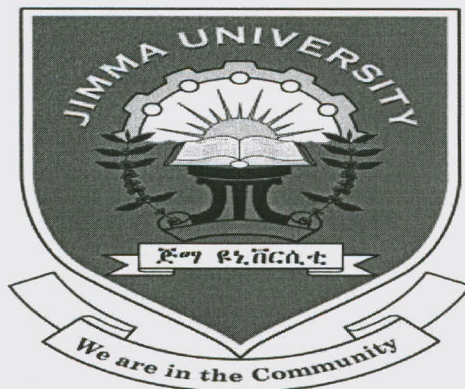
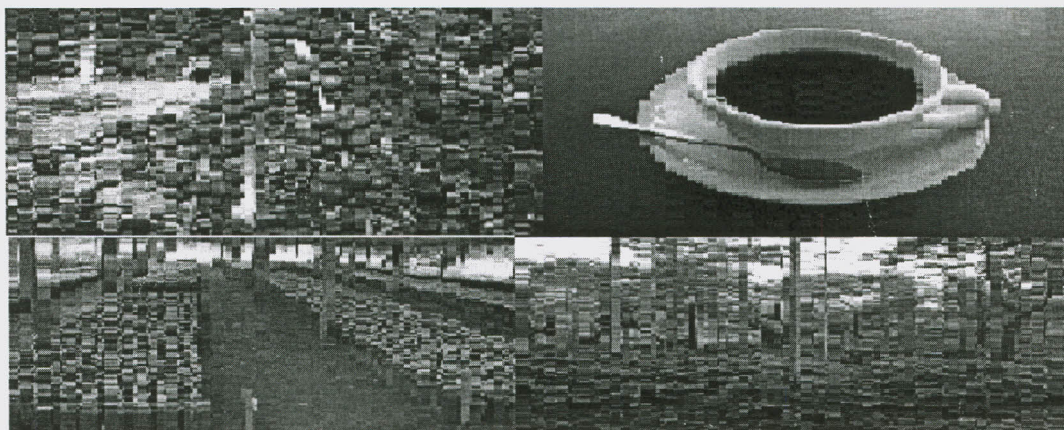


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*IMPACT OF COMMERCIALIZATION ON RURAL HOUSEHOLDS' FOOD
SECURITY IN MAJOR COFFEE GROWING AREAS OF SOUTH WEST
ETHIOPIA: THE CASE OF JIMMA ZONE.*



By: ISMAEL MOHAMMED NASIR

JIMMA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

JUNE, 2014



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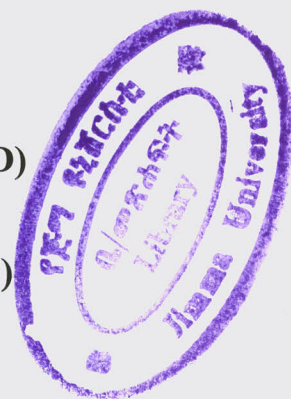
***Impact of Commercialization on rural households' Food Security in
Major Coffee Growing Areas of South West Ethiopia: the Case of
Jimma zone.***

By: ISMAEL MOHAMMED NASIR

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**A thesis Submitted to the School of Graduate Studies of Jimma University
In Partial Fulfillment of the Requirements for the Degree of Master of
Science in Economics
(Economic Policy Analysis)**

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DECLARATION

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in any other university, and that all sources of materials used for the thesis have been duly acknowledged.

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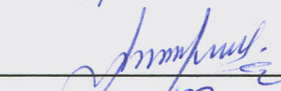
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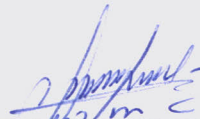
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CERTIFICATION

This is to certify that this Research Project under the title of “**Impact of Commercialization on Rural Households’ Food Security in Major Coffee Growing Areas of South West Ethiopia: The case of Jimma Zone**”, undertaken by **ISMAEL MOHAMMED NASIR** for the partial fulfillment of **Master of Science in Economics Program (Economic Policy Analysis)** at Jimma University is an original work and not Submitted earlier for any degree either at this university or any other university.

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**Impact of Commercialization on Rural Households' Food Security in Major
Coffee Growing Areas of South West Ethiopia: The case of Jimma Zone**

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DEDICATION

I dedicate this thesis to my family for nursing me with affections and love and their dedicated partnership for success in my life.

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ACRONYMS AND ABBREVIATIONS

ACCORD	Agency for Cooperation & Research in Development
AE	Adult Equivalent
ARDO	Agricultural and Rural Development Office
COMP	Crop Output Market Participation
CSA	central statics authority
ECX	Ethiopia commodity exchange
EEA	Ethiopia Economics Association
EHNRI	Ethiopian Health & Nutrition Research Institute
FAO	Food and Agricultural Organization
FDRE	Federal Democratic Republic of Ethiopia
FGT	Foster, Greer and Thorbeck
HFSS	Household food security status
HH	Household
IFPRI	International Food Policy Research Institute
IMF	international monetary fund
IPMS	Improving Productivity and Marketing Success
JARC	Jimma Agricultural Research Center
JZARDO	Jimma Zone Agricultural and Rural Development Office
KCAL	Kilo calorie
MASL	meter above sea level
MDG	Millennium development goal
MEDAC	Ministry of Economic Development & Cooperation

MLE	Maximum livelihood estimation
MOA	Ministry of Agriculture
MOFED	Ministry of Finance and Economic Development
MoFED	Ministry of Finance and Economic Development
NBE	National Bank of Ethiopia
NGO	Non Governmental Organization
PA	Peasant association
Qt	Quintal (100kg)
SD	Standard Deviation
SD	Standard Deviation
SPSS	Statistical Package for Social Sciences
SSA	Sub-Saharan Africa
TLU	Tropical Livestock unit
TYYP	Ten years perspective plan
UN	United Nations
USAID	United state agency for international development
VIF	Variance Inflation Factor

Impact of Commercialization on rural households' Food Security in Major Coffee Growing Areas of South West Ethiopia: the Case of Jimma zone.

ABSTRACT

*This study aimed to analyze the impact of smallholder commercialization on rural food security in Major coffee growing areas of south west Ethiopia: the Case of Jimma zone. For the purpose of analysis both primary and secondary data was used to generate the required information. Multi-stage random sampling technique was used to select 150 smallholder farmers. Descriptive and inferential statistics tool used include, **Crop Output Market Participation (COMP), Foster-Greer-Thorbecke (FGT) model and logit model.** The results showed that about 68% of the small holder farmers were food secure households. Smallholder farmer commercialization has effect on food security level of smallholder farmers. The estimation results of the logit model showed that family size (FSIZEAE), Age of household (HEADAGE), Size of cultivated land (FLANDha), Crop output market participation (COMP), Access to credit (AC-CREDIT), were significantly affect rural household food security. The study suggests for policies that will improve smallholder farmer family planning service, accesses to credits, Capacity building, better land conservation practices, market information and road in designing food security policy in the sampled population*

Key words: Commercialization¹; Rural food security; and smallholder farmers

¹Sokoni (2007:3) defined commercialization of smallholder production as “a process involving the transformation from production for household subsistence to production for the market.” Hazell et al. (2007:4) found out that most definitions refer to agricultural commercialization as “the degree of participation in the output markets with the focus very much on cash incomes.”

CHAPTER ONE: INTRODUCTION

This chapter deals with the introduction of the study. It incorporates background of the study, statement of the problem, Research Questions, objective and significance of the study, Scope of the Study, Limitations of the Study, and Organizations of the Study.

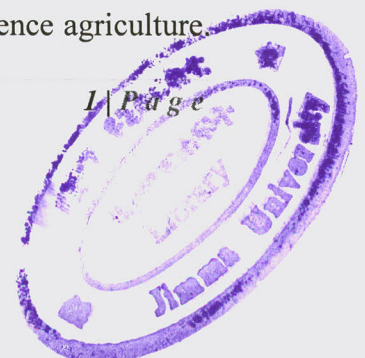
1.1. Background of the study

Agricultural commercialization is a process involving transformation of agriculture to market oriented production which tends to impact income, consumption and nutritional setup of the farm households (Braun, 1995). Smallholder commercialization may be broadly defined as the situation where farmers of small individual and family farms have greater engagement with markets, either for inputs, outputs, or both. Research has shown that smallholder farmers comprise 85 percent of the farming population worldwide. Commercialization of smallholder farms is now viewed by the government as the focal Point to the agricultural development of the country (Gebremedhin and Jaleta. 2010).

Although, smallholders cultivate over 96% of the total agricultural land, the average smallholder cultivates less than one hectare of arable land and consumes more than 65% of total production within the household (EEA, 2006). In many parts of the country, market participation of smallholder family farms (measured either in terms of per capita market share, the volume of farm output supplied to markets or their profit motive) is limited. Furthermore, agricultural markets are fragmented and not well integrated into a wider market system, which increases transaction costs and reduces farmers' incentives to produce for the market. Government policy or the lack of it has contributed to this general characteristic of the smallholder agricultural sector in Ethiopia (MOFED, 2006).

According to various studies, commercial transformation of subsistence agriculture is an indispensable pathway towards economic growth and development for many agriculture dependent developing countries (von Braun (1994), Pingali and Rosegrant (1995), Timmer (1997) and World Bank 2008)). Similarly, Pingali (1997) noted that sustainable household food security and welfare also requires commercial transformation of subsistence agriculture.

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Commercial agricultural production is likely to result in welfare gains through the realization of comparative advantages, economies of scale, and from dynamic technological, organizational and institutional change effects that arise from the flow of ideas due to exchange-based interactions (Romer 1993, 1994). According to a study by Samuel and Sharp (2007), smallholders with high degree of market engagements have better potential of enjoying better standards of welfare. Similarly, Sharp, *et al.*, (2007) noted that enhancing the degree of commercialization of the smallholders can have more impact on reducing poverty and enhancing food security than promotion of few large ventures.

The concept of food security is multidimensional, encompassing food availability, affordability, adequacy, safety and quality. According to the state of food Insecurity 2001, food security is defined as a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life . Therefore, food insecurity arises when there is limited availability of nutritionally adequate and safe foods, or low capacity to obtain such foods.

Ethiopia is one of the emerging economies in Sub-Saharan Africa with an average GDP growth rate of 8.3 percent per annum between 2002 and 2011 (WB, 2012). The agricultural sector has been a dominant contributor having an average of 45.4 percent to the total GDP during the same period of time. In addition to larger contribution, studies revealed that agriculture has a significant potential in achieving faster economic growth and poverty reduction in the country (Bigsten *et al.*, 2003; Block, 1999; Diao & Pratt, 2007). However, maximizing this potential necessarily requires increasing the level of smallholders' agricultural productivity which is existed at base level due to several socioeconomic bottlenecks. For instance, backward technological setups coupled with diminishing cultivated land size, low level of technological adoption and institutional failures are among the main factors (Croppenstedt & Muller, 2000). Besides, poor linkage between market and the farm sector is mentioned as one of the main contributing factors for lower level of agricultural productivity (Fafchamps *et al.*, 2005). Similarly, study made by Braun (1995) indicated that smallholder commercialization is supposed to be vital in improving smallholder's wellbeing in terms of income and food security.

In Ethiopia, the seriousness of food shortage problem varies from one area to another, depending on the state of the natural resources and the extent of development of food shortage (Webb *et al.*, 1994). Hence, household food security is a function of the availability of food within the country and the level of household resources that are necessary to produce or purchase food as well as other basic needs. In most cases, increased incomes resulting from commercialization led to increased food consumption (Bouis, 1994) and improved nutrition (Kennedy, 1994). In this regard, it is important to see its effect on household food security in the study area using detailed household level data, which is the main objective of this study. The study area also selected to represent a dominantly subsistence farming community where land degradation coupled with erratic rainfall, drought problems pose a serious threat on households' food security in south western Ethiopia.

Therefore, the aim of this study was to analyze the impact of smallholder commercialization on rural households' food security in major coffee growing areas of Southwest Ethiopia: the case of Jimma zone.

1.2. Statement of the Problem

Agriculture is considered as a strong option and fundamental instrument for spurring growth and sustainable development, poverty reduction, and enhancing food security in developing countries like Ethiopia. It is also assumed to be a vital development tool for achieving the Millennium Development Goals (MDG), one of which is to halve by 2015 the share of people suffering from extreme poverty and hunger (World Bank, 2008). Promoting commercialization of agricultural production is a cornerstone of the rural development and Poverty reduction strategies of Ethiopia, as well as numerous other developing countries. Past empirical research on smallholder commercialization in developing countries generally supports this view, although the impacts of commercialization are dependent on the local context and policy environment (von Braun and Kennedy, 1994).

Commercialization enhances the links between the input and output sides of agricultural markets. Commercialization entails market orientation (agricultural production decision

destined for market based on market signals) and market participation (produce offered for sale and use of purchased inputs) (Gebremedhin and Jaleta, 2010). Empirical evidence indicates that commercialization of smallholder farms has the potential to enhance incomes and welfare outcomes, and take smallholder farmers out of poverty if constraining factors such as lack of capital, basic skills (farming and commercial), high transaction costs, lack of infrastructure, lack of information and lack of educations could be eliminated (Lerman, 2004).

Although commercialization is seen as an avenue to generate more household income due to its comparative advantages over subsistence production, it is also recognized that a shift from subsistence to commercial crop production may have adverse consequences by exposing households to volatile market prices in cases where rural markets are not well-integrated (Jaleta *et al*, 2009). In terms of food security, there are arguments for and against smallholder commercialization as a pathway for ensuring household food security. On one hand, smallholder commercialization is assumed to have detrimental effects on household nutritional and food security status. This is because commercialization may be associated with diversion of resources from food to cash crop production, which leads to lower food availability from own production and more dependence on local markets (Immink and Alarcon, 1993). Findings from various studies support this view. For instance, Bouis and Haddad (1990) found that among sugarcane-producing households in the Philippines, increased household incomes were a necessary but not sufficient condition for improving preschooler nutrition. More recently, Wood *et al* (2012) found similar results in Malawi.

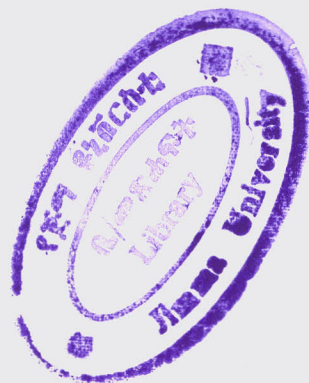
There is also an argument in favor of smallholder commercialization as a means to improve household food security, health and nutrition status. This may arise because commercialization is assumed to lead to increased household income which allows the household to purchase a diversified mix of goods and services, including food, health care, and better housing, among others, or increase the current market basket. In addition, through the income–food–consumption linkage, commercialization is assumed to increase the food intake of household members, which could improve their nutritional and health status (Kennedy, 1994 as cited in Jaleta *et al* 2009).

So far the literature on commercialization of smallholders makes little study on the impact of market participation on rural household's food security in the study area, especially at a household level. The study area was selected from major coffee producing area since the product is important to the national economy, grown and marketed by smallholders for generations, high policy attention and intervention. This study area was also selected to represent a dominantly subsistence farming community where land degradation coupled with erratic rainfall, drought problems pose a serious threat on households' food security in South western Ethiopia. Therefore, this study attempts to fill the gap by conducting an empirical research on identifying, analyzing, and understanding the impact of commercialization on food Security and those elements that are responsible for variation in small holder food Security that is needed to device appropriate interventions and integrated efforts to combat food insecurity. Therefore, the study aimed at analyzing the impact of agricultural commercialization on rural households' food security level in major coffee growing areas of south west Ethiopia: the Case of Jimma zone.

1.3. Research Questions

This study attempted to address three research questions as indicated below:

- ❖ What is the degree or current level of smallholders' commercialization in the study area?
- ❖ What are the major factors determining smallholders food security in the study area?
- ❖ What is the impact of smallholders' commercialization on rural households Food Security?



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1.4. Objectives

The study aimed at analyzing the impact of commercialization on rural households' food Security in major coffee growing areas of south west Ethiopia: the case of Jimma zone. *More specifically the study attempts:*

- ❖ To assess the degree of smallholders commercialization.
- ❖ To determine the demographic and socioeconomic factors determining smallholders food security.
- ❖ To analyze the impact smallholders commercialization on rural households food Security.

1.5. Significance of the Study

This study is important in providing information that can serve as an input for the smooth development process of the country. It provides a basis for recommendations of policy and other interventions that can assist the community to achieve pathways to intensification that are socially preferred. It has a paramount importance in identifying areas in which government policies affect community livelihoods. This in turn, will reduce at least biases of planners and policy-makers in identifying the development area/interest for community.

In addition, since little work has been done in the study area in this regard, the findings of this study used as a tool in providing information that enables relevant entity to compare the food security situation of the households, it provides information that enable effective measures to be undertaken so as to improve food security status and bring the success of food security development programs in the sampled population. It also enable development practitioners and policy makers to have better knowledge as to where and how to intervene in rural areas to bring food security or minimize the severity of food insecurity.

Moreover, area specific identification of demographic, socioeconomic factors determining smallholders food security, the degree of commercialization and the impact of commercialization on rural households food security ease the implementation of different development projects in major coffee growing areas of south west Ethiopia in general and

particular in the sampled population. The study also provides directions for further research, extension and development schemes that would benefit the farming population.

Therefore, though the study was restricted in terms of its coverage, its findings are expected to be useful primarily to the study area, and it also has contributions to the existing knowledge on food security discipline.

1.6. Scope of the Study

The scope of the study covers two sub-districts in Jimma Zone in 20012/2013: in Mana and Goma weredas of Jimma zone, south western Ethiopia. The study was limited to six kebeles of two woreda and used one-year cross sectional data. The survey was gathered qualitative and quantitative data pertaining to social, demographic and economic aspects of households. Data for the study was generated from a farm survey of 150 farmers selected by multistage sampling procedure. These study area also selected to represent a dominantly subsistence farming community where land degradation coupled with erratic rainfall, drought problems pose a serious threat on households' food security in south western Ethiopia.

1.6 Limitations of the Study

As far as research is concerned, there would always be certain limitations. This study was not absolutely free from the respondents' reluctant character to provide accurate information on the applied questionnaire. But to lessen this trouble different methods were used like convincing farmers about the objectives of the study, selecting better enumerators who are working and living with them and official letter was written from the woreda council to each selected kebele aiming at facilitating the willingness and good participation of the respondents. However, the researcher did his level best to capture reliable information by getting understanding of the respondents with regard to the purpose of the study and by establishing good rapport with them.

1.7 Organizations of the Study

The study was organized in four chapters. The first chapter introduces the background and justification for the study objectives, significance, and scope of the study are also discussed in this chapter. The second chapter covers relevant literature review. The third chapter presented and discussed overview of the study area and agricultural policy under different regime. The fourth chapter deals with the research methodology. The fifth chapter deals with Results, both descriptive and econometric. Finally chapter six presents summary, concluding remarks and policy recommendations.

CHAPTER TWO: LITERATURE REVIEW

This chapter deals with review of the related literature. The chapter briefly discusses the definition and concepts of food security, definition of commercialization and conceptualization of a small-holder commercialization, Indicators of household food security empirical studies on determinant of smallholders food security, food security situation in Ethiopia, finally, empirical studies on commercialization and its determinants, the determinant of smallholders Food Security, Food Security Situation in Ethiopia, the impact smallholder's commercialization on rural household food Security.

2.1 Theoretical literature

This section briefly discusses the definition and Concepts of Food Security, definition of commercialization and conceptualization of a small-holder commercialization, Indicators of household food security.

2.1.1 Definition and Concepts of Food Security

Food security is defined by different agencies and organizations differently without much change in the basic concept. According to the World Food Summit plan of action of 1996, food security is generally defined as “all people, at all times, have physical and economic access to sufficient safe and nutritious food for a healthy and active life”. The two major elements/components of food security are availability and accessibility. Availability refers to the quantity and quality of food at any given time in the form of local production through agriculture, fishing, animal husbandry, wild foods (fruits and hunting) as well as imports and exports through the market system. Availability of food is highly correlated to the following factors: natural factors such as change in climate affecting both crops and livestock; displacement caused by conflict, affecting production; widespread illness, such as malaria and HIV/AIDS, affecting labour capacity ;disruption of market dynamics ;government policy either favoring or affecting food security. Accessibility refers to entitlement of food primarily through production, purchase, trade, exchange, and claims. It is influenced by market factors and the price of food as well as by purchasing power related to livelihood situation. Livelihoods are a means of making a living, They comprise ways in which people access and

mobilize resources which enable them to pursue goals necessary for their survival and long-term well being. Livelihoods are affected by natural, policy, social, economic, physical, and human factors. At times when an individual, household, or community is unable to avail and access food for the above mentioned reasons then the situation could be described as a state of food insecurity. Food insecurity is also an underlying cause of malnutrition and in extreme cases results in mortality. High degree of food insecurity when compounded with other undesirable factors can threaten livelihoods. High risks of food insecurity and livelihoods can be expressed in terms of malnutrition, morbidity, and in extreme cases mortality (Beruk Yemane, 2003).

Food security has a long history as an “organizing principle” for social and economic development (Maxwell and Frankenberger, 1992). Over time, this concept has been operationally defined in a number of ways. In most cases, the definitions include elements of availability (supplies of food), accessibility (both physical and economic), and utilization (physiological ability to absorb and utilize consumed nutrients) (USAID, 1997). In general, “food security” refers to that situation in which there is “access for all people at all times to enough food for an active, healthy life” (World Bank, 1986; FAO, 1999). Food security is about equitable access to markets, distribution of resources within households, among individuals, across communities and viable options and opportunities to take action and make decisions.

Food Security has three major components: availability, access and utilization. Food availability refers to the need to produce sufficient food in a way that generates income for small-scale producers while not depleting the natural resource base, and to the need to get this food into the market for sale at prices that consumers can afford. The second component relates to people’s ability to get economic access to this food. Economic access is typically constrained by income. If households cannot generate sufficient income to purchase food, they lack an entitlement to the food. The third component concerns an individual’s ability to use food consumed for growth, nutrition will be impaired (Haddad, 1997; Yusuf, 2006).



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Finally, food security has interrelated components; availability of food through production, storage and imports, and ability of all people in a nation to acquire the adequate food. The ability of all people depends on the situation of their income; urban food security is to a greater deal correlated with the individual earnings of cash income. On the other hand, the increasing trend of cash crops production, mainly sesame and groundnuts, where most of the farmer increase their cash crops cultivated areas may lead to declining food production, which leads to shortages in food and increased food insecurity.

Generally, available literature on food security revealed the definition of food security in terms of access by all household members at all times as central core being other condition also deemed necessary for healthy life. Food security can be explained as access of food by all people to the required dietary intake through various means. It touches the supply in terms of availability and capacity of people to obtain sufficient amount through their own ways.

2.2.1 Indicators of Household Food Security

Assessment of food security is difficult issues as there are no universally established Indicators that serve as measuring tools. Food security requires multi-dimensional Considerations since it is influenced by different interrelated socio-economic, environmental and political factors. Because of this problem, assessing, analyzing and monitoring food Security follows diversified approaches (Debebe Habtewold, 1995).

Maxwell and Frankenberger (1992) listed 25 broadly defined indicators on household food Security. According to Maxwell and Frankenberger (1992) the importance of indicators that Measure food accesses become apparent when it is realized that household food insecurity and Famine conditions were occurring despite the availability of food. Riely and Moock (1995) listed 73 such indicators. Chung, (1997) notes that even a simple indicator such as dependency ratio can come with many permutations. They listed some 450 indicators. Along with the development of the concept of food security, a number of food security indicators have been identified to make monitoring of food situation possible. These include food supply indicators (meteorological data, information on natural resources, agricultural production data, market information, information on pest damage and regional conflict); food access indicators (diversification of income sources, change of food source, access to credit, sale of production

assets and migration) and outcome indicators (household budget and expenditure, food consumption frequency, nutritional status and storage estimates).

These indicators are very important to make decisions on the possible interventions and timely responses (Debebe, 1995). Chung (1997) identified and proposed two types of indicators at individual and household levels. First, generic indicators are those that can be collected in a number of different settings and are derived from a well-defined conceptual framework of food security. Second, location specific indicators are those indicators typically carried only within a particular study area because of unique agro climatic, cultural, or socioeconomic factors. Location-specific indicators can be identified only from a detailed understanding of local condition by using qualitative data collection methods, while the generic indicators are drawn from the food security literature and tested using statistical methods.

2.1. 3 Definition of commercialization and Conceptualization of a Smallholder Commercialization

In most literature, a farm household is assumed to be commercialized if it is producing a significant amount of cash commodities, allocating a proportion of its resources to marketable commodities, or selling a considerable proportion of its agricultural outputs (Immink and Alarcon 1993; Strasberg *et al.* 1999). However, the meaning of commercialization goes beyond supplying surplus products to markets (von Braun *et al.* 1994; Pingali 1997). According to these authors, it has to consider both the input and output sides of production, and the decision-making behavior of farm households in production and marketing simultaneously.

The commonly accepted concept of commercialization is, therefore, that commercialized households are targeting markets in their production decisions, rather than being related simply to the amount of product they would likely sell due to surplus production (Pingali and Rosegrant 1995). In other words, production decisions of commercialized farmers are based on market signals and comparative advantages, whereas those of subsistence farmers are based on production feasibility and subsistence. The level of commercialization need to be measured in order to analyses the determinants of Commercialization. There are a number of different ratios developed to measure the degree of household commercialization. These

different indicators usually emanate from the way Commercialization is conceptualized. Some authors use econometric models derived from the Conventional non-separable agricultural household models to evaluate their resource allocation Decisions for producing commodities consumed at home (food crops) vs. those supplied to markets (cash crops).

In measuring household-specific level of commercialization, Govereh *et al.* (1999) and Strasberg *et al.* (1999) used a household commercialization index (HCI), which is a ratio of the gross value of all crop sales per household per year to the gross value of all crop production. This ratio does not incorporate the livestock subsector, which could be more important than crops in some farming systems. Others use simple indices (ratios) to look at the proportions of resources or income derived from the market. In some cases, these indices are focusing on either input or output side commercialization, whereas in others, they combine the two and look at overall market transactions of a farm household. Following von Braun *et al.* (1994), this study will compute household crop output market participation in annual crops as the proportion of the value of crop sales to total value of crop production, which the researcher refer to in this research as crop-output market participation (COMP) index.

Nevertheless, there is no well accepted and comprehensive definition that could give a multidimensional view to the small holder commercialization concept so that one can easily judge to what extent a given farm household is commercialized in its overall production, marketing and consumption decisions

2.2. Empirical Literature

This section briefly discusses commercialization and its determinants, the determinant of smallholders Food Security, Food Security Situation in Ethiopia, the impact smallholder's commercialization on rural household food Security.

2.2.1. Commercialization and Its Determinants

Agricultural commercialization is a process involving transformation of agriculture to market oriented production which tends to impacts income, consumption and nutritional setup of the farm households (Braun, 1995). Importantly, it is more than producing surplus output to the

market and thus includes household's decision behavior on product choice and input use based on the principle of profit maximization (Pingali & Rosegrant, 1995). However, there is also the prevalence of commercialization in subsistence agriculture where farm households supply certain proportion of their output to the market from their subsistence level (Gebre-ab, 2006). Generally, different approaches are used to measure household commercialization level (Braun, Kennedy, 1994). Commonly, total sale to output ratio which is calculated by taking the value of sales as a proportion of total value of agricultural output is commonly used (Gebre-ab, 2006). Therefore, it is argued that the process of commercialization is determined by a number of factors linked with internal or external to farming activity. Internally, households' resource endowments including land, labor and capital; and whereas, change in technology, infrastructure, demography and market institutions around the farm are among the external factors (Jaleta *et al.*, 2009).

2.2.2. Empirical Studies on Determinant of Smallholders Food Security

According to Toulmin (1986), the people of Bambara Village of Kala in Mali faced food shortages that were mainly induced by two principal factors. One of the factors was climatic, specifically low and highly variable rainfall making the people very vulnerable to crop failure. The second class of risk was demographic, consisting of high level of mortality, varying levels of fertility and vulnerability of all producers to sickness and disability. Land-use competition between pastoralists and farmer has also become the cause of food shortages in some Sub-Saharan African countries (Toulmin, 1986).

The situation in Ethiopia is not much different from the conditions in other developing regions. Mesfin (1991) studied food security in north central Ethiopia and found out that most farmers could not produce enough food to meet the annual requirements, from both the farmers' annual requirement perceptions (ENI, 1990). Seasonal food insecurity exists even in surplus producing area (Degefa, 1996). The result shows 'variations between households practicing double cropping system (during 'Meher' and 'Belg' seasons) and those relying on a single harvest (Meher) were the proportion of farmers practicing double cropping who reported to have faced seasonal food deficit was smaller than those engaged in single harvest. Food security at household level is affected by a number of interrelated factors. It is

determined by household assets ownership, occupation, demographic factors such as size, gender, and age composition of households, educational level, socio-cultural factors, access to credit and inputs, and climatic factors like variability and shortage of rainfall and drought in general (Andersen, 1997). In examining the causes of food-insecurity in Ethiopia it is useful to distinguish between long-term trends, which affect the vulnerability of individuals, households and nation on one hand and sudden shocks, which trigger food systems into crises on the other.

In Ethiopia, Getachew (1995) conducted a study in six rural areas on famine and food security at the household level. According to his study, determinants of household food security/ are level of output, family size, farming systems (agro ecology), land size, livestock, and fertilizer use. The result of logit model analysis revealed that households who have established access to larger land size are better off than those with smaller land size. Moreover, livestock ownership was found to be serving as insurance against food insecurity in normal years. Drought, as noted by Dagneu (1997), was also considered as the major immediate cause of alarming level of food insecurity in many parts of Ethiopia. The studies conducted in East Wellega, Anger Gutin resettlement area, on household food security situation indicate that households could provide only 73 percent of their annual food required during the year (Rata, 1998). The households lack or have very little access to basic resources such as oxen, land, livestock, farm implements; lack of access to off-farm employment and credit; family size, high illiteracy rate and high marketing problem. Thus, other than soil productivity, for household food security, factors like asset possession, extension services, credit, family planning, and marketing facilities are also very essential.

According to Shiferaw *et al.* (2005), household food security is strongly associated with demand side factors such as household size, market access, and per capita aggregate production. On the supply side, the authors, reported technology adoption, farm size, and land quality as significant determinants of household food security. On the other hand, Berhanu (2004), emphasized institutional factors like land policy, input and output market system and poor rural infrastructure in relation to food insecurity problem in Ethiopia. Pastoral communities in different parts of the country face common challenges-among them lack of access to social services, poor infrastructure and recurrent droughts. According to Mohammed



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(2004) the marginalization of pastoralists is reflected not only by a lack of basic infrastructure and a lack of or poor access to basic social services (education, health services, water both for humans and animals) but also by a lack of appropriate policies. Pastoralists are politically marginalized partly because of the absence of coherent institutions to represent them. The political marginalization of pastoralist societies is reflected by their low level of participation in policy formulation and in various institutions of decision-making that affect their life. Marginalization is most severe for women who are given little share of the limited resources and services; their participation in public decision-making is extremely limited.

In Ethiopian condition, the study by Mulugeta in Boke district of Western Hararghe zone revealed that about 71.8 percent of sample farmers were food insecure. The logistic regression model reveal that among 14 explanatory variables included in the model, 8 were found to be significant at less than 10 percent probability level. These significant variables include family size, number of oxen owned, the use of fertilizer, food expenditure pattern, number of livestock owned, size of cultivated land, off-farm income and income per adult equivalent (Mulugeta Tefera, 2002).

A study conducted by Yilma Muluken in the Assosa woreda of Benishangul Gumuz Region, using binary logit model, out of sixteen independent variables, six variables were found to be statistically significant. Family size, age of household head, amount of fertilizer used per hectare, market distance, annual off-farm/non-farm income and annual total farm income are found to be significant variables while the remaining such as sex, level of education, livestock holding, cultivated land and food aid are statistically insignificant. About 79.3 percent of sample households were food insecure (Yilma, 2003).

2.2. 3. Food Security Situation in Ethiopia

Ethiopian history is punctuated by famine. Although most of the occurrences fall within the past 200 years, food related crises can be traced as far back as 250 BC. Several incidences of famines were reported since then. The most recent tragic famines were experienced in 1984/85 (Webb and Braun, 1994).

Currently nearly about 14 million people are food insecure in Ethiopia. Therefore, there is a pressing and urgent needs to assist farmers to be able achieve food security through rapid increase in food productivity and production on an economically and environmentally sustainable basis (Gezahegn, 2004).

Because of the primary dependence on crop production in Ethiopia, harvest failure leads to household food deficits which in the absence of off farm income opportunities and/or timely food aid assistance, leads to asset depletion and increasing level of destitution at the household level. The effect is mirrored at the national level, resulting in overall declining food availability and increased reliance on food aid import to prevent wide spread mortality. Over the last fifteen years this situation has resulted in Ethiopia importing average of 700,000 metric ton food aid per annum to meet food needs among others, demonstrating the scale of the problem in Ethiopia (MOFED, 2002).

To achieve food security and reduce poverty, the logical and paramount goal of the government of Ethiopia is to pursue objectives of sustainable development. Sustainable development entails the harmonization of population growth with utilization and exploitation of the natural resource. This requires redirection and reorientation of research and development as well as institutional change. The basic requirement in this harmonization process is to address change posed by negative synergy arising from rapid population growth, environmental degradation and low agricultural production, leading to food insecurity (Gezahegn *et al*, 2004).

Generally, Though food security as a problem at the national level was first felt in Ethiopia in the 1960s, it only started influencing policy in the 1980s, when food self-sufficiency became one of the objectives of the Ten-year Perspective Plan (TYPP) in the early 1980s. This took place after the 1983/84 drought and famine, which claimed millions of lives (Alemu, 2002). While efforts to ensure adequate food supplies at the national level are laudable, these efforts on their own cannot ensure food availability for households and individuals. As Sen (1981) argues, ensuring access to food, not merely increasing food supplies, should be regarded as the major pillar of food security. This assertion is borne out by empirical evidence that suggests that, even in times when countries experience famine, food supplies have been

generally available, even in regions where large numbers of people died of starvation. The problem is that those who needed the food do not have the means to acquire it (Sen, 1986).

2.2.4 Empirical literature on the impact of Commercialization and on household Food Security

Studies indicated that smallholder commercialization has a significant effect on the level of food security. For instance, Braun (1995) argued that commercialization has direct effect on household's income level which possibly leads to an increase in food and non-food expenditure. This postulation is directly associated with the famous Engel's law which shows the inverse relationship between the share of food consumption expenditure and total income (FAO, 2008). Based on this law, household are likely to spend more on food items as their income level grows up, but with a diminishing budget share allocated to food. Similarly, it is argued that better access for food depends on income growth; in particular to most African smallholders where agriculture is the main source of income. This implies that improving degree of market participation can have a big impact on the status of farmers' food security (Strasberg *et al.*, 1999). The implication is that improving degree of market Participation can have a potential effect on farmers' food security status. Notably, the process of agricultural growth involves unavoidable process in terms of increased commercialization, integration of rural credit market (Mellor, 1990; Timmer, 1997).

Further, In terms of food security, there are arguments for and against smallholder commercialization as a pathway for ensuring household food security. On one hand, smallholder commercialization is assumed to have detrimental effects on household nutritional and food security status. This is because commercialization may be associated with diversion of resources from food to cash crop production, which leads to lower food availability from own production and more dependence on local markets (Immink and Alarcon, 1993). Findings from various studies support this view. This was because higher-income households preferred to spend more of their cash crop income on non-food items, and higher-priced calories, implying that consumption of calories by the preschooler children fell below recommended intakes. Dewey (1981) showed that as a result of a switch to cash crops in rural Mexico, dietary diversity, dietary quality, and nutritional status of preschool children

were negatively associated with lower crop diversity and increased dependence on purchased foods. In Malawi, a study by Randolph (1992) cited in Jaleta *et al* (2009) showed that agricultural commercialization exerted a negative influence on child nutrition, especially during the nutritional stress seasons.

More recently, Wood *et al* (2012) found similar results in Malawi. Households engaged in tobacco farming were disproportionately affected by food price spikes, with their children, who were in uterus during the food price shock, being significantly more likely to be stunted than their non-tobacco producing households. According to Okezie and Nwosu (2007) examined the effects of commercialization among cocoa-growing households in Nigeria. Their findings showed that children in households that were more commercialized recorded high prevalence of under-weight and stunting.

On the other hand, there are also arguments for smallholder commercialization as a pathway for ensuring household food security. Findings from various studies support this view. For instance, The studies conducted in Kenya found that among smallholder tea farms in Nandi South, Kenya, an increase in the ratio of land allocated to tea to that allocated to maize was associated with greater food diversity score (Langat, 2011). This was attributed to the income from tea realized throughout the year, which ensured household access to quality food. In China, Baylis (2012) showed that commercialization increased nutrition, particularly for food insecure households. However, while commercialization of field crops and horticulture increased nutrition that for livestock did not. On the other hand, Strasberg (1999) found that household agricultural commercialization in Kenya increased fertilizer use and productivity for food crops. This may be because commercialization provides a source of cash for purchase of inputs; enables households to access inputs distributed through cash crop marketing firms; and, acts as a source of income to purchase draft oxen and traction equipment that may promote food crop productivity. Similarly, those households with higher income may have better tendency to enjoy from commercialization mainly in those countries like Ethiopia where the share of food consumption expenditure accounts a significant part of income.

According to Kennedy and Cogill (1987) showed that income control by women was associated with improved child nutritional status, suggesting that women were more likely to

spend more on food and health care. According to these authors, a 1% increase in sugarcane income in South Nyanza District in Kenya resulted in an increase in energy intake of 24 kilocalories per household per day. On average, sugarcane production increased household income by 15% which increased household energy intake by 360 kilocalories per day, or approximately 33 kilocalories per day per person in the household.

However, intra-household dynamics affect access to increased food consumption and better nutrition. For instance, income from commercial crops is under the control of men (Kennedy and Cogill, 1987; Immink and Alarcon 1993) and used more for non-food expenditures (Kennedy and Cogill, 1987). Kennedy and Cogill (1987) showed that income control by women was associated with improved child nutritional status, suggesting that women were more likely to spend more on food and health care.

Generally, the food security status of commercialized farm households is influenced by both household-level technological changes that permit increased food crop production on limited resources, and the meso- and macro-level environment consisting of marketing conditions, market prices, rural infrastructure, and access to credit (Immink and Alarcon, 1993). The researcher expected that macro-level factors influence the level of income a commercialized household can earn and market prices, which in turn influence the household income–consumption linkage, whereas household-level technological changes could help to secure food self-sufficiency under a risky food-market environment.

Several studies have been carried out in different countries and come up with different results. The situation in Ethiopia is not much different from the conditions in other developing regions. But, in Ethiopia there is limited work done around this and they are generally focused on welfare impact moreover, as the knowledge of the researcher they are done at macro level not much at the micro level especially in the sampled population Nevertheless, this study will assess the impact of commercialization on rural house hold food security in major coffee growing areas of south west Ethiopia in general and in the sampled population particularly.

CHAPTER THREE: RESEARCH METHODOLOGY

This chapter deals with methodology of the study. The chapter begins with the description of the Study Area, the study design, sources and methods of data collection, sampling size and sampling method, methods of data analysis, description of variables and working hypothesis, procedures of the study and finally, ethical considerations of the study.

3.1. Description of the Study Area

The study was conducted in Jimma zone in 2012/2013 in Mana and Goma weredas, south western Ethiopia. The study area was selected from major coffee producing area since the product is important to the national economy, grown and marketed by smallholders for generations, high policy attention and intervention. This study area was also selected to represent a dominantly subsistence farming community where land degradation coupled with erratic rainfall, drought problems pose a serious threat on households' food security in south western Ethiopia. Jimma Zone is one of the 20 administrative zones in Oromia regional state, is divided under 18 administrative districts with 2.5 million populations from which 94% are rural inhabitants (FDRE, 2008). The Zone covers a total area of 15,569 km² that receive reliably good rains ranging from 1,200–2,800 mm per annum. Subsistence farming is the dominant form of livelihood in the area where only 15% of the population is in non-farm related jobs. The area has suitable agro-ecological potential with the lowest drought risk rating (298) in the country (Milas, and Aynaouik, 1999). Cereals (maize, teff-*eragrostistef*, sorghum and barley), pulses (beans and peas), *cash crops* (coffee and khat-*cathaedulis*), and root crops (*ensetventricosum*-false banana and potato) are the major crops produced in the area. Different fruits and vegetables are also commonly grown where home-gardening by small holder families was observed to increase household income and food security (Kebebew *et al.* 2011)

3.2. Study Design

The study was limited to six kebeles of two Woreda and used one-year cross sectional study design. The survey was gathered qualitative and quantitative data pertaining to social,

demographic and economic aspects of households. The survey work for the collection of primary data was done in December 1, 2013 to January 30, 2014.

3.3. Sources and Methods of Data Collection

Both primary and secondary data were collected for this study. To obtain primary data, structured questionnaire with both closed and open-ended questions was used to collect data from sample farmers, informal discussion and key informants interview. Important variables on economic, social and institutional characteristics of the households were collected in order to get relevant and detail information about households' food security and its influencing factors in Manaa and Gomaa weredas of Jimma zone, south western Ethiopia. Enumerators with at least secondary education that can speak Afan Oromo were recruited. Necessary care was taken in recruiting the enumerators. They were given an intensive training on data collection procedures, interviewing techniques and the detailed contents of the questionnaire. The households' questionnaire was pre-tested, administered, filled by the three trained and experienced enumerators in each weredas. Strict supervision was made during the course of survey. The questionnaire solicited information on food security situation, household assets, aspects of food access, availability and utilization, and was completed by heads of households or their spouses (See the questionnaire in Appendix I).

Secondary data was collected from documents publications and statistics from Ethiopian disaster prevention and preparedness agency (DPPA), ministry of finance and economic development (MoFED) central statics authority (CSA), international monetary fund (IMF), Ethiopia Grain Trade Enterprise, food and agriculture organization (FAO), Ethiopia commodity exchange (ECX) and other relevant offices and local authority records. Moreover, an available document such as policies, strategies, guidelines and reports relevant to commercialization and food security was reviewed. Finally, In order to get relevant and detail information about impact of commercialization and determinants of food security, informal discussion and key informants interview were made in the sampled population

3.4. Sampling Size and Sampling Method

In this study the farming households are actually responsible for making day to day decisions on farm activities. Thus, a household was the basic sampling unit. The study was applied a simplified formula:

$$n = \frac{z^2 pq}{e^2}$$

This is valid where:

n is the sample size,

Z² is the abscissa of the normal curve that cuts off an area α at the tails ($1 - \alpha$) equals the desired confidence level²,

e is the desired level of precision,

p is the estimated proportion of an attribute that is present in the population, and **q** is 1-p. developed by Cochran (1963:75) to determine the required sample size at 95% confidence level, $e = 0.08$ and $P = 0.5$ to yield a representative sample for Proportions.

The study employed both purposive and stratified random sampling techniques. Data for the study was generated from a farm survey of 150 farmers selected by multistage stage sampling procedure. With regard to purposive sampling method, in the first stage, Jimma zone was purposively selected from south western Ethiopia. In the second stage, Mana and Goma weredas was purposively selected from Jimma zone on the ground that they are the major coffee producing area. In third stage three Peasant Associations (PA) or kebeles from each Woreda was selected randomly. In fourth stage, the sample was stratified within each Peasant Associations (PA) to ensure that a representative number of sample were included. Finally, a probability proportional to sample size (PPS) sampling procedure was employed to select total of 150 sample farm households. The number of households was obtained from the 2007 Population and Housing Census while the households were systematically selected from the fresh list of households within the PA made during the survey.

² The area corresponds to the shaded areas in the sampling distribution.

Table 1. Sampled kebeles and the number of sample households

Weredas	Name of Kebeles	Total Household	Sampled Household
Mana	Haro	1638	38
	Gudeta Bula	614	14
	Buture Gabisa	624	15
	Sub-total	2876	67
Goma	Bulbulo	959	23
	Omo Gurude	1374	32
	Chedero Suse	1173	28
	Sub-total	3506	83
	Grand total	6382	150

Source: Survey result

Two types of data analysis, namely descriptive statistics and econometric analysis was used for analyzing the data collected. First, Relevant quantitative and qualitative data were collected using the various methods and Instruments described above in order to get a complete picture of the situation under study. Secondly, all quantitative data from households, and key Informant questionnaires were entered into computer using SPSS Application Software. Thirdly, Analysis of the quantitative data was then undertaken using SPSS software package version 20, whilst all qualitative information were manually extracted by key common issues, coded and analyzed by categorization, classification and summarization techniques using MS Excel. Finally, the findings were then systematically organized, summarized and presented in the form of tables and figures as appropriate.

3.5. Methodology

3.5.1. Descriptive Statistics

This method of data analysis refers to the use of ratios, percentages, means, and standard deviations in the process of comparing demographic and socio-economic factors that are correlated with household food security in the sampled population

3.5.2 Crop Output Market Participation

Following von Braun *et al.* (1994), The researcher was compute household crop output market participation in annual crops as the proportion of the value of crop sales to total value of crop production, which the researcher refer to in this research as crop-output market participation (COMP) index, was compute as follows (see equation 1)

$$COMP_i = \frac{\sum_{k=1}^K \bar{P}_k S_{ik}}{\sum_{k=1}^K \bar{P}_k Q_{ik}} \quad (1)$$

Where:

S_{ik} Is quantity of output k sold by household i evaluated at an average community Level price . Q_{ik} Is total quantity of output k produced by household i .

This index measures the extent to which households' crop production is oriented towards commercial agriculture (Strasberg *et al.*1999), to compute the crop-output market participation (COMP) index for the study period, the researcher take the major crops produced and consumed like cereals, vegetables ,fruits and cash crops as main food crops and cash exportable crops in the sampled population

3.5.3. Measure of Poverty Line

Foster et al. (1984) was used in the assessment of poverty. The FGT measure is given

$$P_\alpha \geq 0 \text{ for } Y < Z \dots \dots \dots (2)$$

Where:

P_α =Weighted poverty index;

n =Total number of households;

q =Number of households; Y = per adult consumption expenditure of household; Z =Poverty line³; When $\alpha = 0, 1$ or 2 , $P_0 = q/n$. where α is the degree of food insecurity with values of 0, 1 and 2 for headcount, short-fall and severity of food insecurity, respectively.

³ In this study poverty line was estimated based on the cost of 2,200 kcal per day per adult food consumption with an allowance for essential non food (MOFED, 2012).



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These poverty lines and the real per adult consumption expenditure are used to aggregate consumption poverty indices. The real per adult consumption is obtained by first dividing the nominal consumption expenditure by nutritional calorie based adult equivalence family size to arrive at per adult consumption expenditure. The calorie based adult equivalent scale used varies by age and gender (MOFED, 2008).

The government of Ethiopia has set the minimum acceptable weighted average food Requirement per person per day at 2200 kcal (MOFED, 2012). Hence, In this study poverty line was estimated based on the cost of 2,200 kcal per adult equivalent (AE) per day food consumption with an allowance for essential non food was employed as a cutoff between food-secure and food insecure households. (MOFED, 2012).

For this study, among four ways of measuring household food security outlined by Hoddinott (2001), household's food or caloric acquisition per AE per day is used to identify the two groups, i.e., food-secure and food insecure groups. Accordingly, data on food available for consumption for the last seven days to the households was obtained through probing the household to recall during interview, and the obtained result was converted to kilocalorie unit. Thus, those households who have energy per AE above the minimum subsistence requirement (2200 kcal) are considered to be food secured, otherwise food-in secured.

Once the groups are categorized as food secured and food in secured, the socio-economic and environmental factors that are correlated with household food security are identified. It is hypothesized that some farm and household characteristics (such as household size, land size, livestock holding etc...) as well as policy and environmental factors have got relative importance in determining whether the households are food secured or not. This shows that examining food security situation requires a combination of both qualitative and quantitative approaches. Hence, food security is a function of both qualitative and quantitative variables that have to be included in the model.

3. 5. 4. Econometric model (Logit model)

To analyze the determinants of food security status of the households in the sampled population Binary logit model was employed. When one or more of the independent variables in a regression Model are binary, we can represent them as dummy variables and proceed to analyze. Binary models assume that households belong to either of two alternatives and that depends on their characteristics. Thus, one purpose of a qualitative choice model is to determine the probability that a household will fall in one of either alternatives (in this study becomes food secure or food insecure). The probit and logit models are commonly used models.

The probit probability model is associated with the cumulative normal probability function whereas the logit model assumes the cumulative logistic probability distribution. The advantage of these models over the linear probability modal is that the probabilities are bounded between 0 and 1. Moreover, they best fit to the non-linear relationship between the probabilities and the independent variables; that is one which approaches zero at slower and slower rates as an independent variable (X^i) gets smaller and approaches one at slower and slower rates as X^i gets large. Usually a choice has to be made between Logit and Probit Models, but the statistical similarities between the two models make such a choice difficult. Gujarati (1999) illustrated that the logit and probit formulation are quite comparable. It does not matter much which function is used except in the cases of where the data are concentrated in the tails following points. For this study the logit model is selected. The logistic function is used because it represents a close approximation to the cumulative normal distribution and is simpler to work with. Moreover, as Train, (1986) pointed out a logistic distribution (logit) has got advantage over the others in the analysis of dichotomous outcome variable in that it is extremely flexible and easily used function (model) from the mathematical point of view and lends itself to a meaningful interpretation and relatively inexpensive to estimate. So that to address the second and third objectives of the study logit model was employed.

The cumulative logistic probability model is econometrically specified as follows (Gujarati, 1995):

$$P_i = F(Z_i) = F(\alpha + \sum \beta_i X_i) = \frac{1}{1 + e^{-(\alpha + \sum \beta_i X_i)}} \dots\dots\dots (3)$$

Where;

P_i is the probability that an individual is being food secure $Z_i = \alpha + \sum \beta_i X_i$, X_i represents vector of the i^{th} explanatory variables

α is a constant term and β_i is vector of coefficients to be estimated, $i = 1, 2, \dots, 12$ and

e is the base of the natural logarithm.

Equation (4) can be written in the form of odds and logs of odds ratio so as to interpret the Coefficients. The odds ratio is ratio of the probability that a household in fever food secure (P_i) to the probability that a household will not be food secured ($1-P_i$).

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

$$\left[\frac{P_i}{1-P_i} \right] = \left[\frac{1 + e^{Z_i}}{1 + e^{-Z_i}} \right] = e^{Z_i} \dots\dots\dots (5)$$

$$\left[\frac{P_i}{1-P_i} \right] = \left[\frac{1 + e^{Z_i}}{1 + e^{-Z_i}} \right] = e^{(\alpha + \sum \beta_i X_i)} \dots\dots\dots (6)$$

This is simply the odds ratio in favor of food security. Finally, taking the natural log of **Equation (7)** we obtain

$$L_i = \ln\left(\frac{P_i}{1-P_i}\right) = Z_i = \alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_m X_m \dots\dots\dots (7)$$

If the disturbance term (U^j) is introduced, the logit model becomes

$$L_i = \ln\left(\frac{P_i}{1-P_i}\right) = Z_i = \alpha + \sum_{i=1}^m \beta_i X_i + U_i \quad i= 1, 2, \dots, 12 \quad \dots\dots\dots (8)$$

L_i = is log of the odds ratio, which is not only linear in X^i but also linear in the parameters and X^i = Vector of relevant explanatory variables.

Finally, based on the above discussion the binary logit model was used to analysis the impact of smallholders' agricultural commercialization on the probability of being food secure. The cumulative logistic probability model is econometrically specified as follows (Gujurat, 1995)

$$L_i = \text{Ln} [P_i / (1 - P_i)] = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \alpha_5 X_5 + \alpha_6 X_6 + \alpha_7 X_7 + \alpha_8 X_8 + \alpha_9 X_9 + \beta_1 D_1 + \beta_2 D_2 + \beta_3 D_3 + \beta_4 D_4 + \beta_5 D_5 + \varepsilon_i \quad \dots\dots\dots (9)$$

Where:

i presents the individual i , $i = 1, 2, n$

L_i = is log of the odds ratio which is not only linear in X_i but also linear in the parameters;

P_i = the probability that an individual is being food secure;

$(1-P_i)$ = the probability that a household will not be food insecure;

α_0 : intercept or constant term, that implies the combined impact of these fixed factors on household food security ;

$\alpha_1, \dots, \alpha_8$: coefficients of continuous explanatory variables (X_1, \dots, X_9) ;

β_1, \dots, β_5 : coefficient of explanatory dummy variable and

ε_i is error term.

After this, it is possible to estimate the Parameters of the model by maximum likelihood function (MLE). Before model analysis was commenced, to check the problem of the multicollinearity the Variance Inflation Factor (VIF) for continuous explanatory variable and contingency coefficients for dummy variables were used in this study. Variance Inflation Factor (VIF) was used to measure the degree of linear relationships among the continuous explanatory variables in which each continuous explanatory variable is regressed on all the

other continuous explanatory variables and coefficients of determination for each auxiliary regression will be computed. Following Gujarati (1995), VIF is defined as:

$$VIF(X_i) = \frac{1}{1 - R^2} \dots\dots\dots (10)$$

Where:

X_i is the i^{th} quantitative explanatory variable regressed on the other quantitative Explanatory variables.

R^2 is the coefficient of determination when the variable X_i regressed on the remaining explanatory variables.

If the value of VIF exceeds 10, it is used as a signal for existence of strong multicollinearity between continuous explanatory variables (Gujarati, 1995). Similarly, there may also be interaction among qualitative variables, which can lead to the problem of multicollinearity. To detect this problem, Contingency Coefficients were computed for each pair of qualitative variables. The Contingency Coefficients were computed as follows:

$$C = \sqrt{\frac{\chi^2}{n + \chi^2}} \dots\dots\dots (11)$$

Where, C= Coefficient of Contingency,
 χ^2 = a Chi-square random variable and
 n = total Sample size.

Contingency coefficient value ranges between 0 and 1, and as a rule of thumb variable with contingency coefficient below 0.75 shows weak association and a value above it indicates strong association of variables.

After specification of the model, the parameter of the model will be estimated by maximum likelihood function (MLE) using SPSS software package version 20. The model is based on the following hypotheses:

3.5. 5. Description of Variables and working Hypothesis

By reviewing the existing theory, and past findings of empirical research, the possible Determinants of food security in the sampled population were identified. Consequently, the following Explanatory variables were selected for the analysis of household food security for all sampled households. In setting our hypotheses, our main interests are in analyzing the determinants food security status, and the impact of commercialization on rural households Food Security. Present our key hypotheses about the effect of explanatory variables below.

The dependent variables of the model: In this model the dependent variable is household food security status (HFSS) that is dichotomous taking a value of 1 if the household is food secure; 0 otherwise. The information, which identifies the food secure from food insecure, will be obtained by comparing poverty line (2200 kcal/day/AE). A household above this threshold is said to be food secure ($Z_i=1$), otherwise food insecure ($Z_i=0$).

The independent variables of the model: the independent variables expected to have Associations with food security status will be selected based on available literature.

Family size in AE (FSIZE): This variable refers to the size of household members converted to adult equivalent. Family size is hypothesized to have negative relationship with food security. It is obvious that as the family size increases, the amount of food for consumption in one's household increases. Empirical evidence shows that larger family size has negative effect on food security (Del Ninno *et al.*, 2001; Mulugeta, 2002; Abebaw, 2003; Yilma, 2005 and Yusuf, 2007). Hence, it is expected that family size and food security are negative related.

Sex of household head (SEX): It is a dummy variable taking a value of 1 if the household head is male, 0 otherwise. It is hypothesized that male-headed households will be more likely to be food secured. The possible explanation for the positive relationship indicates that male headed households more likely to be food secure than female headed households. This may be due to the fact that male headed households usually have higher incomes than the female headed households. Aschalew (2006) reported that sex of the household head has statistically significant negative effect on food security when a household is headed by female.

As a result, it is hypothesized that sex of the household head and food security are positively related in the sampled population

Education of household head (EDUC): Educational status of household head is a dummy Variable taking a value 1 if the household head is literate; 0 otherwise. Education equips Individuals with the necessary knowledge of how to make a living. The effect of education on food security works indirectly by influencing the actions of the person in how to make a living. Literate individuals are very ambitious to get information and use it. As agriculture is a dynamic occupation conservation practices and agricultural production technologies are always coming up with better knowledge. So if the household head is literate he is very curious to accept agricultural or livestock extension services, and soil and water conservation practices including any other income generating activities. Hence, in the study area if developmental activities are planned to be intervened and it is perceived that households who can read and write are the ones more likely to participate than illiterates and their chance to be food secure are higher. Abebaw (2003) showed that level of education has significant negative effect on food insecurity. As a result, it is hypothesized that education and food security are positively related in the sampled population

Age of the household head (AGE): It is a continuous variable measured in a year. Age Matters in any occupation. Rural households mostly devote their time or base their livelihoods on agriculture. The older the household head, the more experience he has in Farming and weather forecasting. Moreover, older persons are more risk averters, and mostly they intensify and diversify their production activities. As a result, the chance for such household to be food secure is high. Empirical evidence shows that age of the household head has positive effect on food security (Abebaw, 2003; Ayalew, 2003). In rural areas, age of household head quite often has negative relationship with food insecurity (Berhanu, 2003; Yusuf, 2007). In light of this, it is hypothesized that age of the household head and food security are positively related.

Total farm income per AE (TFINC): Annual income is a continuous variable and it is the Amount of total farm income measured (in Birr) a household has earned in the last twelve Months. It was expected that total farm income per AE is positively associated with food Security status. It is obvious that income earned from any source improves the food security

Status of the household. Empirical evidence shows that income variable has significant Negative effect on food insecurity (Ayalneh, 2002; Abebaw, 2003; Yilma, 2005; Yusuf, 2007). Hence it is expected that households who have large income, are better in their food Security status.

Off-farm income per AE (OFFI): This represents the total amount of off-farm (in Birr) the farmer earned with in the year. Agricultural production may not be the rural household's only source of income, or even their most important source of income. To be food secure, rural people must have multiple livelihood strategies (Pearce *et at.*, 1996). Empirical evidence shows that off-farm income variable has significant negative effect on food insecurity (Yilma, 2005 and Tesfaye, 2007). Hence, it is expected that the availability of off-farm is positively associated with household food security status.

Livestock holding (TLU): Is the total number of livestock holding measured in tropical livestock unit (TLU). Livestock's are an important source of income, food and draft power for crop cultivation for the farmer. Possession of livestock is expected to have a positive Impact on households' food security situation. Since households with more livestock obtain more milk, milk products and meat for direct consumption, particularly during food crisis, large size livestock owners could be more food secure. Besides, a household with large Livestock holding can have good access for more draft power and manure for crop Production. Moreover, they can obtain more cash income from the sale of skin and hides as Well as live animals. The livestock sale is also used as the major coping strategy during famine and seasonal food shortage. Empirical findings show that livestock holding has negative effect on food insecurity (Ayalneh, 2002; Mulugeta, 2002 and Abebaw, 2003). Therefore, it is logical to expect that a higher value of TLU increase the probability to food security.

Access to credit (AC-CREDIT): It is a dummy variable in the model taking a value 1, if Household head have access to farm credit and 0, otherwise. Those households who received farm credit have possibility to invest in farming activities, which is important component in small farm development programs. Empirical evidence shows that access to credit has positive effect on food security (Abeabaw, 2003; Tesfaye, 2005). Therefore, it is expected that access to farm credit are positively related with food security.

Size of cultivated land (CU-LAND): This variable stands for the total land area cultivated in hectares. Losses of farm land to other uses because of population pressure and limits to the amount of suitable new land that can be brought in to production is one of the constraints of food production (Brown *et al.*, 1990). Fertile farmland is often sacrificed to meet the growing demands of population growth (Ehrlich *et al.*, 1991). As the cultivated land size increases, provided other associated production factors remain normal, the likelihood that the holder gets more output is high. It is hypothesized that farmers who have larger cultivated land are more likely to be food secure than those with smaller area.

Distance from market center (DISMAR): Distance from market is a continuous variable and measured in kilometers. Distance to the market is hypothesized to have negative relationship with food security. It is obvious that proximity to market centers creates access to additional income by providing off-farm/non-farm employment opportunities, easy access to inputs and transportation. Yilma (2005) and Tesfaye (2005) reported that market distance has significant negative effect on food security. It is, therefore, expected that households nearer to market center have better chance to improve household food security status than those far from market centers.

Access to extension program last year (2005) (yes = 1, no = 0), Agricultural services (extension, credit) are expected to enhance farmer skills and Knowledge, link farmers with modern technology and markets, and ease liquidity and input supply constraints (Lerman, 2004), thus are expected to induce food security. It is hypothesized that farmers who use extension program previous year are more likely to be food secure than those without it. It is hypothesized that farmers who have larger access to extension program previous year are more likely to be food secure than those with smaller access to extension program.

Access to irrigation (yes= 1; 0= no); It is a dummy variable in the model taking a value of 1 if the household uses Irrigation, 0 otherwise. In areas where agriculture is the prime source of livelihood of the society soil moisture is very crucial. Even if the climatic condition in a given area is Conducive, then it would be far better to be supplemented with irrigation so that increased output could be attained. It is hypothesized that farmers who have larger access to irrigation are more likely to be food secure than those with smaller access to irrigation.

Crop output market participation index (COMPI); improved income has a potential of progressing the wellbeing of households in terms of food security, assuming other factors constant. Particularly, commercialization is supposed to bring a large impact on increasing farmer's income level which can be used as a source of fund for food purchase with better quality and quantity. However, other exogenous factors including price changes may reduce the consumption bundle of framers in a situation of price shock. Braun (1995) argued that commercialization has direct effect on household's income level which possibly leads to an increase in food and non-food expenditure. It is hypothesized that farmers who have larger crop output market participation index are more likely to be food secure than those with smaller crop output market participation index.

Table 2: List of variables, codes variable definition and working Hypothesis in the model

	Variable Type	Variable Code	Variable definition	working Hypothesis
1	X1	HEADAGE	Age of household head (year)	+
2	X2	FSIZE(AE)	number of Household size (AE)	-
3	X3	DISMAR(km)	Distance from market place (km)	-
4	X4	F-LAND(ha)	Farmland owned (ha)	+
5	X5	TLU	Total livestock holding per household in TLU	+
6	X6	TFINCAE (birr)	Annual farm income per AE (birr)	+
7	X7	COMPI	Crop output market participation index	+
8	X8	OFF-FI(birr)	Non-farm and off-farm employment and remittances (birr);	+
9	D1	SEX	Sex of household head (Male = 1, female = 0)	+
10	D2	EDUC	Education of household head (Literate = 1, illiterate = 0)	+
11	D3	IRRIG	Technology (irrigation) (yes= 1; 0= no)	+
12	D4	ACCREDIT	Access to credit previous year (2012/13) (yes = 1, no = 0)	+
13	D5	INEXT.	Involvement in extension program previous year (2005) (yes = 1, no = 0) (2012/13)	+

3.6. Procedures of the Study

Data from the field was collected with the help of team of data collectors in the study. After visits to sample zones and, introductions with heads or their representatives were made. Then samples were selected in collaboration with these bodies. All the interviews were carried out by the researchers after assigning specific individuals/groups for each sample and kebeles. This means each data collection was carried out simultaneously with different groups of respondents at a time to effectively use the time of the researchers.

3.7. Ethical Considerations

This survey was conducted in a way that meets ethical standards. First, the researchers clearly communicate the purpose of the study to the respondents. The data collectors then inform the respondents that (1) participation is fully based on their willingness, (2) the data would be used only for the purpose of the survey study, and (3) information would be used without the name of the respondents attached to it (that is, under anonymity). Overall, therefore, the respondents were informed about their rights not to participate in the study and Result disseminations will not affect the responders benefit. Finally, while collecting and analyzing the study the researcher uses proper methods.

CHAPTER FOUR: OVERVIEW OF THE STUDY AREA AND AGRICULTURAL POLICY UNDER DIFFERENT REGIME

This chapter deals with the overview of the study area and agricultural policy under different regime. It incorporates the overview of the study area, agricultural policy under different regime, policy framework: general (since 1991), overview of commercial agriculture development in Ethiopia: policy issues, the food security program, food poverty status.

4.1 Overview of the Study Area

The study was conducted in two sub-districts in Jimma Zone in 20012/2013: Mana and Goma weredas of Jimma zone, south western Ethiopia. According to the report by JZARDO, (2008) Jimma Zone is one of coffee growing zones in the Oromia Regional State, which has a total area of 1,093,268 hectares of land. Currently, the total area of land covered by coffee in the zone is about 105,140 hectares, which includes small-scale farmers' holdings as well as state and private owned plantations. Out of the 40–55 thousand tons of coffee annually produced in the Zone, about 28-35 thousand tons is sent to the central market, while the remaining is locally consumed (Alemayehu *et al.*, 2008). Now a day, Jimma Zone covers a total of 21% of the export share of the country and 43% of the export share of the Oromia Region. Coffee is the major cash crop of the Zone, which is produced in the eight namely, Gomma, Manna, Gera, Limmu Kossa, Limmu Seka, Seka Chokorsa, Kersa and Dedo, which serves as a major means of cash income for the livelihood of coffee farming families. According to the report from the same source, 30-45 % of the people in Jimma Zone are directly or indirectly benefited from the coffee industry. The study area is selected from major coffee producing area since the product is important to the national economy, grown and marketed by smallholders for generations, high policy attention and intervention.

4.1.1. Description of the Study Woredas

The study is conducted in Manna and Gomma of Jimma zone (**Figure 1**).The Zone is located in the Southwestern part of Ethiopia between Latitude 6° and 9° north and Longitude 34° and 38° east, and between altitude ranges of 880 to 3340 meters above sea level (ORG, 2003).

4.1.1.1. Goma woreda

According to the report by ARDO, (2008), Goma is one of the known coffee growing woreda, among 18 of Jimma Zone. It is located 397 km Southwest of Addis Ababa and about 50 km west of Jimma town (ORG, 2003). Its area is 1,230.2 km². The annual rainfall varies between 800- 2000 mm, while the mean minimum and maximum annual temperatures of the woreda vary between 7°C - 12°C and 25°C - 30°C, respectively. Based on 15 years weather data obtained from Goma woreda, the average annual rainfall is 1524 mm. Altitudinal range of the woreda is between 1387-2870 m.a.s.l (IPMS, 2007). The three dominant soil types in the woreda are Eutric, Verticals, Humid Alf sols and Humid Nit sols. Nit sols are the most abundant covering about 90% of the woreda, which is dark reddish brown in color, slightly acidic and suitable for coffee production (IPMS, 2007). Agro-ecologically, this woreda is divided into 8% high land (Dega), 88 %, Intermediate high land (Weyina Dega) and 4% low land (Kolla) (IPMS, 2007).

4.1.1.2 Manna woreda

Manna is one of the major coffees producing in Jimma zone, which is located at 368 km southwest of Addis Ababa and 20 km west of Jimma town. The total area of the woreda is 478.98 km² (47,898 ha) of which 12% is highland, 65% intermediate highland and 23% lowland with altitudinal ranges between 1470–2610 m.a.s.l (ARDO, 2008). The mean minimum and maximum temperatures are 13.0⁰ C and 24.8⁰ C, respectively (ARDO, 2008). Based on long term (15 years) weather data obtained from the nearby JARC meteorological station, the average annual rainfall is 1523 mm. Distric Nitosols and Orthic Acrisols are the dominant soil types with slightly acidic PH, which is suitable for coffee production found in Manna Woreda (ORG, 2003).

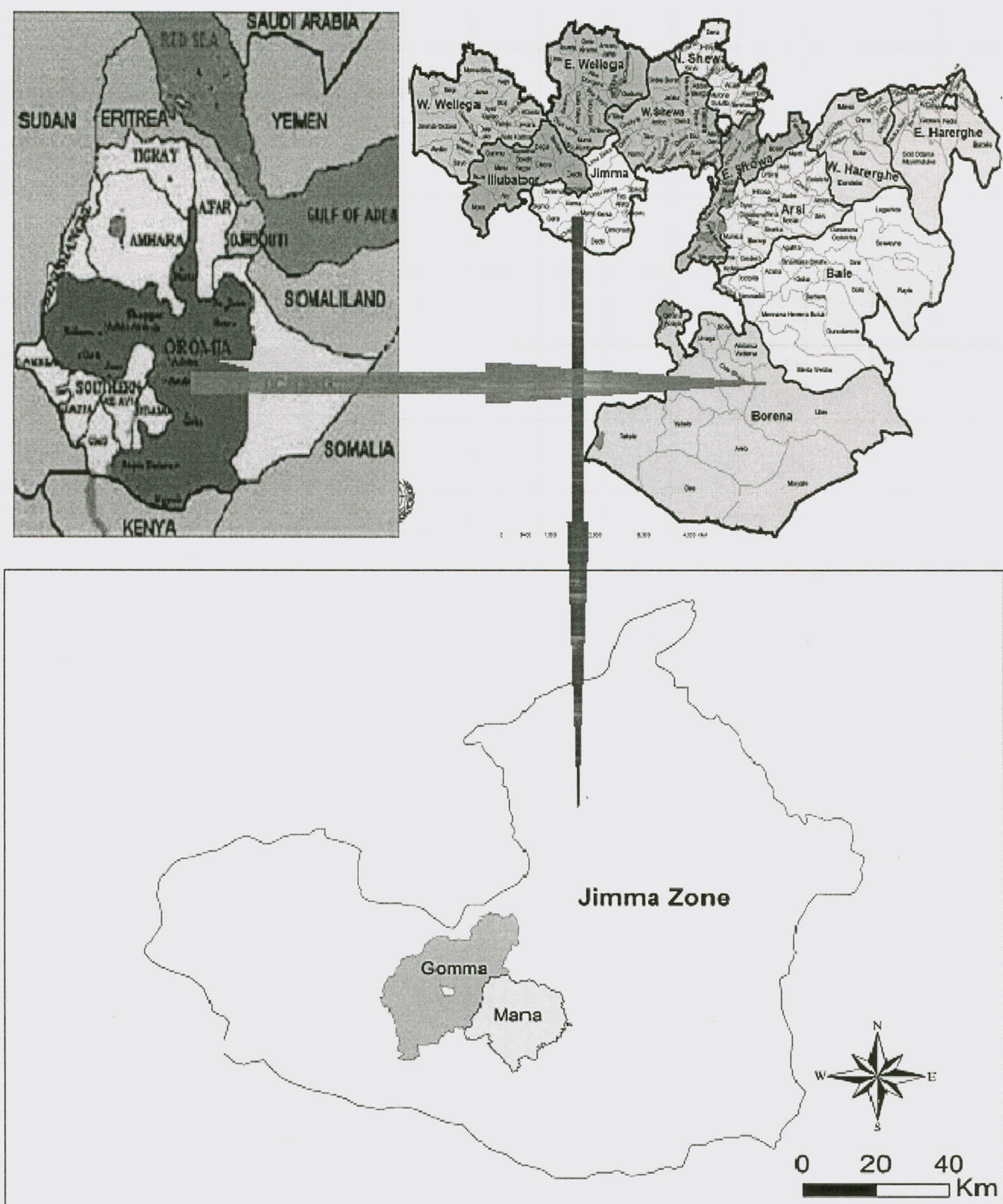


Figure 1: Map of Ethiopia, Oromia Regional State and Survey Areas (Goma & Manna Words), Jimma Zone, Ethiopia.

4.2. Agricultural Policy under Different Regimes

4.2.1 Overview

Ethiopian Agricultural policy has undergone several changes during the past several decades in terms of focus and major goals. In all cases, its central objective remained to be improvement of agricultural performance by creating a favorable environment that could promote the drives of the successive regimes that pursued different objectives for furthering their legitimacy. In what follows, the different paths that agricultural policy making in Ethiopia has followed both in the past and at Present are highlighted.

The imperial regime's first two Five-Year plans (1957-1962 and 1962-1967) heavily favored large-scale commercial farms for augmenting agricultural production for export in line with the modernization drive that gained Currency at the time. Increase in production was expected to be achieved through accelerated investment in large-scale farms pursuant to the dominant line of thinking of the imperial government (EEA, 2004/05).

However, the regime underwent a policy shift, emphasizing the modernization of smallholder agriculture during the Third Five Year-Plan Period (1968-1973). This introduced the package project approach (Deena, 1990), which had two variants, namely the Comprehensive and the Minimum Package Programs focusing on improving agricultural production on farms of individual households and organized groups, respectively, were introduced in some parts of the country. The success of the Comprehensive Package Program, however, was limited because of its high requirements in terms of modern agricultural inputs and skilled human power, unfavorable land tenure regime, and poor infrastructural and market development. The Minimum Package Program too did not entail significant progress due to failure in introducing a more dynamic farming system drawing on the experiences of smallholders (EEA, 2004/05).

Immediately upon seizing power, the military regime (1975-1991) embarked on the socialist path of development that geared Ethiopia's economic and political policies and attendant practices to fit to the principles of this doctrine. Socialist production relations thus prevailed in the workings of the agricultural and other sectors of the economy. The military regime is

famed for introducing radical agrarian changes signified by the Land Reform Act, which was expressed in nationalization and equitable distribution of land.

Besides, peasant associations were established as the nuclei of grassroots administration that served as means for controlling grassroots and local communities. Other reforms introduced for effecting changes in the bid for transforming smallholder agriculture included the establishment of collective and state farms and producers 'cooperatives, which were given privileged access to improved inputs and technical services, irrigation facilities, productive land, and higher farm-gate prices (EEA, 2004/05). Service Cooperatives were also created for facilitating favorable access of smallholders to basic goods and services. The military regime also introduced two land use policies for expediting its resettlement and villagization programs (EEA, 2004/05).

4.2.2 Policy Framework: General (Since 1991)

EPRDF's agricultural policy commenced with the introduction of the Agricultural Development-Led Industrialization (ADLI) Strategy in the mid-1990s. The main arguments made to justify this as an overarching economic policy were that improving the performance of smallholder agriculture could lead to increase in farmers' income, reduction of poverty, and enhancement of production of industrial raw materials including marketable surplus (FDRE, 2008). The government strongly believes that ADLI is the fastest way to ensure economic development and recovery.

However, critics doubt its efficacy by arguing that ADLI tends to disregard labor productivity by focusing on land productivity despite the fact that the main problem of Ethiopian agriculture is low labor productivity (Berhanu, 2003). Moreover, ADLI allegedly tends to emphasize the supply side with little concern for demand in the face of low purchasing power of the rural people on the one hand and the small size of the urban population on the other. Hence it is questionable that increased production alone could entail higher farmer income in the absence of adequate demand (ibid).

Moreover, it is claimed that given its fragmented nature and the small size of per capita land holding, peasant agriculture cannot shoulder the burden of transforming the performance of agriculture in a manner that could enable it to play pivotal roles in boosting Ethiopia's development efforts as expected. In spite of the aforementioned constraining factors, however, EPRDF's Rural Development Policy and Strategy (FDRE 2002) reiterated that the country's overall development should be centered on the rural areas where smallholder agriculture is predominant. The justification for this is premised on the rationalization that the overwhelming majority of the country's population live in the rural areas that enjoy comparative advantages in abundant land and labor that can be judiciously utilized for ensuring economic growth and sustainable development by offsetting the consequences resulting from scarcity of capital (ibid).

The Five-Year Growth and Transformation Plan (FYGTP) for 2010/11 to 2014/15 Succeeds both PASDEP and the previous five-year development plan. The FYGTP, which was unveiled for consultations in August 2010, projects continuing economic growth at a minimum of 10 per cent per annum, and an ambitious best-case scenario of doubling GDP over the five year plan period. The plan aims to reach all of the MDGs and to continue to consolidate democratic governance and institutions and maintain the path towards a stable multi-party democratic system. This will be achieved through balanced participation of the state and private sectors and special support for the emerging states to catch up with the more advanced ones. The plan has three major goals: Continuing rapid economic growth; expanding access to and improving the quality of social services; and Infrastructure development. Agriculture is seen as the key driver of economic development with particular attention given to scaling-up best agricultural practices to provide a foundation for expansion of the industrial sector. Further discussion of the role of the agricultural sector in the growth process is described in "*Ethiopia's Agriculture Sector Policy and Investment Framework: Ten Year Road Map (2010-2020)*."

More recently still, Ethiopia has attracted attention as one of the major recipients of transnational investment in land (Anseeuw *et.al.* 2012). However, the government insists that this is Complementary to efforts to increase the productivity of smallholder agriculture and not a substitute for them.

4.3. Overview of Commercial Agriculture Development in Ethiopia: Policy Issues

Agricultural transformation said to occur when the share of agricultural contribution in the country's labor force and total output declines in both cross-section and time serious samples as income per capita increase (Kuzents 1966, Chenery and Syrquin 1975).

The challenge for the government in the market oriented political economy is to take full advantage of the capacity of markets to coordinate economic activity by providing strong incentives to increase private investment, cost-effective use of productivity enhancing technology and employment growth. The tools' at government disposal include key public investments and policies to influence or modify economic performances to conform more closely to politically defined social objectives. But identifying the correct set of public investment and policies requires information on how the current system works a vision of intended future system, how prevailing global system works and knowledge of accessing them. Transformation requires attractive government policy environment that encourage private sector participation and concerted efforts of public and private in the areas need collaboration. For this, review of past agricultural policies in the different regime and performance of the sector and current environment sought to be important.

4.3.1 Commercial Agriculture in the Pre-1975 period

Agricultural production in pre-1975 Ethiopia could be characterized as mostly Traditional, involving smallholdings, with little or no external input use. The commercial farms established towards the end of this period although contributed little to growth, was not significantly visible, as there was little or no technology transfer between these farms and smallholder peasants that surrounded them. Even worse, in many instances such farms were established by evicting tenants to make way for mechanized farming, notwithstanding their contribution (MEDaC, Market Study, 1999).

The efforts of the Imperial Government of Ethiopia in transforming the national Economy culminated in four five -Years Development Plans. The First-Five Year Development Plan (1957-1962) and the Second-Five Year Development Plan (1962-1967) did not recognize the

need to bring about fundamental changes in the existing methods of peasant production. They heavily favored the expansion of large-scale commercial farms and export crop production (mainly coffee). Moreover, they gave priority to industrialization and have foreseen the contribution of the agricultural sector only in terms of raw materials to expanding industrial sector.

The inability of domestic food production to support the growing population, which Resulted in the country becoming a net food importer for the first time (45,000 tons in 1959/60), brought about a shift in donor aid policies towards rural development and rural infrastructure construction. The strategy changed to Comprehensive Development Program² (1968-1973) concentrating efforts on "high potential areas". In the Fourth Year Development Plan (1974-1978), which identified pulses and cereals as priority crops, more attention was to be given to the agricultural sector, continuing with the package approach.

However, this plan was not implemented due to the 1974 Revolution. In general, the efforts of the Imperial Government to transform agriculture were Unsuccessful. Overall, the extension services, MPP and the public investments to promote private sector investment in the agricultural marketing system were not effective. Agriculture grew by 1.8 percent per year on average over the 1966/67 to 1973/74. Agricultural productivity did not take place both in terms of structure and productivity. Hence sector failed to generate the necessary surplus sufficient to develop the other sector. The sever famine of 1973/74 fueled the overthrow of the system (Eshete, 1998).

4.3.2 Commercial Agricultural under the Military Regime (1975 – 1991)

The military government initiated a radical agrarian reform in the form of Proclamation 31 of 1975, prohibiting private ownership of land and transfer by sale, lease, mortgage or similar means. Their law only recognize the use right of cultivator over his holding. The laws also prohibit the use of hired labor and set the maximum size of holding to 10 hectares thus ending the age-old feudal land tenure system. Land in excess of 10 hectors and large scale mechanized farms were confiscated³ without compensation, and later were organized in to state farms or cooperatives or distributed to landless peasants.

In actuality, the land reform program redistributed very little land. Most peasants just kept the land they ploughed. The major positive effect of the Derg's land policy was not so much an increase in the amount of land accessible to peasants but rather the termination of contribution to landlords in terms of labor or part of their produce. On the negative side, the reform program deliberately abolished the meager amount of Private investment on commercial agriculture started in the imperial period and replaced them with state farms. These state farms, which initially started with a total cultivated area of 67,000 hectares, were later expanded to about 230,000 hectares holding 4% of the total cultivated land and producing about [5% of total annual the agricultural output of the country on average] (Eshete, 1995). Based on the socialist principles of central planning, large amounts of resources had been allocated to these farms. That is, despite their comparatively minor contribution to agricultural output, they received incentives not available to peasant farmers. These incentives included more land resources, per capita in some cases, lower cost fertilizer, higher grain prices, lower land tax, interest free loans from service cooperatives and other agencies, various grant and gift from donors, priority access to bank credit, and disproportionate support from extension staffs from MOA and training opportunities.

Followed integrated rural development approach 312 commercial farms with a total capital of about 29 million were nationalized. In addition over 439 private farms came under government ownership. (MEDaC, Survey of Ethiopian economy) The land proclamation, however, had provisions to compensate for movable properties and permanent works on the land. Regardless of all these incentives given in favor of state farms and producers' cooperatives, their performance in terms of efficiency, productivity and financial returns remained below expectation as technology and efficiency become secondary to social transformation objective. In general ill designed command economic policies lead to the subsequent dwindling, stagnation of economic activities and collapse of military regime leaving development backlogs for current government.

4.3.3 Commercial Agriculture in the Post 1991 Period

Current efforts at agricultural transformation in Ethiopia occur within the context of free market idea, which enhance role of private sectors in all sectors of economic development.



The justification for agricultural transformation lies on social and equity objectives that are more likely to be achieved if agricultural and economic growth can be rapidly expanded while addressing the twin goals of increasing food viability and raising peasant farmer's income.

The Agricultural Development Led Industrialization (ADLI) strategy is drawn from the existing reality that the country is under acute shortage of capita in one hand and endowed with large number of working age population and vast cultivable land. It is believed that faster growth and hence economic development could be realized if the country adopts a strategy that helps to raise the employment of idle labor and enhance productivity of land resources to realize agricultural sector transformation. This is to achieve faster growth and economic development by making use of technologies that are labor-intensive, capital saving but land augmenting. Among important policy elements of the government, Private investors allowed developing commercial farms on the lands not presently occupied by farmers on the long- term and low priced concession; construction of rural infrastructure will remain primarily the government's responsibility.

Commercialization of smallholder agriculture will be the engine for rural growth in the coming decade. In all regions the emphasis will be on ensuring everything possible is in place to facilitate the take-off of commercial opportunities. As indicated above, the transformation of the smallholder farmer is to be achieved through area based specialization as well as diversification of agricultural commodities. The specialization and diversification are to be pursued in Agro ecological Zones production zones. However, the existence of diversified agro-ecological zones in our country makes it possible to produce specialized agricultural products in the areas where the environment is conducive. An initial strategy for area specialization based on resource potential and comparative advantage for high value commodities has been developed. These areas will be further studied and the strategy further refined during the PASDEP period.

4.4. The Food Security Program

The food security program is a special arrangement, which focuses on addressing vulnerability, which exists in different parts of the country. Records show that in a worst year up to fifteen million people in the drought prone areas of the country could face food shortages, which are either chronic or transitory in nature. The cause for the former is structural, while the later is usually triggered by short-term emergency situations. Cognizant of the level of vulnerability in the country, the Government, in close collaboration with its development partners, has developed the Program within the framework of the wider PASDEP. The core objectives of the Program are two. One is to enable the 8.29 million chronically food insecure attain food security within a five year period, and the other to improve significantly the food security situation of the remaining 6.71 million facing transitory problems within the same period.

Achieving food security is another important aspect of Ethiopia's development plans. In 2005 Ethiopia began implementation of a more comprehensive approach to this critical issue under its Food Security Program (FSP). In the past much of the support for the chronically food insecure was met through emergency food assistance. This approach was insufficient and unpredictable and failed to address underlying causes of food insecurity. A key element of the FSP is the Productive Safety Net Programmed (PSNP), in which more predictable food and cash transfers are made to chronically food insecure households in return for labour on public works projects, in particular community-based watershed rehabilitation. These investments help to protect and build household assets, while at the same time strengthening the productive base of food insecure areas and help to reduce chronic food insecurity. In fact, the PSNP public works activities currently represent the largest SLM investment in the country.

4.4.1. Food Poverty Status

The attainment of food self-sufficiency is one of the key objectives of the government as expressed in its GTP and rural development policies and strategies, which is also consistent with the MDG goal of eradicating extreme poverty or hunger. As for total poverty, the various aggregate poverty measures are also computed for food poverty. The food poverty index measures the proportion of food-poor people that fall below the food poverty line. The

proportion of food poor people (food poverty head count index) in the country is estimated to be 33.6% in 2010/11, while it stood at 34.7% in rural areas and 27.9% in urban areas. The food poverty gap index is estimated to be 10.5 % while it is 11.1 % for rural areas and 7.3 % for urban areas (MOFED, 2012).

CHAPTER FIVE: DISCUSSION AND ANALYSIS

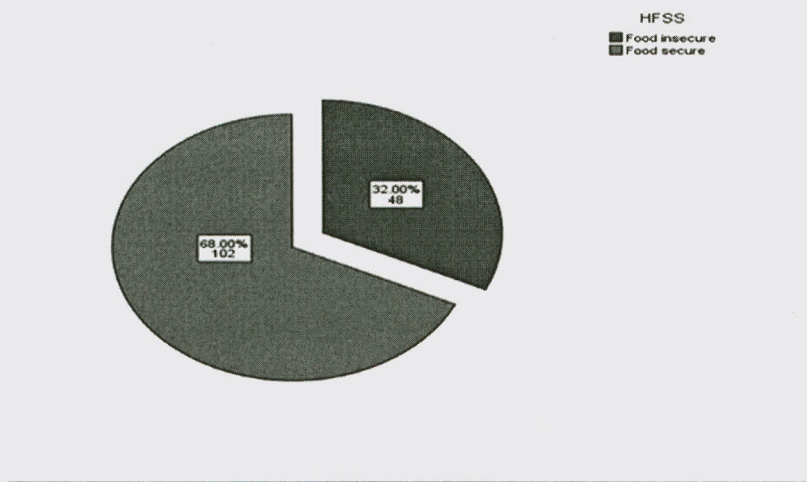
5.1 Introduction

This chapter presents and discusses the results of household's food security analysis and the impact smallholder's commercialization on rural household's food Security in the sampled population. The first section of the chapter reports the demographic and socio-economic background (resource endowment, income and expenditure, and institutional characteristics) of the sample households. Finally, the results of econometric analysis of the determinants of food security status of the households in the sampled population are presented and discussed.

5. 2. Results of Descriptive Analysis

Descriptive statistics of dependent variables used in the regression analysis are given in Figure 2. The result of the survey revealed that 68.0% the sampled households is food secure. This implies that 32.0 % of the sampled households were food insecure or not able to meet the daily recommended caloric requirement.

Figure 2. Household food security status (HFSS)



Source: Own Survey (2012/13)

Demographic and Socio-Economic Characteristics of the Sample Households

Age of household head

The mean age of households in the study area was 48.1 years. Nevertheless, the mean age of food secure households was 50.9 years and that of food insecure households was 42.3 years in the study area. The age ranged from 22 to 78 years. The mean statistical analysis revealed that statistically, there was significant difference between the food secure and insecure groups in the sampled population (Table 6).

Family size in Adult Equivalent

Family size, which measure number of individual members of a household, is a variable used by many empirical studies to see how it affects food security status of households. The mean family size in AE of the household was 5.67 with a range from 2.50 to 8.90 family sizes in AE. The result indicated that the mean age food secure and food insecure household was 5.25 and 6.54 years in the study area respectively (Table 6).

Table 3. Household food security status by age and family size in AE. Of the sample HH

	HFSS						
	Food insecure N=(48)	Food secure N=(102)	Minimum	Maximum	T-value	P-value	Total N=(150)
	Mean	Mean					Mean
Age of the HH head	42.3	50.9	22.0	78.0	5.271	<0.001	48.1
Number of Household size (AE)	6.54	5.25	2.50	8.90	-7.555	<0.001	5.67

Source: Own Survey (2012/13)

Sex of household head

Sex of household head was hypothesized to be one of the variables that make a difference on the level of food security. According to the survey result in the study areas, 35.30% of the sample households were female headed and the rest 64.70% were headed by male. Out of 34.7% of female headed households in the areas, about 28.40% of food secure and about 50.0% of food-insecure households and Out of 64.70% of male headed households in the areas, about 71.6% of them food secure and about 50.0% of them food-insecure households. The chi-square test

revealed that the relationship between Sex of household head and food security was statistically significant at 5% probability level in the areas (**Table 7**).

Education of household head

Categorization of household head as literate and illiterate in the sampled population exhibited that 44.0% were literate. It was hypothesized that as the level of education increases, the probabilities of being food secure increases. The survey results in the sampled population shows that out of 38.2% illiterate households, 66.7% of the food insecure was illiterate and 39% of the food secure was illiterate. The chi-square test revealed that the relationship between education status head and food security was statistically significant at 5% probability level in the areas (**Table 7**).

Access to farm credit service

Credit service improves food security status of households through purchase of agricultural inputs like improved seed and chemical fertilizers. It was hypothesized that households who are willing to participate in credit service can improve their income status through performing different activities with the credits acquired and hence improve their food security condition. Survey result shows about 46.7% of the respondents in study areas have access to farm credit services. Out of 46.7% of households in areas, 61.8% of them are food secure and 14.6% are food-insecure households have access to farm credit. The chi-square test revealed that the relationship between access to farm credit and food security was statistically significant at 5% probability level in the areas (**Table 7**)

Access to extension previous year (2012/13)

Agricultural services (extension) are expected to enhance farmer skills and Knowledge, link farmers with modern technology and markets, and input supply constraints (Lerman, 2004), thus are expected to induce food security. Survey result shows about 78.70% of the respondents in study areas have Involvement in extension program previous year. Out of 78.70% of

households in study areas 76.50%, of food secure and 83.30% of food-insecure households have Involvement in extension program previous year. It is hypothesized that farmers who have Involvement in extension program previous year are more likely to be food secure than those without. The chi-square test revealed that the relationship between Household Involvement in extension service and food security was not statistically significant in the study area at 5% level of significant (**Table 7**).

Access to irrigation

In areas where agriculture is the prime source of livelihood of the society, soil moisture is very crucial. Even if the climatic condition in a given area is Conducive, then it would be far better to be supplemented with irrigation so that increased output could be attained. Survey result shows about 36.0% of the respondents in study areas have used irrigation previous year. Out of 36.0% of households in study areas 47.10% of food secures and 12.50% of food-insecure households have used irrigation previous year. It is hypothesized that farmers who use irrigation previous year are more likely to be food secure than those without it. The chi-square test revealed that the relationship between irrigation and food security was statistically significant in the study area at 5% level of significant (**Table 7**)

Table 4. Distribution of household food security status by sex, education, irrigation, and access to credit service (%) of the sample households

variables		HFSS				Chi-Square Tests (x^2)	p-value
		Food insecure N=(48)		Food secure N=(102)			
		N	%	N	%		
sex	Female	24	50.00%	29	28.40%	6.646	<0.001
	Male	24	50.00%	73	71.60%		
Can you read and write	No	32	66.7%	39	38.20%	10.58	0.001
	Yes	16	33.3%	63	61.80%		
Access to irrigation	No	42	87.50%	54	52.90%	16.919	<0.001
	Yes	6	12.50%	48	47.10%		
Access to credit	No	41	85.40%	39	38.20%	29.193	<0.001
	Yes	7	14.60%	63	61.80%		
Access to extension	No	8	16.70%	24	23.50%	.916	.339
	Yes	40	83.30%	78	76.50%		

Source: *Own Survey (2012/13)*

*. *The Chi-square statistic is significant at the .05 level.*

Cultivated land size

Land size is considered as a critical production factor that determines the type of crops grown and the amount of crop harvested. About 80% of the growth in the agricultural outputs in Africa has been attained through the expansion of cultivated land (Degefa, 2002). Survey result shows the **mean** cultivated land size of households was 1.70 hectare with a range of 0.50 to 4.50 ha in the sampled population are presented as below (**Table 8**).

Table 5. Food security status by mean of cultivated land size (in ha) of the sample households.

	Food insecure N=(48)	Food secure N=(102)	Min imu m	Maxi mum	T- value	P- value	Sum	Total N=(150)
	Mean	Mean						Mean
Total land Area in hectare	1.58	1.75	.50	4.50	1.37	0.173	254.55	1.70

Source: Own Survey (2012/13)

Crop production

Farmers' objectives in crop production are mainly for dietary and cash income. Major crops grown in the sampled population was cereals like maize, Teff, sorghum and root crops; potato and sweet potato, vegetables such as cabbage, spinach and onion, fruits such as orange, avocado whereas cash crops coffee and chats were produced in the study area. Coffee constitute a significant proportion of the study area crop production Next to coffee, Chat and maize were grown by the majority of surveyed farmers. Most of these non-coffee crops provide coffee growers with products that can be either consumed directly or marketed occasionally on local markets. The annual total crop production of households in the sampled population were 2253.00 qt from 254.55 hectare presented as below (Table 9).

Table 6. Mean crop production (in qt) of sample households in the sampled population

	Food insecure N=(48)	Food secure N=(102)	Mini mum	Maximu m	T-value	P- value	Sum	Total N=(150)
	Mean	Mean						Mean
Crop yield of last year/qt	13.86	15.56	3.00	36.00	1.409	0.161	2253.00	15.02

Source: Own Survey (2012/

livestock holding

Livestock provide milk, meat, traction power, income and transport. Moreover, they are sold for cash as a coping mechanism during food shortage. Livestock owned by the sample households include cattle, sheep and goat and poultry. The average livestock owned by the sample respondents in Mana and Goma areas were 2.53TLU. Overall, survey result shows that food secure households own more TLU than food insecure in the sampled population 2.23 and 2.68 respectively are presented as below (Table 10).

Table 7. Mean livestock holding (in TLU) of sample household groups in the sampled population

	Food insecure N=(48)	Food secure N=(102)	Mini mum	Maxi mum	t-value	p- value	Total N=(150)
Total Livestock owned	Mean	Mean					Mean
	2.23	2.68	.00	10.00	1.194	0.235	2.53

Source: Own Survey (2012/13)

Crop output market participation index (COMPI)

Improved income has a potential of progressing the wellbeing of households in terms of food security, assuming other factors constant. Particularly, commercialization is supposed to bring a large impact on increasing farmer's income level which can be used as a source of fund for food purchase with better quality and quantity. However, other exogenous factors including price changes may reduce the consumption bundle of framers in a situation of price shock. Braun (1995) argued that commercialization has direct effect on household's income level which possibly leads to an increase in food and non-food expenditure. Descriptive statistics on the distribution of mean commercialization index showed the average crop output market

participation of rural households was 0.65, indicating moderate market participation. This level is nearly two times consistent with the one cited by Gebre-ab (2006) where an average Ethiopian farmers supply 35 percent of their output to the market. The mean crop output market participation index of food secure households was 0.72 and that of food insecure households was 0.50 in the sampled population. The crop output market participation index ranged from 0.00 to 0.89. It is hypothesized that farmers who have larger Crop output market participation index are more likely to be food secure than those with smaller Crop output market participation index. The sampled populations are mainly characterized by the production of commercial oriented cash crop (coffee) for the market. The mean statistical analysis revealed statistically, there was significant difference between the food secure and insecure groups in the sampled population are presented as below (**Table 11**).

Table 8. Mean Commercialization index (Comp) of sample household groups in the sampled population

	Food insecure N=(48)	Food secure N=(102)	Minimum	Maximum	T-value	P-value	Total N=(150)
	Mean	Mean					Mean
Commercialization index (COMp)	0.50	0.72	00	0.89	8.346	< 0.00*	0.65

Source: Own Survey (2012/13) * Is significant at the .05 level

Income analysis of the households

Household income has a paramount importance in achieving household food security for all segments of rural population. It is important to buy food and non-food items. The major income sources for the households in the sampled population include crops, livestock and their products and off-farm activities. Analysis of the mean difference between the food insecure and secure households with regard to the main source of income shows that the food-secure and food-insecure groups differ on crop income per AE, livestock income per AE and total annual income per AE in the sampled population. It was observed from the survey that crop production especially cash crops like coffee; that was the most important source of income in the sampled population followed by livestock production and off-farm activities.

The mean Annual farm income per AE (birr) of sample households in the sampled population were income per AE (birr) of sample households in the sampled population was Birr 2908.26. The mean annual income per AE of food secure and food insecure household in the sampled population was Birr 3382.45 and 1900.60 respectively. The mean Annual Value of crop sold in (ETB) was 15050.67 and the mean annual Total income from Livestock sold in Birr was 2373.15. The mean Annual income from Off farm (Birr) of sample households in the sampled population was Birr 5134.667. The mean Annual income from Off farm (Birr) of food secure and food insecure household in the sampled population was Birr 5524.510 and 4306.250 respectively. The statistical test showed a significant mean difference between food secure and food insecure household groups in terms of annual income per AE at 1% probability level in the sampled population are presented as below (**Table 12**)

Table 9. Household food security status by household income sources per year per AE, Total Annual income from Off farm (Birr), Value of annual crop sold (ETB) and Total Lives. Inco.

	Food insecure N=(48)	Food secure N=(102)	Minimum	Maximum	t-value	p-value	Total N=(150) Mean
Annual farm income per AE (birr)	1900.60	3382.45	6400.00	91800.00	5.237	< 0.00*	2908.26
Total Annual income from Off farm (Birr)	4306.250	5524.510	.00	25000.00	1.583	0.116	5134.667
Value of annual crop sold (ETB)	11746.67	16605.49	.00	304000.00	1.094	0.276	15050.67
Total Livestock sold in Birr	1514.89	2768.63	.00	65000.00	1.214	0.227	2373.15

Source: Own Survey (2012/13)

* Is significant at the .05 level

Consumption expenditure of households

Survey result showed that the mean annual consumption expenditure for sample households in the sampled population were Birr 21542.40. The mean annual consumption expenditures for food secure and food insecure households in the sampled population were Birr 23454.51 and 17479.17, respectively. Survey result showed that the mean daily consumption expenditure per AE for sample households in the sampled population were Birr 10.90. The mean daily consumption expenditures per AE for food secure and food insecure households in the sampled population were Birr 12.54 and 7.41, respectively are presented as below (Table 13).

Table 10. Total consumption expenditure per AE of households in the sampled population

	Food insecure N=(48)	Food secure N=(102)	Minimum	Maximum	T-value	P-value	Total N=(150)
	Mean	Mean					Mean
Total consumption expenditure in birr / per year	17479.17	23454.51	6400.00	91800.0	2.972	0.003	21542.40
Consumption expenditure in birr per day /AE	7.41	12.54	1.97	41.57	4.968	< 0.000	10.90

Source: Own Survey (2012/13)

Distance from market center

Proximity to market center creates access to additional income by providing off-farm/nonfarm employment opportunities and easy access to inputs and transportation. It was, therefore, expected that households nearer to market center have better chance to improve household food security status than who do not have proximity to market centers. Table 12 depicts the statistical results of the two groups in relation to the effect of market distance on food security. Survey result showed that the mean Distance from market center for sample households in the sampled population was 3.3 km. The mean Distance from market center for

food secures and food insecure household the study areas in (km) were 3.33 and 3.09, respective are presented as below (Table 14)

Table 11. Descriptive statistics for distance from the market place of households in the sampled population

	Food insecure N=(48)	Food secure N=(102)	Minimum	Maximum	T-value	P-value	Total N=(150)
	Mean	Mean					Mean
Distance from the nearest market (In km)	3.09	3.33	1.00	11.00	0.66	0.51	3.3

Source: Own Survey (2012)

5.3. Results of Determinants of Household Food Security

Logit model was employed to assess determinants of food security of households. Before fitting the models, it was important to check whether there exists serious problem of multicollinearity among the hypothesized explanatory variables. The values of VIF for each of the continuous variables in the study area are shown in the (Appendix Table 4). VIF values were found to be less than 10. Hence, there was no a multicollinearity problem among all the hypothesized continuous variables included in the model. The result of the computation of contingency coefficients (Appendix Table 5) revealed that there was no a serious problem of association among discrete explanatory variables as the contingency coefficients did not exceed 0.75. Therefore, all the hypothesized dummy variables were included in the logistic regression model.

As repeatedly stated, household food security (HFS) variable was used in the model as a dependent dummy variable with a value of 1 describing the probability of the household 1, being food secure, 0 otherwise. For analyzing food security status of the sample households, a total of 12 explanatory variables were included in the model. In order to identify the most important determinants from the potential hypothesized independent variables assumed to

influence food security of households in the sampled population, binary Logit model was estimated. For the purpose, a statistical package, SPSS version 20 was used. The results of the Logit regression model for the study areas are presented in (Table 15).

The likelihood ratio has a chi-square distribution and it is used for assessing the significance of logistic regression. Model chi-square provides the usual significance test for a logistic model i.e. it tests the null hypothesis that none of the independent variables are linearly related to the log odds of the dependent. It is an overall model test which doesn't assure independent variable is significant. The result is significant at less than 1% probability level revealing that the null hypothesis that none of the independent variables are linearly related to the log odds ratio of the dependent variables is rejected. In addition, goodness of fit in logistic regression analysis is measured by count R^2 which indicates the number of sample observations correctly predicted by the model. The count R^2 is interpreted based on the principle that if the predicted probability of the event is less than 0.50, the event will not occur, and if it is greater than 0.50, the event will occur (Maddala, 1989). Hence, the model results showed that the logistic regression model correctly predicted 90.8 % of sample households (which is greater than 0.50) in the study area.

Out of the twelve independent variables hypothesized to have influence on household food security, five variables for the sampled population were found to be statistically significant. The maximum likelihood estimates of the logit model in the sampled population showed that family size (FSIZEAE), Age of household (HEADAGE), Size of cultivated land (FLANDha), Crop output market participation (COMp), Access to credit (AC-CREDIT), were found to be the important determinants identified to influence household food security status in the study area (Table 13). In light of the above summarized model results possible explanation and interpretation for each significant independent variable are given consecutively as follows:

Results of Econometric Analysis

Consistent with several prior findings in other places the discussion and interpretation of the significant explanatory variables in the binary logit model estimation are presented as below

Table 12. Logit estimation results for the impact of smallholder commercialization on rural food security

Variables	Coefficients	Std. Err.	Sig.	odd ratio	95% C.I.for EXP(B)	
					Lower	Upper
SEX(M)	1.131	1.197	0.344	3.1	0.297	32.343
HEADAGE	0.289	0.118	.014*	1.335	1.059	1.683
EDUChhd(Yes)	0.55	1.252	0.66	1.733	0.149	20.168
FSIZEAE	-4.433	1.33	.001**	0.012	0.001	0.161
TLU	0.563	0.374	0.133	1.755	0.843	3.654
FLANDha	0.03	0.012	.015*	1.03	1.006	1.056
TFINCAEbirr	0.0002	0.0003	0.543	1.0002	0.999	1.001
OFFFIbirr	0.0002	0.0002	0.188	1.0002	0.999	1.001
ACCREDIT(No)	-7.062	2.125	.001**	0.001	0.00001	0.055
INEXT(Yes)	1.118	1.454	0.442	3.058	0.177	52.848
COMp	0.108	0.035	.002**	1.114	1.04	1.192
DISMARKm	0.123	0.258	0.633	1.131	0.683	1.873
Constant	1.738	4.54	0.702	5.687		

** And *are significant at less than 1% and 5%probability level respectively.

Number of obs	150
Pearson Chi-square	156.991
Prob > chi ²	0.0000
Log likelihood	31.070
Percent correctly predicted (R ²)	90.8 %

Source: Model outputs or results based on survey data (2012/13)

5.4. Discussion of Significant Explanatory Variables in the Study Areas

Commercialization (crop output market participation) and food security

It is believed that commercialization have a potential of improving farm households food security status through providing different types of resources in agricultural production; particularly, in terms of investment in infrastructure and human capital (Govere *et al.*, 1999). This argument indirectly suggests the expected role of commercialization for agricultural productivity in supplying different types of inputs. On other hand, Braun (1995) claimed that the process of smallholder commercialization has multiple effects on the overall welfare of farm households including on income and nutrition. The food security or nutrition effect of commercialization ultimately depends on the decision behavior of farm households in allocating resources including land, labor, time and capital. For instance, allocation of land for non-food cash crop may decrease household food supply unless the households should have other sources of off-farm income that could be used for food purchase. This suggests having better income through commercialization and off-farm income allowed households to widen their consumption pattern in terms of quality and quantity. Explicitly, this research analyzes the impact of commercialization on household food security status.

The survey result on the impact of smallholder commercialization on food security revealed that agricultural commercialization (crop output market participation) affect the rural households food security in the study area due to the significance of the crop commercialization index at 1% probability level in the logit model used and it has a positive coefficient of showing a positive relationship to food security or probability of being food secure which is in line with a priori Expectation. This means that the higher the smallholder farmer's commercialization, the higher the probability of being food secure. This indicated that those farmers with higher commercialization index are associated with higher agricultural income suggesting the possible positive effects of market participation on farmers' food purchasing power. Importantly, lower average commercialization index is associated with higher off-farm income which points the possible scenario that farmers can potentially widen their consumption pattern in terms of quality and quantity with the income generated from off-farm sector. Households with higher crop value produced sell higher proportion of their

product, implying that building the capacity of households to produce surplus production is critical to improve market participation. Other things being constant, the odds ratio in favor of being food secure increase by a factor of 1.114 as commercialization increase by one unit. This result is in conformity with the findings of Mulugeta (2002), Yusuf (2007) and Amsalu (2014).

Family size (FSIZEAE)

This variable was significant at 1% probability level and negatively related with the state of food security. The result indicated that larger household size tends to be food insecure compared to smaller family size which is in line with a priori expectation. The possible explanation is as family size increases, the amount of food for consumption in one's household increases thereby that additional household member shares the limited food resources. Other things being constant, the odds ratio in favor of being food secure decreases by a factor of 0.012 as family size increase by one adult equivalent. This result is in conformity with the findings of Mulugeta (2002); Abebaw (2003), Ayalew (2003), Tesfaye (2005) and Yusuf (2007), Amsalu (2012).

Age of household head (HEADAGE)

The sign of the coefficient of change in age of the household head showed a positive relationship with food security and is significant at 5% probability level. This means that an increase in the age of the household head increase the likelihood of the household to become food secure. This is possible because farmers get more and more experience in their farming operation, climatic knowledge of their area, accumulate wealth and use better planning than the younger ones. Hence, they have better chance of becoming food secure. Keeping other factor unchanged, the odds ratio in favor of food security increase by a factor of 1.335 when age of the household head increases by one year. This result is in agreement with a prior expectation and the findings of Abebaw (2003), Ayalew (2003), Amsalu (2012), Yilma (2005) and Yesuf (2007).

Size of cultivated land (FLANDha):

It is hypothesized that farmers who have larger cultivated land are more likely to be food secure than those with smaller area. In agreement with the hypothesis, its coefficient came out to be positive and significant at 5% probability level. Losses of farm land to other uses because of population pressure and limits to the amount of suitable new land that can be brought in to production is one of the constraints of food production (Brown *et al.*, 1990). Fertile farmland is often sacrificed to meet the growing demands of population growth (Ehrlich *et al.*, 1991). The probable explanation is that as the cultivated land size increases, provided other associated production factors remain normal, the likelihood that the holder gets more output is high. The odds ratio in favor of food security increases by a factor of 1.03 as the size of cultivated land increases by one hectare, keeping other factor constant. This result is in agreement with a prior expectation and the findings of Abebaw (2003) and Tesfaye, (2005).

Access to credit (AC-CREDIT)

It is hypothesized that farmers who have Access to credit are more likely to be food secure than those doesn't have Access to credit. The positive relationship is explained by the fact that credit helps to improve the ability of farmers at critical times of the year to buy inputs and encourage farmers to adopt new technology. The model result confirms that credit is statistically significant at 1% probability level with the expected sign. The credits used for agricultural inputs improve their productivity and increase the farm income and wealth status of the farmers and those farmers with better food security status than the others. The probable explanation is that those households who received farm credit have possibility to invest in farming activities, which is important component in small farm development programs. The odds ratio of 0.001 for this variable indicates that, assuming other factors are constant, the odds ratio in favor of being food secure decreases by a factor of 0.001 as a farmer decreases the use of credit by one unit. This result is in agreement with a prior expectation and the findings of Abebaw, (2003) and Tesfaye, (2005).

Finally, the remaining explanatory variables, sex of household head (SEX), Total annual farm income per AE (TOTFARINAE), Total Annual income from Off farm (Birr) (OFFFIbirr), education of household head (EDUChhd), Livestock size (TLU) and Access to extension service does not affect the rural households' food security in the study area due to the non-significance in the logit model used; however, they have has a positive coefficient of showing a positive relationship to food security or probability of being food secure.

CHAPTER SIX: CONCLUSION AND RECOMMENDATION

6.1 Conclusion and Summary

Agriculture is considered as a strong option and fundamental instrument for spurring growth and sustainable development, poverty reduction, and enhancing food security in developing countries like Ethiopia. It is also assumed to be a vital development tool for achieving the Millennium Development Goals (MDG), one of which is to halve the share of people suffering from extreme poverty and hunger by 2015 (World Bank, 2008).

Promoting commercialization of agricultural production is a cornerstone of the rural development and poverty reduction strategies of Ethiopia, as well as numerous other developing countries. Past empirical research on smallholder commercialization in developing countries generally supports this view, although the impacts of commercialization are dependent on the local context and policy environment (von Braun and Kennedy, 1994). In this line, identifying and analyzing the major determinant of food security and the impacts of smallholder commercialization at household level through research was found as one of the way-outs in a process of pinpointing alternative interventions and policy options.

To examine the impacts of commercialization on rural household food security, a survey was conducted on 150 sample households from the major coffee growing areas of Jimma zone. Both primary and secondary data was collected for this study. The survey work for the collection of primary data was done in December 1, 2014 to January 30, 2014. In this study both descriptive statistics and econometric methods were used for the analysis of the survey data. Sample households were classified into food secure and food insecure groups based on food consumption in kcal by the households in the last seven days either from own produce or through purchase. The amount of food consumed by each household during the seven days was converted in to equivalent daily kcal per AE and then compared with recommended daily kcal per adult equivalent (2200 kcal). If this recommended daily kcal per adult equivalent was less than 2200 kcal, the household was considered as food insecure and food secure otherwise. The descriptive analysis result of the survey revealed that 68.0% the sampled households is

food secure. On the contrary, 32.0 % of the sampled households were food insecure or not able to meet the daily recommended caloric requirement.

Based on the survey data, demographic and socio-economic factors related to food security were estimated using the descriptive statistics and the results revealed that family size in AE, age of the HH head, sex HH head, and education HH head, access to irrigation, access to credit, crop output market participation, off- farm income per AE, annual agricultural income per AE (birr) and total consumption expenditure in birr / per year contributed significantly to food security status in the sampled population.

Binary Logit model was employed to assess determinants of food security. Before fitting the models, it was important to check whether there exists serious problem of multicollinearity among the hypothesized explanatory variables. The values of VIF for each of the continuous variables were found to be less than ten and hence, there was no a multicollinearity problem among all the hypothesized continuous variables included in the model. The result of contingency coefficient revealed that there was no a serious problem of association among discrete explanatory variables as the contingency coefficients did not exceed 0.75. Therefore, all the hypothesized dummy variables were included in the binary logistic regression model.

The model results showed that the likelihood ratio has a chi-square distribution and it is used for assessing the significance of logistic regression. Model chi-square provides the usual significance test for a logistic model and the result is significant at less than 1% probability level. In addition, goodness of fit in logistic regression analysis is measured by count R^2 . Hence, the model results showed that the logistic regression model correctly predicted 90.8 % of sample households (which is greater than 0.50) in the sampled population.

The maximum likelihood estimates of the logit model showed that the impact of smallholder commercialization on rural household food security revealed that agricultural commercialization affect the rural food security in the study area due to the significance of the crop commercialization index and it has a positive coefficient of showing a positive relationship to food security or probability of being food secure which is in line with a priori Expectation. Further, the study has shown as the major factors affecting rural food security

family size (FSIZEAE), Age of household (HEADAGE), Size of cultivated land (FLANDha), Crop output market participation (COMp), Access to credit (AC-CREDIT), were found to be the important determinants identified to influence household food security status in the study area.

Generally, this research discovered the determinants of food security and the impact of commercialization on rural households' food Security in the study area. Even if the problems of food security and impact of commercialization are multidimensional and dynamic, this study emphasized only on household level based on cross-sectional data. Though useful, such study does not capture the complex and dynamic nature of food security and impact of commercialization.

6.2 Policy Recommendations

Based on the findings and conclusion of the study, the following policy recommendations are forwarded.

Family size and food security were strongly and negatively related in the study. Therefore, proper attention should be given to limit the increasing population in the areas. This could be achieved by proper awareness creation about practicing family planning activities through integrated health and education services so as to limit the growing family size.

Age of households was positively correlated with food security. This means younger households are less likely to be food secure. Therefore, capacity building, empowerment and training for young household heads should be given in the sampled population.

Crop output market participation (Comp) and food security are strongly and positively related in the study. This implies that any policy effort aimed at creating efficient tie between farmers and market will improve the performance of agricultural production thus promotes commercialization of rural households and ultimately improves food security. The overall finding on Crop output market participation (Comp) suggests the requirement of substantial effort towards improving farmers' market participation rate and further specialization in coffee could enhance overall agricultural commercialization in the sampled population

Therefore, increasing farmer's educational level, and creating sufficient access of ICT tools including radio and cell phone significantly contributes for higher degree of market participation should be given in the sampled population.

Access to credit and food security was strongly and positively related in the study area. The positive relationship is explained by the fact that credit helps to improve the ability of farmers at critical times of the year to buy inputs and encourage farmers to adopt new technology. Therefore, concerned stakeholders in the study area should identify the different possible types of microfinance service that farmers can Access in and promoting effective credit Services. Moreover, they should be provided with the necessary knowledge and skills of the various types of credit use, saving habit, small scale business activities, enhancing the capacity to borrow larger sums and non-farm activities that could improve their food security status.

Cultivated land size was positively related and found to be significant in the study. Physical and biological conservation measures should be widely promoted to enable the households to maintain their food security status rather than expanding the land size. The cultivable land in the study area is limited and no opportunity to expand. This also implies that research and extension have to look for the better conservation practices so as to improve the farmers' food access sustainably.

However, the researcher highlight that appropriate government policies including investment in rural infrastructure and crop improvement research and extension, establishment of secure rights to land and water , promotion of better Livestock management practices, improved crop varieties with full management practices, developing small scale irrigation schemes, developing institutional mechanisms (like insurance) that can help coffee growers to better deal with market risks, Support towards developing the non-farm sector and other agricultural activities can help alleviate many of the possible adverse transitional consequences and thus will ultimately reduce food security .

2.3 Future Potential Study Area

In general, the study presented in this paper indicates the impact of smallholder commercialization in major coffee growing areas and thus provide support for the current government policy aiming at increased smallholder commercialization and improve their food security status of household.

Therefore, improved income has a potential of progressing the wellbeing of households in terms of food security, assuming other factors constant. Particularly, commercialization is supposed to bring a large impact on increasing farmer's income level which can be used as a source of fund for food purchase with better quality and quantity. However, other exogenous factors including price changes may reduce the consumption bundle of framers in a situation of price shock. This requires further econometric modeling that considers the net effect of commercialization on food consumption expenditure with respect to variation in market price and household income level. As a result, the study could not differentiate this interaction and rather put it as a future potential study area.

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Appendix

Appendix I: Survey Questionnaire

QUESTIONNAIRE ON THE IMPACT OF COMMERCIALIZATION ON RURAL HOUSEHOLDS' FOOD SECURITY IN MAJOR COFFEE GROWING AREAS OF SOUTH WEST ETHIOPIA: THE CASE OF JIMMA ZONE.

Survey questionnaire

The objective of this questionnaire is to collect information related to *rural households' food security and factors determine in Jimma zone, SW of Ethiopia*. The study is conducted for academic purpose. Hence, we request your honest and fair responses to fill up this questionnaire.

PART I: GENERAL

1. Enumerators

1. Name of the enumerators: _____

2. Signature of the enumerator ensuring completeness of questionnaire

Signature: _____ Date (DD/MM/YY) _____

2. Identification of the respondent

1) Name of the region _____

2) Woreda _____

3) Keble/PA/ _____

4) Zone /goxe/ _____

PART II: Demographic and socio-economic characteristics of the household

2.1. Information about Household characteristics

1. Sex 1) Male 2) Female

2. Age the household head _____ years

3. marital status of the household head: 1) Single 2) Married 3) Divorced 4) Widow

4. Can you read and write? 1. Yes 2. No

5. If yes, level of education in grade _____ : 1) illiterate 2) primary 3) secondary 4) tertiary 5) Other
6. Farming experiences in year since started _____
7. Did you have some social position (PA, Sc, Idir etc) in the community so far?
 1. Yes
 2. No
8. Religion ___ 1=Christian, 2=Muslim, 3=Waqefatta 4. Other specify: _____
9. Family size in household? Total _____ Num. of male = _____ Num. of female = -----

2.1. Information about the household family 1. Information about family members

No.	Name	Age	Sex	Education level	Relation ship
1					
2					
3					
4					
5					
6					
Total					

NB. Code of family member relation 1= head of the household 2=Wife 3= Son/ daughter 4= servant 5= other

3. Asset ownership

3.1 Land resources owned of year 2005 E.C

1. has the household their own land? _____ 1) yes 2) No
2. If yes, how did you obtain the land? ___ 1) Own 2) rented (contract) 3) Share cropped
 - 4) Received as a gift
 - 5) other

(3.1) Information about sample household land holding and its uses

No	Type of land use	Area in hectare
1	Cultivated land	
2	Grazing land	
3	Forest land	
4	Fallow land	
5	Homestead	
6	Other	
	Total	

4. Livestock ownership

4.1 Livestock ownership and number sold in Birr in year 2005 E.C

No	Type of livestock	Total No.	Number sold	Total value (Birr)
1	Oxen			
2	Bulls			
3	Cow			
4	Calve			
5	Heifer			
6	Sheep			
7	Goat			
8	Donkey			
9	Horse			
10	Mules			
11	Chicken (poultry)			
	Other			

5. Income from Off farm income in year (2005 E.C) (Average income)

Number of family involved		Annual income (Birr)
Handcrafts ⁴		
Petty trading		
Labour selling		
Making home-made drinks (e.g. Arakie)		
Remittance	Internal source	
	External (from abroad)	
Others specify		

5. Crop production & Amount consumed of each crop last in year 2005 E.C. (Q

4 Include crafting works like weaving, black smithing, etc.

Category	Type of crop	Area in (ha)	Yield ((Qt)(1))	Amount sold (Qt)	Unit price	Total income from production	Consumption Own production (Qt)	Purchased (Qt)	Food aid (Qt)	Total food Consumption	Consumption Expenditure/per year
Cereals	Maize										
	Wheat										
	Barley										
	Sorghum										
	Teff										
	Chick pea										
	Beans										
	Pea										
	Sesame										
	Potato										
	Tomato										
	Vegtal	Onion paper									
Others(specify)											
Cash crops	Coffee										
	Chat										
Fruits	Orange										
	Banana										
	avocado										
	Others(specify)										
Grand Total											

6. Do you use irrigation? 1. Yes 2. No

6.1 If yes, what is the improvement in the production?

7.1 Is it the product you produce sufficient to cover last year consumption? 1) Yes 2) No

8. If not sufficient what is the cause? For each of the items, please indicate how do you think or rate the items are the main causes of food deficit in your area?

Cause	1= Strongly disagree	2= disagree	3= Neutral	4= Agree	5=Strongly agree
Absence of adequate rainfall					
Insect or pest infestation					
Shortage of cultivated land					
Poor quality of land					
Livestock diseases					
Shortage of livestock feed					
Others (specify)					

Part III: Household Expenditure (Average Expenditure)

1. From the List of food items below state unit price and quantity of purchased food available; non-purchased food and total consumption from all source during last 7 days.

Food type consumed	Total food consumed			Consumed from purchased		Consumed from own harvest		Consumed from food aid		Consumed from gift/remittance	
	Amount [KG]	Value [Birr]	kcal	Amount [KG]	Value [Birr]	Amount [KG]	Value [Birr]	Amount [KG]	Value [Bir]	Amount [KG]	Value [Birr]
Maize											
Sorghum											
Teff											
Millet											
Wheat											
Barely											
Others											
Soybean											
bean											
peas											
Mango											
Banana											
Orange											
cabbage											
Potato											
Tomato											
Green paper											
Onion											
Coffee											
Tea											
Other											

2. Animal products consumed from all source during last 7 days.

Food type consumed	Total food consumed			Consumed from purchased		Consumed from own harvest		Consumed from food aid		Consumed from gift/remittance	
	Amount [KG]	Value [Birr]	kcal	Amount [KG]	Value [Birr]	Amount [KG]	Value [Birr]	Amount [KG]	Value [Birr]	Amount [KG]	Value [Birr]
Milk											
Butter											
Cheese											
Meat											
Chicken											
Eggs											
Honey											
Others											

3. Weekly purchased non food expenditure during last 7 days: Unit, list of type of expenditure, total value

Type of non food expenditure	Quantity(kg)	kcal	Total value (Birr)
Salt			
Sugar			
Species			
oil			
Others (specify)			

4. Annual non-food expenditure during the 2005 E.C.

Type expenditure	Quantity	Market price(ETB)	Total value (ETB)
Clothing			
Medication			
School fees			
Social (funerals, marriagetc...)			
Others (specify)			

PART IV: Institutional Characteristics of the Household

1. Credit services

1. Have you received any type of credit from formal sources (e.g. microfinance) in 2005 EC?

1) Yes 2) No

1. 2. Have you received credit from non-formal sources (e.g. relatives, etc.)? a) Yes b) No

2 Marketing and Marketing Information

2.1 How far is your residence from the nearest market? (In walking hours)(Km) _____

2.2 Do you seek for price information before you bring your product to the market?

a) Yes b) No

- If yes, what is the source of price information? _____

4. Do you sell your produce when prices are low? a) Yes b) No

4. Agricultural extension services

4. 1. Has your household received any type of extension from any government and/ NGOs?

a) Yes b) No

4. 2. Is there development agent in your PAs? a) Yes b) No

Thank you very much for your cooperation

Appendix II

Appendix Table 1. Calorie value of food items (in Kcal per Kg)

Food items	Unit	Kcal
Teff	Kg	3589
Wheat	Kg	3623
Maize	Kg	3751
Barley	Kg	3723
Peas	Kg	3553
Beans	Kg	3450
Potato	Kg	1037
Onion	Kg	713
Cowpea	Kg	3450
chickpea	Kg	3450
Vegetable	Kg	370
Meat	Kg	1148
Milk	Litter	737
Egg	each	61
Butter	Kg	7364
Edible Oil	Litter	8964
Coffee	Kg	1103
Sugar	Kg	3850
Salt	Kg	1780
Cabbage	kg	240
Spices	kg	3200
sorghum	kg	2560
Avocado	kg	1600
Chat	kg	220
Tea	kg	400
Cheese	kg	3870
Honey	kg	3600
Tomato	kg	170
Orange	kg	340
Green paper	kg	280
Banana	kg	600
Mango	kg	450

Source: EHNRI, 1998

Appendix Table 2: Conversion factors used to calculate Tropical Livestock Units (TLU)

Animals	TLU-equivalent
Calf	0.2
Heifer & Bull	0.75
Cows & Oxen	1
Camel	1.25
Horse	1.1
Donkey	0.7
Sheep & Goat	0.13
Chicken/poultry	0.013

Source: Storck et al. (1991)

Appendix Table 3: Conversion factor used to compute consumption unit (AE)

Age group(years)	Sex	
	Male	Female
< 10 years of age	0.6	0.6
10-13 years of age	0.9	0.8
14-16 years of age	1	0.75
17-50 years of age	1	0.75
Over 50 years of age	1	0.75

Source: Storck et al. (1991)

Appendix Table 4. Variance Inflation Factor (VIF) for continuous variables

	Un standardized Coefficients		Standardized Coefficients		t- value	P- value.	Co linearity Statistics	
	B	Std. Error	Beta				Tolerance	VIF
(Constant)	0.119	0.245			0.483	0.63		
Age of the HH head	0.011	0.003	0.234		3.951	0	0.904	1.107
Number of Household size (AE)	-0.149	0.026	-0.364		-5.639	0	0.759	1.317
Total Livestock owned	0.027	0.014	0.127		2.024	0.045	0.808	1.238
Total land Area in hectare	0.077	0.04	0.122		1.91	0.058	0.774	1.292
Commercialization index (COM)	0.922	0.163	0.37		5.673	0	0.741	1.349
Annual farm income per AE (birr)	2.14E-05	0	0.085		1.336	0.184	0.779	1.283
Total Annual income from Off farm((Birr)	4.85E-07	0	0.005		0.079	0.938	0.927	1.079
Distance from the nearest market? hours)(km)	0.006	0.014	0.027		0.469	0.64	0.917	1.091

A Dependent Variable: HFSS

Appendix Table 5. Contingency coefficient (C) value of dummy variables

Variables	SEX	HEADAGE	EDUCHhd	FSIZEAE
SEX	1	0.037	0.158	0.063
HEADAGE		1	0.03	0.265
EDUCHhd			1	0.163
FSIZEAE				1

Appendix Table 6: Descriptive statistics for continuous variables used in econometric

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Age of the HH head	150	56	22	78	48.14	10.09
Number of Household size (AE)	150	6.4	2.5	9	5.67	1.14
Total Livestock owned	150	10	0	10	2.53	2.16
Total land Area in hectare	150	4	0.5	5	1.70	0.74
Commercialization index (COM)	150	0.89	0	1	0.65	0.19
Annual farm income per AE (birr)	150	13784.7	397.1	14182	2908.26	1753.96
Total Annual income from Off farm((Birr)	150	25000	0	25000	5134.67	4419.80
Access to credit from formal sources in 2005 EC?	150	1	0	1	0.47	0.50
Distance from the nearest market? hours)(km))	150	10	1	11	3.25	2.03
Total Livestock sold in Birr	149	65000	0	65000	2373.15	5867.99
Crop yield of last year /qt	150	33	3	36	15.02	6.91
Value of annual crop produced (ETB)	150	36400	2200	38600	17690.12	7478.94
Value of annual crop sold (ETB)	150	304000	0	304000	15050.67	25389.08
KCAL PER ADULT EQU. AE /DAY	150	3938.28	1361.09	5299	2717.49	746.43
Annual food expenditure during the 2005 E.C.	150	144000	-64200	79800	14310.73	13987.38
Annual non-food expenditure during the 2005 E.C.	150	72500	2500	75000	7231.67	8235.81
Total consumption expenditure in birr / per year	150	85400	6400	91800	21542.40	11784.05
Total consumption expenditure in birr / per day (AE)	150	39.661	1.97	42	10.90	6.35

Appendix Table 7: Descriptive statistics for continuous variables used in econometrics by HFSS

	HFSS		
	Food insecure	Food secure	Total
	Mean	Mean	Mean
Age of the HH head	42.31	50.88	48.14
Number of Household size (AE)	6.54	5.25	5.67
Total Livestock owned	2.23	2.68	2.53
Total land Area in hectare	1.58	1.75	1.7
Commercialization index (COM)	0.5	0.72	0.65
Annual farm income per AE (birr)	1900.6	3382.45	2908.26
Total Annual income from Off farm((Birr)	4306.25	5524.51	5134.667
How far is your residence from the nearest market? (km)	3.09	3.33	3.25
Total Livestock sold in Birr	1514.89	2768.63	2373.15
Crop yield of last year /qt	13.86	15.56	15.02
Value of annual crop produced (ETB)	15882.29	18540.86	17690.12
Value of annual crop sold (ETB)	11746.67	16605.49	15050.67
KCAL per adult equiv. AE /day	1961.4	3073.29	2717.49
Annual food expenditure during the 2005 E.C.	9920.833	16376.569	14310.733
Annual non-food expenditure during the 2005 E.C.	7558.33	7077.94	7231.67
total consumption expenditure in birr / per year	17479.17	23454.51	21542.4
total consumption expenditure in birr / per day (AE)	7.412	12.545	10.902

Appendix Table 8: Descriptive statistics for continuous variables used in econometrics by HFSS

	HFSS		t-value	sig p-value	Total Mean
	Food insecure	Food secure			
	Mean	Mean			
Age of the HH head	42.31	50.88	5.271	0.00	48.14
Number of Household size (AE)	6.54	5.25	-	0.00	5.67
Total Livestock owned	2.23	2.68	1.194	0.235	2.53
Total land Area in hectare	1.58	1.75	1.37	0.173	1.7
Commercialization index (COM)	0.5	0.72	8.346	0.00	0.65
Annual farm income per AE (birr)	1900.6	3382.45	5.237	0.00	2908.26
Total Annual income from Off farm((Birr)	4306.25	5524.51	1.583	0.116	5134.667
Distance from the nearest market? hours)(km)	3.09	3.33	0.66	0.51	3.25
Total Livestock sold in Birr	1514.89	2768.63	1.214	0.227	2373.15
Crop yield of last year /qt	13.86	15.56	1.409	0.161	15.02
Value of annual crop produced (ETB)	15882.29	18540.86	2.053	0.042	17690.12
Value of annual crop sold (ETB)	11746.67	16605.49	1.094	0.276	15050.67
KCAL PER ADULT EQU. AE /DAY	1961.4	3073.29	11.83	0.00	2717.49
Annual food expenditure during the 2005 E.C.	9920.833	16376.569	2.692	0.008	14310.733
Annual non-food expenditure during the 2005 E.C.	7558.33	7077.94	-	0.74	7231.67
Total consumption expenditure in birr / per year	17479.17	23454.51	2.972	0.003	21542.4

Appendix III: Photo of Data Collection

