	[ ]
9	Cooperatives	Yes [ ]No [ ]	1. Producers 2. Saving & credit		

7. Do you get labor support from relatives/neighbors when you are in need? Yes [ ] No [ ]
8. Does membership in these social organizations involve any fee? Yes [ ] No[ ]
9. If your response to Q no. 8 is yes, how much?_____
10. Do you obtain any remittances from your relatives? Yes [ ] No[ ]
11. If yes, indicate the sources, amount and purpose for which you have used the remittances

Remitted by	Location	In birr	Allocated for
1. Husband 2. Wife 3. Children 4. Other relatives 5. Non relative6. Organization	1. sameDistrict 2. Neighboring district 3. other zone 4. other region 5. abroad	Birrr	1buy food. 2. school fee 3. medication 4. build a house 5. buy ox 6. purchasing inputs

12. Have you received any gifts to widows/elderly from ones relatives? Yes [ ] No [ ]

C. Physical capital

1. Physical capita

No.	Physical capital	Access	Type	Distance	Remark
1.	Potable Water	Yes [ ] No [ ]			1. Spring 2. Pipeline
2	Water for livestock	Yes [ ] No [ ]			1. Stream 2. River 3. pond
3	Irrigation facility	Yes [ ] No [ ]	1. m. pipe 2.small scale		1. Private 2. community
4	Road	Yes [ ] No [ ]	1.feeder 2.gravel		1. Feeder 2. Whole weather

5	Transport	Yes [ ] No [ ]			. Animals 2. Cart
6	Grain mill	Yes [ ] No [ ]	1.traditional 2.modern		1. Water 2. Diesel 3. Hydro
7	Power	Yes [ ] No [ ]	.Modern 2. Traditional		1. Firewood 2. Biogas 3. Solar
10	Human health	Yes [ ] No [ ]	1. Clinic 2. center		1. Private 2. Public
11	Animal vet.	Yes [ ] No [ ]	1. Clinic 2. center		1. Private 2. Public
12	Technologies	Yes [ ] No [ ]			Fertilizer, seeds, herbicides
13	Farm implements	Yes [ ] No [ ]	Plough [ ] weaving tool [ ] sickle [ ] ax [ ]hoe [ ]		
14	House and its asset	Roofing	grass [ ] iron sheet[ ] straw [ ] wood [ ] plastic [ ]		
		Walls	Wood with Mud [ ] mud with cement [ ]brick[ ]		
		Assets	sleeping mats [ ] bed [ ] tables [ ] radio [ ] TV [ ] phone [ ] chairs [ ] full cooking tools [ ]solar power [ ]		
		Toilet	Yes [ ] No [ ]		
		Floor	Mad [ ] cement [ ] wood [ ]		

2. If you do not cultivate crops using irrigation what are your reason?

   Lack of water resource [ ] lack of land suitable for irrigation [ ] lack of knowledge [lack of labor[ ] problem of wild animal on crop [ ] Other_____

2 Financial capital

1. Which of the following forms capital do you keep as an asset? Stock of crop [ ] livestock [ ] jeweler [ ]
2. If you have capital in the form of crop please indicate which ones and amount as follows

A. Types of major field crops owned in quintal from 2008 E.C harvest													
Crop type	Maize	Sorghum	teff	wheat	Barley	bean	Peas	Lentils	Nug	Seasam	millet	chickpeas	ground nut
Quintal													
Income in ETB													

A. Types of perennial crops grown and income obtained from 2008 E.C harvest											
Crop type	Mango	Banana	Papaya	Potato	Sweet potato	Carrot	Onion	Coffee	Chat	Paper	Tomato
Quintal											
Income in ETB											

3. Do you sell part of your agricultural products in market while the amount left after sell is not adequate for household consumption? Yes [ ] No [ ]
4. If your response to Question no. 3 is yes, why?

   To pay loan/rent [ ]school fee [ ] tax [ ] medication [ ]
5. Indicate which modern farming technologies do you use in your agricultural activities

Modern farming techniques used to grow crops				
No	Types of technology	Applied	Quintals, lit, K/G	Optimal
1	Chemical fertilizer	Yes [ ] 2. No [ ]		Yes [ ] 2. No [ ]
2	Improved seeds	Yes [ ] 2. No [ ]		Yes [ ] 2. No [ ]
3	Herbicides	Yes [ ] 2. No [ ]		Yes [ ] 2. No [ ]
4	Irrigation	Yes [ ] 2. No [ ]		Yes [ ] 2. No [ ]
5	Improved livestock breed	Yes [ ] 2. No [ ]		Yes [ ] 2. No [ ]
6	Improved bee hive	Yes [ ] 2. No [ ]		Yes [ ] 2. No [ ]

6. If you do not use the above inputs (all or in part) adequately what is the reason?

   Absence of supply [lack of knowledge to use [ ]nature of the land[ ] its use has no change [ ]
7. How do you evaluate the price of these inputs in relation to the production you obtain from using them?

   Very expensive [ ] expensive [ ] medium [ ] cheap [ ] very cheep [ ]

A. **Financial capital in terms of livestock**

1. If your household owns any farm animal, would you please tell us the livestock held; breed and estimated price based on the market value at the time of the survey?

A. Types of owned2008 E.C									
	Cows	Oxen	Goats	Sheep	Horses	Mule	Donkey	Chicken	Bee hive
Total number									
Breed									
Income in ETB									

2. What are the major constraints you face in raising livestock?

   Lack of pasture & water [ ] disease/pests[ ]attack by wild life[ ]theft [ ]

3. Which source of regular inflow of finance do you have

   Remittance[ ]crop sales [ ] milk and its products[ ] petty trade [ ] labor work [ ]

3 Human capital

1. Do you have some knowledge required for farming? Yes [ ] No[ ]
2. If yes, which activities are you capable/skilled to practice by your own?

   Plowing [ ] clearing farm land[ ] hoeing [ ]planting of tree crops [ ] weeding [ ] harvesting [ ] trashing [ ] terracing [ ] sawing seed [ ] fencing [ ] constructing sheds for animals [ ] bee hiving [ ]making farm equipment[ ]

3. On which of the following areas other than farming do you have knowledge?

   Saving [ ] nutrition[ ] sanitation [ ] family planning [ ]

4. Do you get training from local FTC on modern farming practices? Yes [ ] No [ ]
5. If your response on Q 4 is yes, which farming practice you currently adopted because of the training?

   Intercropping [ ]use improved variety of crop [ ] use improved breed of livestock [ ]

6. Is your family labor adequate to manage your farming activities? Yes[ ] No [ ]
7. Do you have plots of land left uncultivated or crop loss because of lack of labor? Yes[ ] No [ ]
8. If yes, for which farming activities? Plowing[ ]harvesting [ ] weeding [ ] herding [ ] clearing farm land [ ]
9. Is there time when labor is idle/family members are not working? Yes [ ] No[ ]
10. If your response on Q9 is yes,in which months of the year (list please)_____
11. Are you in good health condition to pursue different economic activities? Yes [ ] No [ ]
12. Is there any member of the household having chronic health problem? Yes [ ] No[ ]
13. Are some farming activities which you do not practice? Yes [ ] No [ ]
14. If your response on Q 13 is yes, what is your reason?
15. Culturally unacceptable[ ] requires much physical strength[ ]lack of skill [ ]
16. Which activities are culturally unacceptable to be practiced by you?

    _____

17. What happen to your farm and crop productivity due to your lack of good farming skill/expertise?

Seed washed away [ ] top soil taken by runoff [ ] poor land preparation [ ] high problem of weeding [ ] high post-harvest loss [ ] other specify _____

4 Institutions/transforming structures

A. Institutions/hardware

1. Would you please tell us the types and accessibility of the physical institutions that exist in your locality?

Services		**Type of Institutions**				
		Governmental	Private	NGO	Access	**Distance in Km**
1. Credit					Yes [ ] No [ ]	
2. Health	Human				Yes [ ] No [ ]	
	Animal				Yes [ ] No [ ]	

Services		**Type of Institutions**			**Access**	**Distance in Km**
		Governmental	Private	NGO		
3. Insurance	Crop				Yes [ ] No [ ]	
	Animal				Yes [ ] No [ ]	
4. School					Yes [ ] No [ ]	
5. Potable water					Yes [ ] No [ ]	
6. FTC					Yes [ ] No [ ]	
7. Extension					Yes [ ] No [ ]	
8. Power /electricity					Yes [ ] No [ ]	
9. Grain mill					Yes [ ] No [ ]	
11. Nearest road					Yes [ ] No [ ]	
Only for No. 1 →		Micro finance B. Rural Bank . Insurance D. Cooperatives				

2. What makes it challenging for you when you are using health services?

Distance [ ] poor facilities [ ] lack of health professionals [ ] high price [ ]

3. How often you are contacted by DA's on your farm for technical assistance?

Weekly [ ] once in two [ ] weeks monthly [ ] only during farming season [ ]

4. On which topics do the agricultural extension workers counsel you during their field visits? New farming practices [ ] use of inputs [ ]conservation[ ]use of improved animal breed [ ] saving [ ] other matters other than agriculture [ ]
5. Do you think that extension workers/DA are impartial to you because of your being male/female? Yes [ ] No[ ]
6. Which extension worker/DA do you prefer regarding its gender? Male [ ] Female [ ]
7. Is there functional farmers training center (FTC) in your locality? Yes [ ] No [ ]
8. How frequent the trainings are? Yearly [ ] seasonal[ ]often [ ]
9. What is the duration of each training _____

B. Financial institutions/structures

1. Do you access financial services such as loan from local financial institutions? Yes [ ] No [ ]
2. If your response on question no 1 is yes, for what purpose do you allocate the credit you receive? Pay loan [ ] school fee [ ] medication [ ] purchase inputs [ ] buy oxen [ ] petty trade [ ]
3. Is the loan you obtained adequate for the intended investment/financial needs? Yes [ ] No [ ]
4. Is the term of payment of the loan convenient to you? Yes [ ] No [ ]
5. How is the interest compared to the rate in other banks? Lower [ ]Same [ ]higher [ ]
6. Was there time when you do not access credit while you are in need? Yes [ ] No [ ]
7. If your response on question no.6 is yes, what is the reason? No such service [ ]lack of collateral [ ]bad loan history[ ]biases of loan providers [ ]
8. Do men and women access financial services equally from these institutions? Yes [ ] No [ ]
9. Do contribute money for local community development activities? Yes [ ]No [ ]
10. If your response on Q no 9 is yes, who decide the amount of money you are required to contribute? Myself [ ] local officials [ ]
11. If it is by estimate by local officials, how do you evaluate their estimation in relation to your capacity? Fair[ ] high [ ] very high [ ]

C. Policies rules and regulations

1. Are you full member of the farmers association in your kebele? Yes [ ] No [ ]

2. If your response on Q1 is no, what is your reason?_____
3. If you are member, do you think that you are getting all the services provided through the farmers' association equitably compared to other farmers? Yes [ ] No [ ]
4. Are there local formal local laws, rules and procedures to settle matters on land, water, pasture and other related issues? Yes [ ] No [ ]
5. On which aspects of your life do you lack practical protection? Personal [ ]property[ ]
6. Is there minimum labor payment determined by local law in your area? Yes [ ] No[ ]
7. Is there equal participation of male and female by local administrators? Yes[ ]No [ ]
8. Have you ever in dispute for the past one two years with people on matters related to land, water, and pasture? Yes [ ] No [ ]
9. Do you believe that, the laws, rules, and regulations of government are effectively executed by local/kebele officials? Yes [ ] No [ ]
10. If your response on Q no 9 is no, why? Lack of capacity [ ] partiality [ ]
11. Are there local cultural (informal) customs, laws exist that govern the use and distribution of communal resources among different members of the community? Yes [ ] No[ ]
12. Do these customs, rules, laws on communal land (grazing) water and forest use discriminate different people? Yes [ ] No [ ]
13. Do you think that local rules are partial in their application to different sexes? Yes [ ] No[ ]
14. How is your engagement in farming activities (as plough, trashing) viewed among the local community? Acceptable [ ] not acceptable [ ]migrate for search of job [ ] working as daily laborer [ ]
15. Do local custom treat labor exchange between male and female equally? Yes [ ] No [ ]
16. Have you had wedding/graduation ceremony of one's family member2007/08? Yes [ ] No[ ]
17. If your response on Q no 16 is yes, what household asset did you sacrificed in expense to the ceremony?

    Sold livestock [ ]slaughtered livestock [ ]sold plots of land [ ] spent money in cash [ ]
18. Which of the local institutions are more important to your farm productivity and wellbeing of your household?

Relation with kinship [ ] Private firms[ ]cooperatives[ ] FTC [ ] Faith based institutions [ ] Micro finance [ ] idir [ ] iqub [ ] share crop [ ] labor exchange [ ]

19. Do you know what rights you have to access the government institutions? Yes [ ] No [ ]
20. If your response on question no. 19 is yes, do you exercise those rights? Yes [ ] No [ ]
21. If you do not exercise your rights, why? _____

5 Trends, shocks, seasonality

A. Seasonality shocks

1. If one of the following problems has happened to your household in 2007/2008 EC?

No	Events/problems	Yes	No	Events/problems	Yes	No	consequences	Yes	No
	Flooding			insect on crops			Death of hh member		
	Hail rain			animal disease			Decline in milk		
	Frost			cut off transport			Death of oxen		
	Extended dry			erratic rain fall			Death of milk cow		
	Sickness			Loss of pasture			Crop loss		

2. Has death to any member of your family happened? Yes [ ] No[ ]
3. If your response to question No. 2 above is yes, what is the amount of money spent in relation to this event?_____
4. Has any member of the household married this year? Yes [ ] No[ ]
5. If your response to question No. 4 above is yes, what the amount of money spent as dower and wedding ceremony?_____
6. Do you think the expense on the wedding has affected your household's food security? Yes [ ] No[ ]

Trends

1. Which of the following conditions are commonly observed in this area?

Increase in population [ ] decline in crop yields[ ] decline in livestock productivity [ ] rising price of finished goods [ ] rising in price of agricultural inputs [ ] rising in the cost

of transportation [ ] increased acidity of soil [ ] degradation of land/soil [ ] deforestation [ ] population increase [ ] increasing resettlement [ ]increasing investment on land [ ]

6 Domestic activities

1. Do you engage in any domestic/household tasks? Yes [ ] No [ ]
2. If your response on Q no. 1 is yes, in which of the following activities
   Collecting fuel wood[ ]Fetching water [ ]Cleaning house [ ]Cooking food [ ]Child care [ ]
3. Please state the total hours you spent on each of the following major domestic tasks per/day
   Food preparation____collecting firewood___Fetching water___cleaning __Caring for children___

7 On farm activities

1. Indicate which of the following activities are carried in the household to produce food and generate income

No	Farming activities	Yes	No	Major activities	Supplementary
1					
2					
3					
4					
5					
Plowing 2. Clearing 3. Digging 4. Hoeing 5. Planting of tree crops 6. weeding 7. harvesting 8. trashing 9. terracing 10. sawing seed 11. fencing 12. Constructing sheds 13. Protecting crops from wild animals and theft while on farm day and night 14. Protecting animals from wild animals and theft during night 15. Herding and watering livestock 16. 17.					

2. Which farming activities are considered as taboo/sanctioned to be done by females?

Off farm activities -Activities by any member of the household as source of income

1. Does any member of the household participate in any activity other than farming to generate income? Yes [ ] No [ ]
2. If your response on Q no. 1 is yes, please indicate the activities, participants and amount of income from the activities.

Activities	Number of participants	Months and amount of time spent with respective	Income earned in birr	Income used for		
				1st	2nd	3rd
Mining 2. labor on farm 3. Labor on non-farm 4. trading drinks & food 5. petty trading 6. hair dressing 7. spinning cotton 8. herding9. pottery10. making farmequipments 11. carpenter 12. wavering 13. making charcoal 14. selling fuel wood 15. hunting 16. collecting wild honey	Head Spouse Child (one) Child (two)	Duration	Birr	1. purchase food 2. save 3. build house 4. farming inputs 5. buy clothes 6. medication 7. pay loan 8. school fee 9. pay tax		

3. Is the pay same for male and female when you or any members of your family member engage in any labor works? Yes [ ]No [ ]
4. If your response on Q2 is no, whose labor is pied less? Males [ ] Females[ ]
5. What are the barriers to your/ member of your household's participation in non/off farm activities?

   Busy on own farm [ ] busy in domestic activities [ ] local negative cultural attitude [ ] Lack of skills [ ] Health problems [ ] Lack of start-up capital [ ] lack of security [ ]
6. Responsible person for domestic activities? Wife [ ]husband [ ]boys [ ] girls [ ]
7. What time do you daily spent on; fetching water___fetching firewood___cooking__child care__
8. Why do you pursue nonfarm livelihood activities? ***(Multiple Responses is possible).*** Have no other means of living [ ] Because of low productivity of farming [ ]Have small land to farm [ ] Uncertain agricultural performance [ ] Due to attractive nonfarm wage [ ]To increase cash saving [ ] Due to wide opportunity available [ ] Because I have no skill on farming [ ]

9. Which livelihood strategies do you think is more productive and important for food security and wellbeing of your household? Growing crop and raising livestock on own farm[ ]employment on farming activities on others farm[ ]working on no farm activities such as petty trading[ ]

Migration

1. Do you or any member of the household move to other places away from home to work and get additional income? Yes [ ] No[ ]
2. If yes tell us member of the household, duration and activities engaged in at destination

No	Migrant	Destination	Engaged in	Month	Duration of stay
1					
2					
3					
	Husband Wife Children	Neighboring district Neighboring zone Other region Abroad	1. Onfarm2. non farm 3. Trade 4. Road side food vending 5. Maids 6. Herder 7. Babysitter		Weeks Months Years

V. Food security questions

1. Does your household gets all-year round food requirements from own production? Yes [ ] No [ ]

2. If your response on Q No. 1 is no, for how many months do your own productions cover the food requirement at home? (mention name of months)_____

3. Does the income you earn from non-farm activities enable you to buy adequate food? Yes [ ]No [ ]

4. According to your self-assessment, your household is: food secure [ ] food insecure[ ] do not know [ ]

5. What do you think are the main reasons for being food insecure from the following factors?

Crop failure [ ] lack of input [ ] lack of labor [ ] sickness [ ] lack of oxen [ ] lack of land [ ] crop disease[ ] less income from non-farm activities [ ] Failure to properly utilize own production and other earnings [ ] less income from off farm activities [ ] low price for own agricultural products [ ]

Question on HHDDS

1. Which staple crops are consumed in your household during the last 7 days and 24 hours?

No	Food group	Examples	Frequency	
			7 days	24 hrs
1	cereals	maize, wheat, sorghum, millet, *teff*, barley, or any other grains or foods made from these (e.g. *injera*, *kita*, *eshet* (maize), bread, spaghetti porridge or other grain products) +		
2	white roots & tubers	potatoes, *achote*, or other foods made from roots		
3	vitamin "A" rich veg. & tubers	pumpkin, carrot, squash, or sweet potato + other locally available vitamin A rich vegetables		
4	dark green leafy vegetables	including wild forms + locally available vitamin A rich leaves such as amaranth, cassava leaves, cabbage,		
5	Other vegetables	other vegetables (e.g. tomato, onion, eggplant) + other locally available vegetables		
6	vitamin a rich fruits	ripe mango, cantaloupe, apricot (fresh or dried), ripe papaya, dried peach, banana, orange and 100% fruit juice made from these + other locally available vitamin A rich fruits		
7	other fruits	other fruits, including wild fruits and 100% fruit juice made from these		
8	organ meat	liver, kidney, heart or other organ meats or blood-based foods		
9	flesh meats	beef, pork, lamb, goat, game, chicken, other birds,		
10	eggs	eggs from chicken or any other egg		
11	fish	fresh or dried fish		
12	legumes, nuts and seeds	dried beans, dried peas, lentils, nuts) or foods made from these (eg. shiro, peanut butter)		
13	Milk & its products	milk, cheese, yogurt or other milk products		
14	oils and fats	Eadble oil, fats or butter added to food or used for cooking		
15	sweets	sugar, honey, drinks made of honey, sugary foods		
16	Condiments & beverages	spices (black pepper, salt), condiments (soy, bean, pea sauces), coffee, tea, alcoholic beverages		
HH	Did anyone in your household eat anything (meal or snack) outside the home yesterday?			

Adapted from FAO 2008

2. Availability of food to household in the last four weeks/one months (HFIAS)

NO	QUESTION	RESPONSE OPTIONS	CODE
1	In the past four weeks, did you worry that your household would not have enough food?	0 = No (skip to Q2) 1=Yes	|___|
1a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	|___|
2	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	0 = No (skip to Q3) 1=Yes	|___|
2a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	|___|
3	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	0 = No (skip to Q4) 1=Yes	|___|
3a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	|___|
4	In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	0 = No (skip to Q5) 1=Yes	|___|
4a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	|___|
5	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	0 = No (skip to Q5) 1=Yes	|___|

5a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	|___|
6	In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food?	0 = No (skip to Q5) 1=Yes	|___|
6a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	___|
7	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	0 = No (skip to Q5) 1=Yes	|___|
7a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	|___|
8	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	0 = No (skip to Q5) 1=Yes	|___|
8a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	|___|
9	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	0 = No (skip to Q5) 1=Yes	|___|
9a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	|___|

3. Which problems do the household members face with regard to proper utilize food?

No	Problems of utilization	Yes /No	most critical problems		
			1st	2nd	3rd
1.	Prevalence of human diseases		1st	2nd	3rd
2.	Lack of access to clean & potable water		1st	2nd	3rd
3.	Problem of sanitation		1st	2nd	3rd
4.	Lack of knowledge on nutrition		1st	2nd	3rd
5.	Lack of saving tradition (extravagancy)		1st	2nd	3rd

4. Which consumption based coping mechanisms do you use when faced the problem of shortage of food? How frequently did you use these mechanisms?

	Behaviors: In the past 7 days, if there have been times when you did not have enough food or money to buy food, how many days has your household had to:	**Frequency:** No. of days: (0–7) NA for not applicable)
Dietary, (1) Increase short term availability (2,3,4,5,6) , Decrease No. Of hh members (7), Rationing (8,9,10,11,12)	Rely on less preferred and less expensive foods?	
	Borrow food, or rely on help from a friend or relative?	
	Purchase food on credit?	
	Gather/hunt wild food, or eat immature crops?	
	Consume seed stock held for next season?	
	Receive assistance/aid from a friend or relative?	
	Send household members to eat elsewhere on?	
	Limit portion size at mealtimes?	
	Restrict consumption by adults to feed small children to eat?	
	Feed working members at the expense of non-working ones?	
	Reduce number of meals eaten in a day?	
	Skip meals entire days without eating?	

5. What other non consumption coping strategies do you when the household is food insecure?

Coping strategies	Yes No	**Coping strategies** strategy is used when Less Moderate Sever	Yes/no
Changing others livestock to milk cow/donkey etc		Selling charcoal?	
Grow faster ripe crops		Sell off farm oxen?	
Seek work on wage/ labour in the nearby towns		Sell off jewelry?	
10. Work on wage/ labour on others farmland?		. Lease out land?	.
3. Sell off small animals?		. Sell off land?	.
. Selling Firewood?		. Sell off house?	.

Appendix2

Checklist for interview with key informants, FGD and case households

1. Checklist for interview with key informants Agriculture and rural development office

Agricultural production of the district
Settlement of population, vegetation coverage, land resources seem over time

Land size and quality/fertility over time

Livelihoods pursed by rural farming communities in the district and its dynamics over time

Major changes noticed in rainfall, temperature animal and crop disease

Relation and resource share within the inhabitants (natives and settlers) and neighboring Gumuz communities

Food security status of households in the district

Type of food insecurity do people of this area commonly experience

Groups of society face food insecure in the area and reasons

Implementation and achievements ofrural development policies (food security) in the district

Local development programs (extension packages and services, small scale irrigation, credit, inputs) target the various livelihoods groups

Farm households have access to credit

Coordination of different sectors found in the district (agriculture, credit/ input provisions, health, education, etc)

Farmers/rural communities are access to new agricultural practices

Timeliness cost/affordable and adequacy of inputs

Gender equality in the local community

Female farming households access to and control of productive resources (land, water) accessed

Perception towards female-headed households (mobility, practicing farming activities -ploughing, bee hiving etc) and its affecton their food security and livelihood

Major observable shocks that affect crop and animal productivity and human health

Group of people are more vulnerable to these shocks

Private agricultural investments in relation to the interest of local farming communities

2. Checklist for interview with key informants -community elders

Changes noticed in settlement of population, forest coverage; pasture and water for livestock seem over time

Agricultural productivity of the area over years

Land tenure/administration, size and quality/fertility over time

Major livelihoods of people of the area over time

Food self sufficiency of people of the area

Groups of society face food insecure in the area and reasons

Type of food insecurity do people of this area commonly experience

Food security offemale-headed households compared to male headed households

Access to physical capitals(extension packages and services, small scale irrigation, inputs new agricultural practice)by different group of people

Timeliness, adequacy and affordability of inputs, credit and other services

Participation of communities in local development activities

Interventions to improve socio-economic situation of rural communities (roads, information, market health, energy, education, land tenure)

View of gender equality by the local community

Perception towards female-headed households

Female farming households access to productive resources (land, water)

Attitude of local communities towards women carrying different farming activities

3. Checklist for key informant interview with district women affairs office

Women access toproductive resources in the district

Participation of women in local administration

Mobility of women to work

Availability of sustainable education on traditional practices against women

Level of implementation policies on agricultural production, credit, health, education, etc to empower women

4. Checklist for discussion with local administrative officials

Equitable distribution of natural resources (land) among farm households

Presence of local rules/laws on distribution/use of these resources

The position/representation of female-headed households on distribution/use of these resources

Any affirmative action for disadvantaged groups such as female-headed household

5. Checklist for FGD

Food security situation over time

Perception on food security

How do you perceive food security? (eating three times a day, availability of food stock at household, having sufficient income to purchase food)

A household being headed by male or female make difference on food security of the households

Coping mechanisms to shortage of food in terms of their severity

Women/female-headedhouseholds representation in some local decision making processes-resource distributions as; land, conflict resolution

Access to productive assets/capitals

The status of female-headed households against male headed households in terms of;

Crops commonly grown by female-headed households

Transfer/food aid

Functioning of local organizations and continuity in their existence and activities

Provision of different social services

Local services and activities targeting the poor

Inclusiveness and interestedness of local community organizations and institutions

Timeliness and affordability of input, agricultural extension and credit services

Local cultural norms towards female headship

Cultural norms towards females work as wage laborer

Cultural norms towards female perform activities locally said to be “male’s role”

Local culture related to land ownership by female

Female’s labor (wage/labor opportunity and rate of payment)

Implementation of laws regarding gender (equal access to resources)

6. Check list for interview with local market traders

Goods you mostly trade with

Food products are traded out from the local markets of the district

Food products are imported to markets of this district from outside

Time of the year rural farming households sell their agricultural products

The quality of agricultural products sold in the market

Price difference seems among different local markets in the district

7. **Checklist for in-depth interview with female-headed households**

Perception of female headship towards food security

Perception of off farm activities

Importance of local institutions in food security

Application of local laws on property ownership to different sexes

Impact of local institutions/cultures on your social, economic activities of female-headed Level of participation in local administration, decision making, access and control onresources

Gender equality practices in the community

Problem because of female headship

Challenges (experience, skill, work overload) on agricultural activities

Local culture towards female practicing plowing

Strategies used to cope with local challenges

Coping mechanisms used when face food shortage

Income generation opportunities available

Membership different local community organizations

8. **Checklist for in-depth interview with food insecure female-headed households**

Current food security of your household

Reasons for your food insecurity

How does your household become female-headed?

Time sinceyou become female-headed

Your food security situation before female headship

Does the separation of your husband in any way affected the asset base and livelihood activities of the household and?

Are there some activities the household has been carrying out while your household was headed by your husband but now interrupted? Why they are interrupted?

In which season/months of the year your household face shortage of food?

How do you cope with the shortage?

9. Checklist for interview with microfinance officials

Guidelines on provision of financial services

Treatment of different users of your service

Presence of special program/scheme/ credit arrangement for disadvantaged groups

Group of rural households are regularly/more use your financial services

Rate of interest of the loan

Convenience of the services for users- place and time

Reason for default by the loan users

10. checklist for interview with District health workers (human and livestock)

Major diseases common to the place (human and livestock)

Sanitation

Section of the population are more affected (human)

The habit of the local people in using the health services (human and livestock)

11. checklist for interview with District agricultural extension workers

Provision of agricultural extension service in the district

Number and educational background of the extension workers

Coverage of extension service in the district

Focus of the agricultural extension service in the district

Female-headed households' access to agricultural extension services compared to male headed households

Presence of training programs target the needs of people with different needs as; women, female-headed, disable, elderly, land less

12. A guide to personal observation by the researcher (transect walk)

Settlement of population
Natural resource- degradation

Land use patterns (irrigation, investment, expansion)

Infrastructure as road (accessibility, means of transport mostly used, bridges) schools, and health centers, water

Market places (settings, types of crops, livestock, actors, and transactions)

Appendix 3

Glossary

Abbamichu	-	A friendship established between an Oromo and Gumuz persons
Afraasaaa	-	Early/onset of farming season
Areke	-	A local drink
Ateetee	-	A ritual practiced exclusively by women
Dabare- buna	-	Coffee drinking group established by neighborsw
Dabare -tikaa	-	A rotational cattle herding group among neighbors
Dado	-	Immediate labor reciprocation among few individuals on similar farming activities
Dabo	-	Labor support to an individual by community members for free
Dana'o	-	Insect pest which eats grain in grannies
Daraba	-	A type of agro-pastoral where livestock are moved to nearby lowland area
Dawulla	-	A local measurement unit for grain (1 dawulla=2 kuintals)
Dega	-	High altitude
Dugda	-	A temporary labor group established by two or more individuals to reciprocate in labor on turn basis
Edir	-	Self-help association of households
Ergisa	-	Borrowing
Gare misoomaa	-	Development group which is the smallest unit of local administration at established at village level
Hidhata	-	Pairing oxen
Hodha/safed	-	A traditional tool used for various purposes including refine/clearing grain from chaff, holding cooked food and others
Injera	-	A pan cake like thin bread
jaala	-	The name given to a person who holds a boy when he is circumcised
Jaarii	-	A ritual carried every year with the onset of spring season
Jarsa biyya/araaraa	-	Local elders
Kursii bunna	-	A small amount of food served on coffee ceremonies
Liqii baalatiti	-	A loan mostly grain taken to be paid from next harvest
Muka jaarii	-	A tree under which *jaarii* ritual is made
Qolla	-	Low altitude
Ribbi	-	Raising livestock where the offspring will be shared
Shamma	-	A traditional cloths made of cotton
Timad	-	Local land measurement unit (1 timad= 0.25 ha)
Tokko-shane	-	One to five group
Waaqa uumaa	-	The divine creature
Warra	-	A lineage or close family members
Woyna-degga	-	Mid-latitude

Appendix4

Asset position of households (index)

Difference between genders of households in access to livelihood capitals (based index)

Livelihood capital	Indicators	Male headed		Female-headed	
		Indicator weight	Capital value	Indicator weight	Capital value
Natural capital	Land	0.4469	0.44195	0.5394	0.350625
	Water for irrigation	0.4492		0.2632	
	Tree for farming activities	0.5799		0.3609	
	Tree for non-farm activities	0.2918		0.2390	
Social capital	Warra/relatives	0.4864	0.580725	0.3008	0.4455
	Cooperative	0.4358		0.1504	
	Neighbor	0.5019		0.4962	
	Village edir	0.8988		0.8346	
Physical capital	Farm implements	0.9533	0.7508	0.7744	0.6648
	Household durable assets	0.6664		0.4838	
	Agricultural technologies	0.3503		0.2428	
	Health facilities	0.9222		0.9158	
	Road and transport	0.6200		0.5388	
	Grain mill	0.8797		0.8560	
	Potable water	0.8638		0.8421	
	Farming experience	.7498	0.61484	.5598	0.42482
Human capital	Education	.568		.392	
	Skills on farming activities	.6822		.3540	
	Skills on non-farm activities	.2140		.1604	
	Health of household head	.8602	0.5811	.6579	0.3911
Financial capital	Income from crop	.4344		.3636	
	Income from livestock	.4862		.4113	
	Access to credit	.5486	0.4897	.3459	0.3736

Appendix 5

Co linearity test

Coefficients

Model		Collinearity Statistics	
		Tolerance	VIF
1	Education	.743	1.346
	Familysize	.485	2.063
	Land size	.731	1.367
	Member in cooperatives	.625	1.600
	Access to road with transport	.670	1.492
	Produce cash crop	.686	1.459
	Amount of fertilizer used	.570	1.754
	Health condition of hhh	.820	1.219
	Access to credit	.793	1.260
	Access to agricultural extension	.784	1.275
	Total livestock owned	.460	2.174
	Participate in off-farm activities	.814	1.228
	Sex of the household head	.409	2.443

a. Dependent Variable: Score on farming experience

Appendix 5

Trends of agricultural production and related issues

Trends	Frequency (N=390)	Percentage
Decline in crop yield	306	78.5
Decline in livestock productivity	275	70.5
Rise in price of goods	186	47.7
Rising price of inputs	234	60
Rising in cost of transportation	170	43.6

Appendix 6

Environmental shocks experienced by households

Shock on crops and livestock		**Freq.(N=390)**	**%**
	Flooding	219	56.2
	Frost	25	6.4
Environmental	Hail rain	124	31.8
	Erratic rain	44	11.3
	Insect pest	156	40.0
	Livestock disease	136	34.8
Socio-economic	Sickness of hh member	76	19.5
	Cut off transportation	61	15.6
	Crop failure	124	31.8

Appendix 7

Variation in access to some natural resources

			Sex of the household head		Total
			FHHH	MHHH	
Access to tree	Yes	Count	22	78	100
		Expected Count	34.1	65.9	100.0
		% within Sex of the hhh	16.5%	30.4%	25.6%
		% of Total	5.6%	20.0%	25.6%
	No	Count	111	179	290
		Expected Count	98.9	191.1	290.0
		% within Sex of hhh	83.5%	69.6%	74.4%
		% of Total	28.5%	45.9%	74.4%
Total		Count	133	257	390
		Expected Count	133.0	257.0	390.0
		% within Sex of hhh	100.0%	100.0%	100.0%
		% of Total	34.1%	65.9%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.765[a]	1	.003		
Continuity Correction[b]	8.056	1	.005		
Likelihood Ratio	9.224	1	.002		
Fisher's Exact Test				.003	.002
Linear-by-Linear Association	8.743	1	.003		
N of Valid Cases	390				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 34.10.

b. Computed only for a 2x2 table

Crosstab

			Sex of the household head		Total
			FHHH	MHHH	
Access to tree for house construction	Yes	Count	50	111	161
		Expected Count	54.9	106.1	161.0
		% within Sex of hhh	37.6%	43.2%	41.3 %
		% of Total	12.8%	28.5%	41.3 %
	No	Count	83	146	229
		Expected Count	78.1	150.9	229.0
		% within Sex of hhh	62.4%	56.8%	58.7 %
		% of Total	21.3%	37.4%	58.7 %
Total		Count	133	257	390
		Expected Count	133.0	257.0	390.0
		% within Sex of hhh	100.0 %	100.0%	100.0 %
		% of Total	34.1%	65.9%	100.0 %

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.133[a]	1	.287		
Continuity Correction[b]	.913	1	.339		
Likelihood Ratio	1.138	1	.286		
Fisher's Exact Test				.329	.170
Linear-by-Linear Association	1.130	1	.288		
N of Valid Cases	390				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 54.91.

c. Computed only for a 2x2 table

Crosstab

			Sex of the household head		Total
			FHHH	MHHH	
Access to tree for livestock shade construction	Yes	Count	48	148	196
		Expected Count	66.8	129.2	196.0
		% within Sex of hhh	36.1%	57.6%	50.3%
		% of Total	12.3%	37.9%	50.3%
	No	Count	85	109	194
		Expected Count	66.2	127.8	194.0
		% within Sex of hhh	63.9%	42.4%	49.7%
		% of Total	21.8%	27.9%	49.7%
Total		Count	133	257	390
		Expected Count	133.0	257.0	390.0
		% within Sex of hhh	100.0%	100.0%	100.0%
		% of Total	34.1%	65.9%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	16.202[a]	1	.000		
Continuity Correction[b]	15.353	1	.000		
Likelihood Ratio	16.361	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	16.160	1	.000		
N of Valid Cases	390				

a. 0 cells (0.0%) have expected count less than 5.

b. The minimum expected count is 66.16.

Crosstab

			Sex of the household head		Total
			FHHH	MHHH	
Access to tree for fencing	Yes	Count	52	148	200
		Expected Count	68.2	131.8	200.0
		% within Sex of hhh	39.1%	57.6%	51.3%
		% of Total	13.3%	37.9%	51.3%
	No	Count	81	109	190
		Expected Count	64.8	125.2	190.0
		% within Sex of hhh	60.9%	42.4%	48.7%
		% of Total	20.8%	27.9%	48.7%
Total		Count	133	257	390
		Expected Count	133.0	257.0	390.0
		% within Sex of hhh	100.0%	100.0%	100.0%
		% of Total	34.1%	65.9%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	11.993[a]	1	.001		
Continuity Correction[b]	11.264	1	.001		
Likelihood Ratio	12.059	1	.001		
Fisher's Exact Test				.001	.000
Linear-by-Linear Association	11.962	1	.001		
N of Valid Cases	390				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 64.79.

b. Computed only for a 2x2 table

Crosstab

			Sex of the household head		Total
			FHHH	MHHH	
Access to tree for farm implements	Yes	Count	49	152	201
		Expected Count	68.5	132.5	201.0
		% within Sex of hhh	36.8%	59.1%	51.5%
		% of Total	12.6%	39.0%	51.5%
	No	Count	84	105	189
		Expected Count	64.5	124.5	189.0
		% within Sex of hhh	63.2%	40.9%	48.5%
		% of Total	21.5%	26.9%	48.5%
Total		Count	133	257	390
		Expected Count	133.0	257.0	390.0
		% within Sex of hhh	100.0%	100.0%	100.0%
		% of Total	34.1%	65.9%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	17.453[a]	1	.000		
Continuity Correction[b]	16.572	1	.000		
Likelihood Ratio	17.594	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	17.408	1	.000		
N of Valid Cases	390				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 64.45.

b. Computed only for a 2x2 table

Crosstab

			Sex of the household head		Total
			FHHH	MHHH	
Access to firewood	Yes	Count	76	185	261
		Expected Count	89.0	172.0	261.0
		% within Sex of hhh	57.1%	72.0%	66.9%
		% of Total	19.5%	47.4%	66.9%
	No	Count	57	72	129
		Expected Count	44.0	85.0	129.0
		% within Sex of hhh	42.9%	28.0%	33.1%
		% of Total	14.6%	18.5%	33.1%
Total		Count	133	257	390
		Expected Count	133.0	257.0	390.0
		% within Sex of hhh	100.0%	100.0%	100.0%
		% of Total	34.1%	65.9%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.721[a]	1	.003		
Continuity Correction[b]	8.064	1	.005		
Likelihood Ratio	8.576	1	.003		
Fisher's Exact Test				.004	.002
Linear-by-Linear Association	8.699	1	.003		
N of Valid Cases	390				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 43.99.

Appendix 8

Difference in access to livestock (t-test)

Independent Samples Test

		Levene's Test for ev		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error	95% Confidence Interval	
									Lower	Upper
Cattle TLU= Ox & cow	Equal variances assumed	17.361	.000	5.289	388	.000	2.18038	.41223	1.36989	2.99087
	Equal variances not			6.261	385.795	.000	2.18038	.34823	1.49571	2.86505
TLU of goats	Equal variances assumed	.618	.432	.176	388	.860	.00241	.01367	-.02446	.02928
	Equal variances not			.190	327.754	.849	.00241	.01267	-.02251	.02733
TLU of sheep	Equal variances assumed	5.620	.018	1.300	388	.194	.01607	.01236	-.00824	.04038
	Equal variances not			1.464	361.092	.144	.01607	.01098	-.00551	.03766
TLU of Mule	Equal variances assumed	15.269	.000	1.902	388	.058	.02742	.01442	-.00093	.05577
	Equal variances not			2.426	363.333	.016	.02742	.01130	.00519	.04965
TLU of donkey	Equal variances assumed	84.587	.000	4.710	388	.000	.20223	.04294	.11782	.28665
	Equal variances not			5.920	374.555	.000	.20223	.03416	.13506	.26941
TLU of chicken	Equal variances assumed	5.145	.024	4.184	388	.000	.01629	.00389	.00863	.02394
	Equal variances not			4.030	241.090	.000	.01629	.00404	.00833	.02425
Bee colony	10.614	.001		1.599	388	.111	0.013083	.00818	-.00031	.02917
				2.092	337.701	.037	.01308	.0625	.00078	.02539

Appendix 9

Variation on access to crop (t-test)

T test on households financial capital (from index of crop harvested 2016)

Group Statistics							
	Sex of the household head		Statistic	Bootstrap[a]			
				Bias	Std. Error	95% Confidence Interval	
						Lower	Upper
Maze	Mhh	N	256				
		Mean	.5471	-.0002	.0183	.5125	.5839
		Std. Deviation	.28564	-.00084	.00814	.26818	.29950
		Std. Error Mean	.01785				
	Fhh	N	133				
		Mean	.4049	.0001	.0158	.3761	.4373
		Std. Deviation	.18672	-.00228	.02044	.14310	.22156
		Std. Error Mean	.01619				
Sorghum	Mhh	N	256				
		Mean	.5499	.0005	.0172	.5181	.5845
		Std. Deviation	.27579	-.00070	.00803	.25903	.29088
		Std. Error Mean	.01724				
	Fhh	N	133				
		Mean	.4077	.0012	.0169	.3783	.4456
		Std. Deviation	.19683	-.00046	.02096	.15163	.23707
		Std. Error Mean	.01707				
teff	Mhh	N	256				
		Mean	.1094	-.0006	.0192	.0717	.1483
		Std. Deviation	.31272	-.00235	.02462	.25854	.35605
		Std. Error Mean	.01955				
	Fhhh	N	133				
		Mean	.0150	.0000	.0104	.0000	.0391
		Std. Deviation	.12216	-.01179	.05149	.00000	.19449
		Std. Error Mean	.01059				
millet	Mhh	N	256				
		Mean	.5001	-.0003	.0177	.4640	.5358
		Std. Deviation	.29219	-.00086	.01015	.26854	.30964
		Std. Error Mean	.01826				
	Fhh	N	133				
		Mean	.4106	-.0003	.0192	.3747	.4470
		Std. Deviation	.21878	-.00243	.02298	.16775	.25537
		Std. Error Mean	.01897				
groundnut	Mhh	N	256				
		Mean	.4934	-.0005	.0173	.4588	.5277
		Std. Deviation	.27973	-.00097	.01090	.25417	.29821
		Std. Error Mean	.01748				

	Fhh	N	133				
		Mean	.3954	-.0003	.0170	.3624	.4320
		Std. Deviation	.19531	-.00258	.02372	.13938	.23797
		Std. Error Mean	.01694				
mango	Mhh	N	256				
		Mean	.5014	-.0002	.0184	.4659	.5376
		Std. Deviation	.29658	-.00102	.01029	.27390	.31372
		Std. Error Mean	.01854				
	Fhh	N	133				
		Mean	.4660	.0003	.0233	.4221	.5127
		Std. Deviation	.27052	-.00138	.01750	.23155	.29951
		Std. Error Mean	.02346				
banana	Mhh	N	256				
		Mean	.3902	-.0007	.0117	.3679	.4118
		Std. Deviation	.19197	-.00212	.01709	.15513	.21981
		Std. Error Mean	.01200				
	Fhh	N	133				
		Mean	.3653	.0001	.0129	.3411	.3918
		Std. Deviation	.15017	-.00271	.02659	.08582	.19450
		Std. Error Mean	.01302				
coffee	Mhh	N	256				
		Mean	.5117	-.0008	.0181	.4755	.5445
		Std. Deviation	.29168	-.00128	.00964	.26939	.30770
		Std. Error Mean	.01823				
	Fhh	N	133				
		Mean	.3776	.0001	.0131	.3538	.4070
		Std. Deviation	.15459	-.00263	.02277	.10370	.19454
		Std. Error Mean	.01340				

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Independent Samples Test

		Levene's Test for E V		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence interval	
									Lower	Upper
Maze	Equal variances	98.998	.000	5.191	387	.000	.1428	.02739	.08834	.19603
	Equal variances not			5.900	367.161	.000	.14218	.02410	.09479	.18958
Sorgham	Equal variances	73.523	.000	5.284	387	.000	.14214	.02690	.08925	.19502

	Equal variances not			5.860	350.065	.000	.14214	.02426	.09443	.18985
	Equal variances	54.144	.000	3.347	387	.001	.09434	.02818	.03892	.14975
teff	Equal variances not			4.244	365.830	.000	.09434	.02223	.05062	.13805
	Equal variances	47.680	.000	3.109	387	.002	.08952	.02880	.03290	.14613
millet	Equal variances not			3.399	339.202	.001	.08952	.02633	.03772	.14131
	Equal variances	60.676	.000	3.606	387	.000	.09795	.02716	.04454	.15135
groundnut	Equal variances not			4.024	354.717	.000	.09795	.02434	.05007	.14582
	Equal variances	6.662	.010	1.151	387	.250	.03543	.03078	-.02508	.09595
mango	Equal variances not			1.185	289.824	.237	.03543	.02990	-.02341	.09427
	Equal variances	7.113	.008	1.304	387	.193	.02493	.01911	-.01265	.06251
banana	Equal variances not			1.408	328.644	.160	.02493	.01771	-.00990	.05976
	Equal variances	147.249	.000	4.950	387	.000	.13409	.02709	.08083	.18734
coffee	Equal variances not			5.926	386.834	.000	.13409	.02263	.08960	.17857

Appendix 10

Dietary diversity

Consumption of different food groups by households

	Food groups											
All hhs	cereal	Veg	Whitub	Frut	Meat	Egg	Fis	Pulse	Milk	Oil	Swt	Cond
Freq	390	274	139	82	14	37	4	328	180	355	108	390
%	100	70.3	35.6	21	3.6	9.5	1.02	84.1	46.2	91	27.7	100
Mhh	257	190	97	55	11	31	4	232	132	240	87	257
Frq	100	73.9	37.7	21.4	4.3	12.1	1.6	90.3	51.4	93.4	33.9	100
%												
Fhh	133	84	42	27	3	6	0	96	48	115	21	133
Frq	**1000**	**63.2**	**31.6**	**20.3**	**2.3**	**4.5**	**0**	**72.2**	**36.1**	**86.5**	**15.8**	**100**
%												

Appendix 11

Correlation between three food security indicators

	Pearson's correlation		
	CSI	HDDS	HFIAS
CSI	1		
HDDS	-.348**	1	
HFIAS	.601**	-.436**	1

Source: Field survey, 2016

Correlation was significant at ($p<0.01$)

Appendix 12

Regression output

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	388	99.5
	Missing Cases	2	.5
	Total	390	100.0
Unselected Cases		0	.0
Total		390	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
food insecure	0
food secure	1

Classification

Classification Table[a,b]

Observed			Predicted		
			FSECCCC		Percentage Correct
			food insecure	food secure	
Step 0	F security	food insecure	0	109	.0
		food secure	0	279	100.0
Overall Percentage					71.9

a. Constant is included in the model.
b. The cut value is .500

Overall significance of the model

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.940	.113	69.235	1	.000	2.560

Iteration History[a,b,c,d]

Iteration	-2 Log likelihood	Coefficients												
		Constant	FAMILY	_TLU	Sex	EXTENSIon	LAND	Eduuuu	IRRIGATION(1)	FertilizerUsed	CREDITACC(1)	Age	Physcal_road(1)	NON_FARM

Step 1	1	377.469	-.205	.072	.043	-.342	-.398	.464	.373	.554	.260	.175	-.015	.439	.333
	2	359.285	-.648	.102	.115	-.365	-.402	.736	.438	.732	.520	.256	-.021	.633	.492
	3	355.847	-.965	.113	.187	-.333	-.356	.794	.439	.765	.765	.291	-.024	.743	.556
	4	355.621	-1.064	.116	.213	-.321	-.340	.790	.442	.766	.871	.299	-.024	.779	.571
	5	355.620	-1.071	.116	.215	-.320	-.339	.789	.443	.766	.881	.300	-.024	.782	.572
	6	355.620	-1.071	.116	.215	-.320	-.339	.789	.443	.766	.881	.300	-.024	.782	.572
Step 2	1	377.841	.038	.072	.044	-.394	-.394	.469		.547	.277	.176	-.017	.461	.354
	2	359.567	-.379	.102	.116	-.422	-.397	.755		.723	.539	.256	-.023	.660	.516
	3	356.122	-.699	.113	.188	-.389	-.349	.818		.756	.781	.290	-.026	.769	.580
	4	355.898	-.795	.116	.214	-.377	-.333	.815		.757	.885	.299	-.026	.805	.595
	5	355.897	-.802	.116	.216	-.376	-.332	.814		.757	.894	.299	-.026	.808	.596
	6	355.897	-.802	.116	.216	-.376	-.332	.814		.757	.894	.299	-.026	.809	.596
Step 3	1	378.605	.143	.067	.042	-.383	-.384	.483		.550	.232		-.015	.421	.332
	2	360.614	-.216	.095	.113	-.410	-.390	.766		.727	.461		-.022	.608	.480
	3	357.270	-.503	.105	.184	-.378	-.344	.824		.759	.678		-.024	.714	.537
	4	357.058	-.589	.107	.209	-.366	-.329	.820		.761	.771		-.024	.748	.549
	5	357.057	-.595	.107	.211	-.366	-.328	.819		.761	.780		-.024	.751	.550
	6	357.057	-.595	.107	.211	-.366	-.328	.819		.761	.780		-.024	.751	.550
Step 4	1	378.985	.214	.067	.050	-.391	-.403	.495		.555			-.016	.379	.323
	2	361.296	-.096	.092	.129	-.430	-.420	.788		.736			-.022	.527	.474
	3	358.190	-.338	.099	.207	-.411	-.384	.851		.776			-.024	.593	.536
	4	358.019	-.401	.100	.232	-.404	-.374	.849		.781			-.024	.608	.550
	5	358.019	-.404	.100	.234	-.404	-.374	.849		.781			-.024	.609	.551
	6	358.019	-.404	.100	.234	-.404	-.374	.849		.781			-.024	.609	.551
Step 5	1	380.254	.465		.055	-.431	-.400	.484		.569			-.014	.374	.344
	2	362.762	.238		.139	-.474	-.409	.778		.742			-.020	.517	.497
	3	359.712	.027		.217	-.455	-.372	.838		.773			-.022	.579	.556
	4	359.549	-.028		.242	-.448	-.363	.836		.776			-.022	.594	.569
	5	359.548	-.030		.243	-.448	-.362	.836		.776			-.022	.595	.570
	6	359.548	-.030		.243	-.448	-.362	.836		.776			-.022	.595	.570
Step 6	1	383.068	.276		.063	-.457		.546		.641			-.017	.437	.363
	2	364.696	.043		.151	-.486		.858		.807			-.023	.571	.521
	3	361.402	-.156		.232	-.462		.915		.834			-.025	.624	.580
	4	361.225	-.208		.259	-.455		.911		.836			-.025	.638	.593
	5	361.225	-.210		.260	-.455		.910		.836			-.025	.638	.593
	6	361.225	-.210		.260	-.455		.910		.836			-.025	.638	.593
Step 7	1	384.860	.642		.065	-.477		.529		.669			-.017		.396
	2	366.910	.498		.154	-.508		.819		.850			-.023		.569
	3	363.748	.335		.233	-.488		.866		.884			-.024		.633
	4	363.585	.294		.258	-.482		.860		.888			-.024		.647
	5	363.584	.292		.260	-.482		.860		.888			-.024		.647
	6	363.584	.292		.260	-.482		.860		.888			-.024		.647

a. Method: Backward Stepwise (Likelihood Ratio)

b. Constant is included in the model.

c. Initial -2 Log Likelihood: 460.810

d. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	355.620[a]	.237	.342
2	355.897[a]	.237	.341
3	357.057[a]	.235	.338
4	358.019[a]	.233	.335
5	359.548[a]	.230	.330
6	361.225[a]	.226	.326
7	363.584[a]	.222	.319

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	10.415	8	.237
2	6.718	8	.567
3	19.732	8	.011
4	14.908	8	.061
5	21.555	8	.006
6	6.685	8	.571
7	4.800	8	.779

Classification Table[a]

	Observed		Predicted		
			FSECCCC		Percentage Correct
			food insecure	food secure	
Step 1	FSECURITY	food insecure	52	57	47.7
		food secure	32	247	88.5
	Overall Percentage				77.1
Step 2	FSECURE	food insecure	51	58	46.8
		food secure	32	247	88.5
	Overall Percentage				76.8
Step 3	FSECURITY	food insecure	49	60	45.0
		food secure	33	246	88.2
	Overall Percentage				76.0
Step 4	FSECURE	food insecure	50	59	45.9
		food secure	31	248	88.9
	Overall Percentage				76.8
Step 5	FSECURITY	food insecure	47	62	43.1
		food secure	31	248	88.9
	Overall Percentage				76.0
Step 6	FSECURITY	food insecure	46	63	42.2
		food secure	26	253	90.7
	Overall Percentage				77.1
Step 7	FSECURITY	food insecure	43	66	39.4
		food secure	30	249	89.2

Overall Percentage			75.3

a. The cut value is .500

Block 1: Method = Backward Stepwise (Likelihood Ratio)

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	106.811	13	.000
	Block	106.811	13	.000
	Model	106.811	13	.000
Step 2[a]	Step	-.101	1	.750
	Block	106.710	12	.000
	Model	106.710	12	.000
Step 3[a]	Step	-1.027	1	.311
	Block	105.682	11	.000
	Model	105.682	11	.000
Step 4[a]	Step	-1.361	1	.243
	Block	104.322	10	.000
	Model	104.322	10	.000
Step 5[a]	Step	-1.322	1	.250
	Block	102.999	9	.000
	Model	102.999	9	.000
Step 6[a]	Step	-1.414	1	.234
	Block	101.586	8	.000
	Model	101.586	8	.000
Step 7[a]	Step	-2.000	1	.157
	Block	99.586	7	.000
	Model	99.586	7	.000
Step 8[a]	Step	-2.360	1	.125
	Block	97.226	6	.000
	Model	97.226	6	.000

a. A negative Chi-squares value indicates that the Chi-squares value has decreased from the previous step.

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	FAMILY	.109	.082	1.769	1	.184	1.116	.949	1.311
	TLU	.199	.081	6.088	1	.014	1.220	1.042	1.428
	Sexhh(1)	-.315	.298	1.118	1	.290	.729	.406	1.309
	EXTENSIONSERV(1)	-.314	.286	1.207	1	.272	.731	.417	1.279
	LAND	.719	.368	3.819	1	.051	2.053	.998	4.224
	Eduuuu	.271	.853	.101	1	.751	1.312	.246	6.986

	IRRIGATION(1)	.765	.297	6.632	1	.010	2.150	1.201	3.848
	FertilizerUsed	.825	.845	.954	1	.329	2.282	.436	11.946
	CREDITACC(1)	.357	.283	1.587	1	.208	1.429	.820	2.489
	Age	-.024	.013	3.437	1	.064	.976	.952	1.001
	Physcal_road(1)	.763	.457	2.792	1	.095	2.146	.876	5.253
	NON_FARM	.560	.280	3.988	1	.046	1.750	1.010	3.031
	COOPERATIVE(1)	-.473	.376	1.580	1	.209	.623	.298	1.303
	Constant	-.548	1.046	.274	1	.600	.578		
	FAMILY	.109	.082	1.762	1	.184	1.115	.949	1.311
	TLU	.198	.081	6.073	1	.014	1.219	1.041	1.428
	Sexhh(1)	-.349	.280	1.552	1	.213	.706	.408	1.221
	EXTENSIONSERV(1)	-.309	.285	1.174	1	.279	.734	.420	1.284
	LAND	.731	.367	3.972	1	.046	2.078	1.012	4.265
	IRRIGATION(1)	.761	.297	6.569	1	.010	2.139	1.196	3.827
Step 2[a]	FertilizerUsed	.830	.843	.968	1	.325	2.293	.439	11.972
	CREDITACC(1)	.359	.283	1.607	1	.205	1.432	.822	2.494
	Age	-.025	.012	4.070	1	.044	.975	.952	.999
	Physcal_road(1)	.779	.454	2.938	1	.087	2.178	.894	5.307
	NON_FARM	.573	.277	4.276	1	.039	1.774	1.030	3.054
	COOPERATIVE(1)	-.491	.371	1.745	1	.186	.612	.296	1.268
	Constant	-.367	.878	.175	1	.676	.693		
	FAMILY	.101	.082	1.518	1	.218	1.106	.942	1.298
	TLU	.220	.078	8.016	1	.005	1.246	1.070	1.451
	Sexhh(1)	-.384	.278	1.910	1	.167	.681	.395	1.174
	EXTENSIONSERV(1)	-.355	.282	1.588	1	.208	.701	.403	1.218
	LAND	.754	.369	4.176	1	.041	2.127	1.031	4.385
	IRRIGATION(1)	.784	.296	7.040	1	.008	2.190	1.227	3.909
Step 3[a]	CREDITACC(1)	.327	.281	1.349	1	.245	1.387	.799	2.407
	Age	-.024	.012	3.897	1	.048	.976	.952	1.000
	Physcal_road(1)	.627	.421	2.216	1	.137	1.871	.820	4.270
	NON_FARM	.564	.277	4.160	1	.041	1.758	1.022	3.023
	COOPERATIVE(1)	-.517	.371	1.942	1	.163	.596	.288	1.234
	Constant	-.121	.841	.021	1	.885	.886		
Step 4[a]	FAMILY	.093	.081	1.317	1	.251	1.098	.936	1.287
	TLU	.215	.077	7.746	1	.005	1.240	1.066	1.442

	Sexhh(1)	-.372	.277	1.804	1	.179	.690	.401	1.186
	EXTENSIONSERV(1)	-.345	.281	1.506	1	.220	.708	.408	1.229
	LAND	.770	.368	4.372	1	.037	2.160	1.049	4.447
	IRRIGATION(1)	.786	.295	7.111	1	.008	2.195	1.232	3.912
	Age	-.023	.012	3.391	1	.066	.978	.954	1.001
	Physcal_road(1)	.590	.415	2.015	1	.156	1.804	.799	4.072
	NON_FARM	.520	.273	3.627	1	.057	1.682	.985	2.871
	COOPERATIVE(1)	-.445	.364	1.491	1	.222	.641	.314	1.309
	Constant	.007	.834	.000	1	.993	1.007		
	TLU	.223	.077	8.418	1	.004	1.250	1.075	1.453
	Sexhh(1)	-.411	.274	2.238	1	.135	.663	.387	1.136
	EXTENSIONSERV(1)	-.335	.281	1.424	1	.233	.716	.413	1.240
	LAND	.750	.369	4.125	1	.042	2.117	1.027	4.366
Step 5[a]	IRRIGATION(1)	.779	.294	7.017	1	.008	2.179	1.225	3.878
	Age	-.021	.012	2.866	1	.090	.980	.957	1.003
	Physcal_road(1)	.571	.417	1.880	1	.170	1.770	.783	4.005
	NON_FARM	.536	.272	3.881	1	.049	1.709	1.003	2.914
	COOPERATIVE(1)	-.471	.362	1.690	1	.194	.624	.307	1.270
	Constant	.380	.769	.245	1	.621	1.463		
	TLU	.236	.077	9.487	1	.002	1.266	1.090	1.471
	Sexhh(1)	-.417	.273	2.328	1	.127	.659	.386	1.126
	LAND	.810	.367	4.867	1	.027	2.248	1.095	4.615
	IRRIGATION(1)	.841	.289	8.475	1	.004	2.320	1.316	4.087
Step 6[a]	Age	-.023	.012	3.839	1	.050	.977	.954	1.000
	Physcal_road(1)	.614	.415	2.184	1	.139	1.847	.819	4.168
	NON_FARM	.554	.271	4.194	1	.041	1.741	1.024	2.959
	COOPERATIVE(1)	-.504	.362	1.941	1	.164	.604	.297	1.228
	Constant	.243	.760	.102	1	.749	1.275		
	TLU	.260	.075	11.959	1	.001	1.297	1.119	1.503
	Sexhh(1)	-.455	.272	2.799	1	.094	.635	.373	1.081
	LAND	.910	.366	6.196	1	.013	2.485	1.214	5.088
	IRRIGATION(1)	.836	.288	8.417	1	.004	2.308	1.312	4.061
Step 7[a]	Age	-.025	.012	4.484	1	.034	.975	.953	.998
	Physcal_road(1)	.638	.414	2.373	1	.123	1.893	.840	4.266
	NON_FARM	.593	.268	4.890	1	.027	1.810	1.070	3.063
	Constant	-.210	.686	.094	1	.759	.810		
Step	TLU	.260	.075	12.134	1	.000	1.297	1.120	1.501

8[a]	Sexhh(1)	-.482	.270	3.186	1	.074	.617	.364	1.048
	LAND	.860	.362	5.635	1	.018	2.362	1.162	4.803
	IRRIGATION(1)	.888	.286	9.656	1	.002	2.431	1.388	4.258
	Age	-.024	.012	4.069	1	.044	.976	.954	.999
	NON_FARM	.647	.266	5.943	1	.015	1.910	1.135	3.215
	Constant	.292	.599	.238	1	.626	1.339		

a. Variable(s) entered on step 1: Family size, TLU, Sexhh, Extensionserv, Land, Education, Irrigation, Fertilizer, CreditAcess, Age, Physcal_road, Non_Farm, Cooperative.