ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

FACULTY OF BUSINESS AND ECONOMICS

DEPARTMENT OF ECONOMICS

(POLICY ANALYSIS)

FOOD INSECURITY AND ITS DETERMINANTS IN RURAL HOUSEHOLDS IN AMHARA REGION

FREHIWOT FANTAW SEID

FEBRUARY 2007.

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

FACULTY OF BUSINESS AND ECONOMICS

DEPARTMENT OF ECONOMICS

FOOD INSECURITY AND ITS DETERMINANTS IN RURAL HOUSEHOLDS IN AMHARA REGION

FREHIWOT FANTAW SEID

FBRUARY 2007

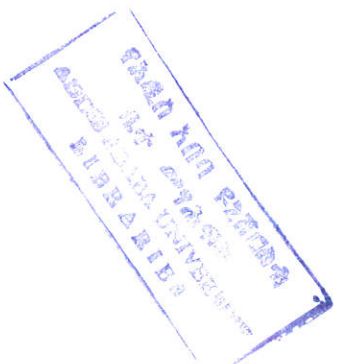
Addis Ababa.

FOOD INSECURITY AND ITS DETERMINANTS IN RURAL HOUSEHOLDS IN AMHARA REGION

A THESIS PRESENTED TO THE SCHOOL OF GRADUATE STUDIES
ADDIS ABABA UNIVERSITY
FACULTY OF BUSINESS AND ECONOMICS
DEPARTMENT OF ECONOMICS
(POLICY ANALYSIS)

IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTERS OF SCIENCE IN ECONOMICS

BY
FREHIWOT FANTAW SEID
FEBRUARY 2007.



ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

"Food Insecurity and its Determinants in Rural Households in Amhara Region."

By

Frehiwot Fantaw Seid

Approved by the Board of Examiners:

DR. J. MANOHAR RAO
Advisor

Signature

Getachew Yoseph
Examiner

Signature

Worknesh Negatu
Examiner

Signature

ACKNOWLEDGMENTS

First and foremost praise be to Allah (S.W) the Beneficent...the Merciful God, who enable me to complete my work.

I would like to express my heart felt gratitude to my advisor Dr. Manohar Rao for his valuable comments and constant encouragements through out the study. I am also thanking the Central Statistical Agency (CSA) that allowed me to use the 1999/00 HICE and WM surveys data. The Canadian International Development (CIDA) (i.e., Canadian Education and Training Awards-Africa (CETAA) program) and Yeteem Children and Destitute Mothers Fund (YCDM) have also deserved my special gratitude for their unreserved financial support in this endeavor.

My Special appreciation also goes to Ato Mageru Haile, Ato Mohammed Beshir and Ato Samuel Hailu for their encouragements and critical comments in this work.

I fail short of word to express my heart-felt gratitude to my husband Abdu Ebrahim and to my baby girl Hidaya Abdu and all my family members for their encouragements and sincere wishes for the success of this work.

TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

List of Diagram

Acronyms

CSA:	Central Statistical Agency
DPPA:	Disaster Prevention and Preparedness Agency
EA:	Enumeration Area
EEA	Ethiopian Economic Association
FDRE	Federal Democratic Republic of Ethiopia
FAO:	Food and Agriculture Organization
FANTA:	Food and Nutrition Technical Assistance
FIVIMS:	Food Insecurity and Vulnerability Information Mapping System
FSS:	Food Security Strategy
HFS:	Household Food Security
HICE:	Household Income, Consumption, and Expenditure Survey
MEDaC:	Ministry of Economic Development and Cooperation
MOFED:	Ministry of Finance and Economic Development
MT:	Metric Tone
NGOs:	Non-Governmental Organizations
NPDM:	National Policy on Disaster Prevention and Management
PRS:	Poverty Reduction Strategy
PSU:	Primary Sampling Unit
SF:	Safety Net
WB:	World Bank
WFP:	World Food Program
WFS:	World Food Summit
WM:	Welfare Monitoring

Abstract

The main objective of the study is to identify the problem of food insecurity and its determinants in rural households of the Amhara Regional State of Ethiopia. The necessary data were generated from the secondary data of Household Income, Consumption and Expenditure (HICE) and Welfare Monitoring (MW) surveys conducted by Central Statistical Agency (CSA) in the year 1999/00. The data generated from all the 1740 rural households of the Amhara Region who were participated in both surveys was used as secondary data in this thesis research. The data analysis techniques involved both descriptive and econometric analyses. The specific statistic used includes percentage, mean, and standard deviation in the descriptive statistics and tobit model of regression in the econometric analysis.

The results of the study revealed that the rural households in the Amhara regional state of Ethiopia are food insecure. It was checked by using recommended minimum calorie requirement (i.e., 2200 kcal). Based on the results about 56 percent of the Amhara rural households are food insecure. They could not cover the required minimum daily calorie from the income generated from their agriculture as well as other activities on which their participation was found to be low and livestock possession as it has a problem of both quality and quantity. Moreover, the profile of the Amhara rural households was found to be more devastating. Illiteracy is more pervasive and accounts for 79.5 percent (1383) of the household heads. In general, households with large family size, illiterate and old household heads are more likely to be food insecure than those with smaller family size, educated and younger household heads. Moreover the empirical analysis reveal that household size, education, agricultural income, and share of food in total expenditure, participation in off-farm activities, and livestock possession found to be significant and have the expected sign. Although the ownership of livestock has an impact on the food insecurity of rural households it could not ripe anything because of lower quality and quantity of the possession. The study concluded that natural factors, demographic and socio-economic factors such as large family size, high dependency ratio, low level of agriculture production, low level of livestock wealth, low participation in off-form activities, and so on of farming are among the factors that increase the odds of food insecurity.

Policy implication of the study include: population policy should be implemented effectively; off-farm employment should be enhanced; promotion of livestock and increased agricultural productivity through different ways should be implemented; and the development of small-scale irrigation should be given a priority.

Chapter One

Introduction

1.1. Background of the Study

Lack of food excludes people to practice what other people are doing every time. However, large amount of food production in the world does not ensure any country's food security. Moreover, huge production of food at national level does not guarantee for the household food security. This may be due to unfair distribution of resources, variation in production functions, and motives for productivity. That is why even if the production increases through time; food insecurity, malnutrition and hunger would remain the main agenda and much more serious problems in the world today (Barrett 2002).

In the World Food Summit held in 1996, the world leaders met in Rome and made a commitment to decrease the number of food insecure people by half not more than the year 2015. After some years, the world food summit tried to evaluate its activities in food security programs but the trend showed that it is unlikely to meet their target by 2015 (FAO 2003, Madley 2000, Population Council 1996). This means that the problem of food insecurity may go beyond the determined period and will continue further.

Historically, Ethiopia has been relatively food secured in the Imperial period (before 1960's). However, since early 1960's domestic food supply failed to meet the requirements of the people, both at national and household levels. In line with this, the food insecurity problem became an important agenda through time. In the 1990's about thirty million (30,000,000) people were estimated to be food insecure in Ethiopia. In addition, 50-100 kilogram per capita food gap has

occurred (Habtewold 2001). Among this food insecure people large number is found in rural areas of the country. The proportion of people who are unable to attain their minimum nutritional requirement is reported to be fifty two percent (52%) of the rural population (MEDAC 1999).

Ethiopian economy is based on subsistence agriculture that accounts for more than eighty percent (80%) of the population. This sector also contributed more than forty-five percent (45%) of the national Gross Domestic Product and 82.2 percent (82.2%) of the export income. This sector relied on nature and low technologies and the production suffered frequent drought and famine. In Ethiopia many people died of drought than other problems particularly in the periods of the registered and documented recurrent drought epidemics. Such epidemics include the 1957-58, 1964-65, 1972-73, 1983-84, 1998-99, and 2003. During these periods of drought epidemics so many people were died and many others were forced to change their localities for the search of food and means of living (EEA 2005, Welde-Giorgis et. al. 2000).

The extent of food insecurity in Ethiopia in recent years has become alarming and its coverage in drought periods has reached as high as 45 percent of the population. It is frequently aggravated and turns out to be more acute, and on the average over five million people are enlisted for a daily relief food per annum over the last decade, even when the weather and market conditions appear to be normally good (Clay et al 1998).

According to the Ethiopian Economic Association's report, the number of people affected by drought and famine was 1.5 million or five percent (5%) of the total population in the early 1970's. However, this number increases to seven million or 17.4 percent (17.4%) of the total

population in 1984. Moreover, it rose to 14.5 million people or twenty two percent (22%) of the total population in 2003 (EEA 2005, FSP 2003). In Ethiopia agricultural production, grain constitutes the major staple food for most Ethiopians. Thus, grain production of the year 2003/4 increased by 59 percent as compared with that of 1978/9. However, the production in the drought and famine affected year of 2002/3 declined by 26 percent as compared to the previous year. Moreover, in the year 2003/4 where grain production has been forecasted to be good (i.e., 117.47 MT), there was a food deficit of about 26 percent. In terms of nutrition the per capita food supply increased from 1500 kcal in 1993 to 1800 kcal in 2002. On the average between the years 1993 to 2002 it is 1700 kcal, which is less than the minimum requirement of 2100 kcal per person per day (EEA2005, FSP2002).

From this we can understand that even if domestic production is the first and prime source of food supply of the country, food-import supplements a lot. Ethiopia imported an average of over 263 thousand metric tones of food in the beginning of 1980s and this number decline to 255 Thousand metric tones in the second half of the same year but in the early 2000 this amount increase to 327 thousand MT with higher share of grains at 92 percent. The major food aid commodities distributed in Ethiopia constituted cereal followed by oils and fats. Wheat constitutes the largest share and accounts for about 80 percent of the total volume of food aid. Sorghum and maize account for about 8 percent and 3 percent respectively, while oils and fats about 3 percent of the total (EEA 2005, Clay et al 1998).

Table 1: Regional Food Insecurity Profile-- Ethiopia (in number)

No	Region/ Administration	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
1	Tigray	675,000	1,361,100	703,275	1,047,400	938,500	917,2000	851960	1,422,500	388,646	0
2	Afar	35,000	50,000	23,909	272,704	127,700	225,400	94214	474,500	207,025	54,600
3	Amhara	676,120	2,854,800	765,632	2,534,915	2,130,000	1,724,800	3617	2,308,300	114,610	154,700
4	Oromiya	125,500	1,120,600	620,742	1,598,246	1,129,000	1,051,400	1,100,000	2,617,700	500,004	733,780
5	SNNP	249,600	310,000	314	852,740	868,800	3,031,3000	1,500,000	1,245,200	325,998	35,910
6	Somali	35,000	50,000	401,842	1,321,000	981,000	894,800	900,000	1,167,100	557,861	1,514,960
7	B.Gumuz	13,000		10	4,201		9,000	6,000		0	4,200
8	Gambella	41,500	1,000	1	46,600		32,800	24,000	44,700	49,500	50,200
9	Harar	11	12,800	13,313	7,070	17,600	13,000	10,000	16,500	0	0
10	Addis Ababa	56,000	17,615	19,614						0	0
11	Dire-Dawa	90,006	3,350	58	47,459	48,700	10,000	12,000	73,200	38,454	31,160
Total		3,153,000	1,931,990	5731315	2,551,510	7,732,335	6,242,300	5,181,700	4,000,000	2,182,098	2,579,510

Source: DPPC various reports of early warning

From Table 1 above, it is simple to note that the regional profiles of food insecurity reflect variation on deprivation among the regions. The figures indicate that even though the problem is prevailing in all regions the risk is higher in Amhara. Based on population and land sizes and tenure, Amhara is also the second largest region in the country, next to Oromia. Accordingly, it is became the first in number of food insecure population over the last 10 years (see Table 1 above). When we look the number of food insecure people in the Amhara region it is clear that for most of the years it is above a million are suffer from shortage of food.

1.2 Ethiopian Food Security Policy

In the 1974, Ethiopian government established the relief and rehabilitation commission (RRC) to monitor the incidence of food security across the country and coordinate food aid activities including those of international NGOs. In 1985, 48 international NGOs were operating relief project in the country. Local churches and other organizations have also been quite active historically (Webb, Brown, and Yohannes 1992).

Since the end of the civil war in 1991, the Ethiopian government has steadily expanded its disaster prevention and preparedness capacity to prevent reoccurrence of the mortality level seen during the famine years of 1984 and 1985. In 1993, the government adopted a national policy on disaster prevention and management (NPDM). The main objective of the policy is to ensure that the relief assistance addresses the route cause of food shortage and famine and reduced people's long-term vulnerability to disaster. The idea of labor

incentive public work was also ensured in the policy, which prohibits free food distribution to the able bodies by creating linkage between relief programs to the development work (TGE 1993).

After the political instability has been settled and the EPRDF government gets a hold in power in the year 1991/92, the Ethiopian government is implementing different policies and strategies to solve the problem of food insecurity. The government's strategy of Agriculture Development Led Industrialization (ADLI), formulated in 1994, based on the premises of improving the overall performance of agriculture that will result in better agricultural development and productivity that in turn leads to industrial development eventually of developed and industrialized nation.

The major components of ADLI include: input provision to peasants, promotion of small-scale irrigation, improved livestock herds, environmental protection and natural resource management, grain marketing efficiency, promotion of farmers' organizations and women's participation in agriculture and expanding rural roads. Under this policy the *Food Security Strategy (FSS)* was initially designed at federal level in 1996. Then after, it was formulated as *Regional Food Security Strategy* in the regions of Tigray, Amhara, Oromiya, and Southern Nations, Nationalities and People (SNNP). The strategic document was revised in the year 2001 (FSS 2002, FDRE 1996).

Accordingly, Ethiopian economy could not attain food security by supplying food at national and household level. For this reason food aid become important and turn out to be a common practice in the country to save millions of lives both in the emergency and development programs. Currently, Ethiopia consistently receives large amount of food aid. Such a humanitarian relief has accounted for almost a third of all donor inflows (Getachew 2004). According to Food Security Program, the average food aid flow to the country reached about 700,000 MT (FSP 2003). This shows that the country has continues to depend on food imports, mainly on food aid.

By the time, the Ethiopian government and other national and international organizations going to take measures to improve the problem of food insecurity through *Safety Net Program*. This program is supported by trained agriculture extension experts and focused on provision of food to the needy population through participation in public activities (Steven and Kennan 2001).

In general the Ethiopian government implements poverty reduction strategy (PRS), hence examination of food insecurity at regional, zonal or household levels to identify the specific characteristic of the problem is crucial. Having this background, this study tries to investigate the food insecurity and its determinants in rural households in Amhara regional state of Ethiopia.

1.3 Statement of the Problem

In spite of the fact that Ethiopia has abundant natural resources, most of its socioeconomic indicators are extremely low and discouraging. In Ethiopia food shortage has aggravated the already poor economy of the country. Since Ethiopia is one of the poorest countries in the world today it has received enormous amount of food aid over the past several decades through short run and long run programs. It includes safety net and similar support programs that aimed to alleviate the problem of food shortage to the maximum. If not, it aimed to narrow the gap between the demand and supply of food aid to the minimum.

Numerous studies have confirmed that there is a problem of food insecurity in Ethiopia with wide range of area to be covered and large number of people to be attended for different identified causes of food insecurity problem. Among these causal factors per capita land holding with increasing population growth, livestock availability, education, per capita income of the household from agricultural and non agriculture activities, soil fertility, conflict, under-funded agriculture are the major and commonly mentioned factors (Gebre-Selassie 2005, Negatu, 2004,Ramakirshina et al, 2002, Madeley 2000).

Ethiopian government and international donors are implementing different categories of responses to food insecurity to attain food self–sufficiency and reduced food aid dependency. These categories are based on Supply Based responses (Increasing the level

and stability of production, Increasing food reserve, and Influencing international food markets), Demand Based responses (Improving income, productive assets available to vulnerable groups, and other market and non-market transfer), and Disaster Prevention and Preparedness Capabilities having adequate early warning systems (IDRI and IFPRI 2003).

Despite such effort food insecurity remains the main problem in our country and the need for food aid become increasing. There were and still are different food aid responses taken to solve the problem of food insecurity problem through both emergency relief as well as development works. But, many literatures come to different, incomparable and somewhat controversial results on the effect of food aid on the overall agriculture development, marketing behaviors and consumption patterns (Habtewold 2001, Maxwell 1986, Clay et al 1985).

In the last ten years the Amhara regional state have been identified as chronically food insecure area and can not adequately feed its population. In the region, about 2.5 million people were suffered from food insecurity and drought problem. Therefore, they will continue to be dependent on relief assistance. Some studies were also undertaken only in some parts of the Amhara regional state but the results of such researches revealed the same (Amhara National Regional State 2002, Gebre-Selassie 2005).

Moreover, some huge researches that include the whole region in terms of geographical coverage have identified and proved to be food insecure region for longer time periods. Therefore, both the comprehensive and area specific researches are different faces of the same token. Both types of researches clearly showed us that the Amhara regional state is the hardly stricken and food insecure area. Instead of concentrating in a specific Wereda it is better to look and define the empirical cause of food insecurity problems in that region. Having this background in mind the study put forward the following research questions.

- -What is the condition of food insecurity problem in the rural households of the Amhara region?
- -What are the determinant factors for food insecurity problem in the rural households of the Amhara region?

1.4. Objectives of the Study

The main objective of this study is to assess food insecurity and its determinants in the rural households in Amhara regional state of Ethiopia. The specific objectives of this study include:

1. To assess the food insecurity situation of rural households in Amhara regional state.
2. To identify the major factors that contributes to household food insecurity situation in the region.

3. On the bases of the results of the above two objectives the study will also recommend what should be done and identifies policy measure that improve the households' food insecurity problem.

1.5 Significance of the Study

As indicated above, the country in general and the study area in particular has been facing food insecurity. Identifying and understanding factors that cause and/ or influence the problem as well as its intensity at household level deserves rigorous empirical research where food shortage has been pronounced and has great importance for policy implications and interventions.

The result of the study provides policy related information that helps to prioritize among the many possibilities depending on the relative extent of influences of its determinants. More specifically, it helps concerned bodies in their effort to formulate policies and develop intervention mechanisms that are tailored to the specific need of the study area. Furthermore, this study attempts to make further contribution to the previous studies and can be used as a source material for further studies.

1.6 Organization of the Paper

This thesis research has been designed in five consecutive chapters. Chapter one is introduction and covers background of the study, Ethiopian food security policies, objectives of the study, statement of the problem, its significant as well as hypotheses and

organization of the paper. Information on the previous works and empirical findings have been properly sifted out and entertained in chapter two. Chapter three also deals with research methodology where the data type and use, area of study and model specifications are presented. Chapter four gives us the analysis and interpretation of descriptive and econometric analysis. Finally conclusions drawn from the analysis of the data and policy implications as well as recommendation are covered in chapter five.

Chapter Two

Literature Review

2.1 The concepts of food security and Food Insecurity

The concepts and definitions of food security and insecurity have been discussed for a long period of time. There is much literature on the concepts and definitions of food security. Since its inception it is defined in different ways by international organizations and researchers. According to Hoddinot (1999) there are close to 200 definitions and 450 indicators of food security.

In the early periods the question was whether a nation or a region could grasp enough food to meet the cumulative requirements of its people. This means that special attention was given to fluctuations in aggregate food supply. Food security interventions were also primarily concerned with providing effective shock absorber mechanisms against such fluctuations. Such conceptions could be clear from the definition of the World Food Conference of 1974 (Barrett 2002, Valdes 1981).

According to the World Food Conference of 1974 food security was defined as:

'availability at all times of adequate world food supplies of basic foodstuffs…to sustain a steady expansion of food consumption…and to offset fluctuations in production and prices' (United Nations 1974).

However it was soon realized that this definition gave a very limited view of the food security problem. It is so because a large number of a population could be living in hunger even if the country had sufficient food in the aggregate during normal times. It is also a paradox that global food security exists along side individual food insecurity. It is known that the world produces enough food to feed every one. However, there are countries in the world, regions within countries, villages within regions, households within villages and individuals within household that are not able to meet their food needs.

This means that adequacy at the national level does not necessarily ensure adequacy at the household or individual level. As a result food security had advanced from emphasizing the supply side through the individual and household level (demand side) for improved access to food in the 1980s (FAO, 1983). In the 1990s, improved access was redefined by taking into account livelihood and subjective considerations. It emphasizes a broader framework of individual behavior in the face of uncertainty, irreversibility, and binding constraints on choice (Osmani 2001, Maxwell, 1996).

The most widely used definition of food security is the one forwarded by World Food Summit in 1996 and broadly set as '*Food security exists when all people at all times, have physical and economic access to sufficient, safe and nutritious food to meet their*

dietary needs and food preferences for an active and healthy life' (FAO, 1996). This definition integrates stability, access to food, availability of nutritionally adequate food and the biological utilization of food.

To sum up, it is known that food security concepts and definitions have developed over the past thirty years. Hence, the current concept emphasizes the role of multiple factors that affect the household's or individual's ability to acquire enough food all the times (Maxwell 1996). Consistence with these definitions of food security can be defined with the main emphasis on food availability, access, and utilization.

The other concept that is worth mentioning here is that the issue of food insecurity. It is believed that people who frequently do not have enough to eat according to accepted cultural norms created a crisis. For this reason, the phrase '*Food Insecurity'* was used to describe the instability of national or regional food supplies over time. It was then expanded to include lack of secure provisions at the household and individual level. Food insecurity concern may be due to either inadequate physical availability of food supplies, poor access among the population, or inadequate utilization of food (Habicht et. al. 2004)

Food insecurity classified as chronic or transitory. Some other literature also include a third kind of food insecurity; i.e., cyclical type of food insecurity. Chronic food insecurity occurs when a household is persistently unable to meet the food requirements of its

members over a long period of time. It, therefore, afflicts households that persistently lack the ability to either buy food or produce their own. Structural factors contributing to chronic food insecurity include poverty (as both cause and consequence), the fragile natural resource base, weak institutions and unhelpful or inconsistent government policies. It is argued that chronic food insecurity at the household level is mainly a problem of poor households in most parts of the world (FAO 2002).

On the other hand, transitory food insecurity refers to a temporary decline in a household's access to enough food. It results from a temporary decline in household access to food due to crop failure, seasonal scarcities, temporary illness or unemployment, instability in food prices, production, household income or combination of these factors. But, the main triggers of transitory food insecurity in Ethiopia are drought and war. Finally, the cyclical type of food insecurity is caused by seasonality (Osmani 2001, FAO2006).

In general, a household can be said to be food secure only if it has protection against all kinds of insecurity. The average access to food over the long term should be nutritionally adequate, and a household should be able to cope with short-term vicissitudes (changes) without sacrificing the nutritional needs of any of its members. Finally the concept and definition of food security were developed and clearly explained based on the growing hunger, food insecurity and malnutrition situations in developing countries. From the

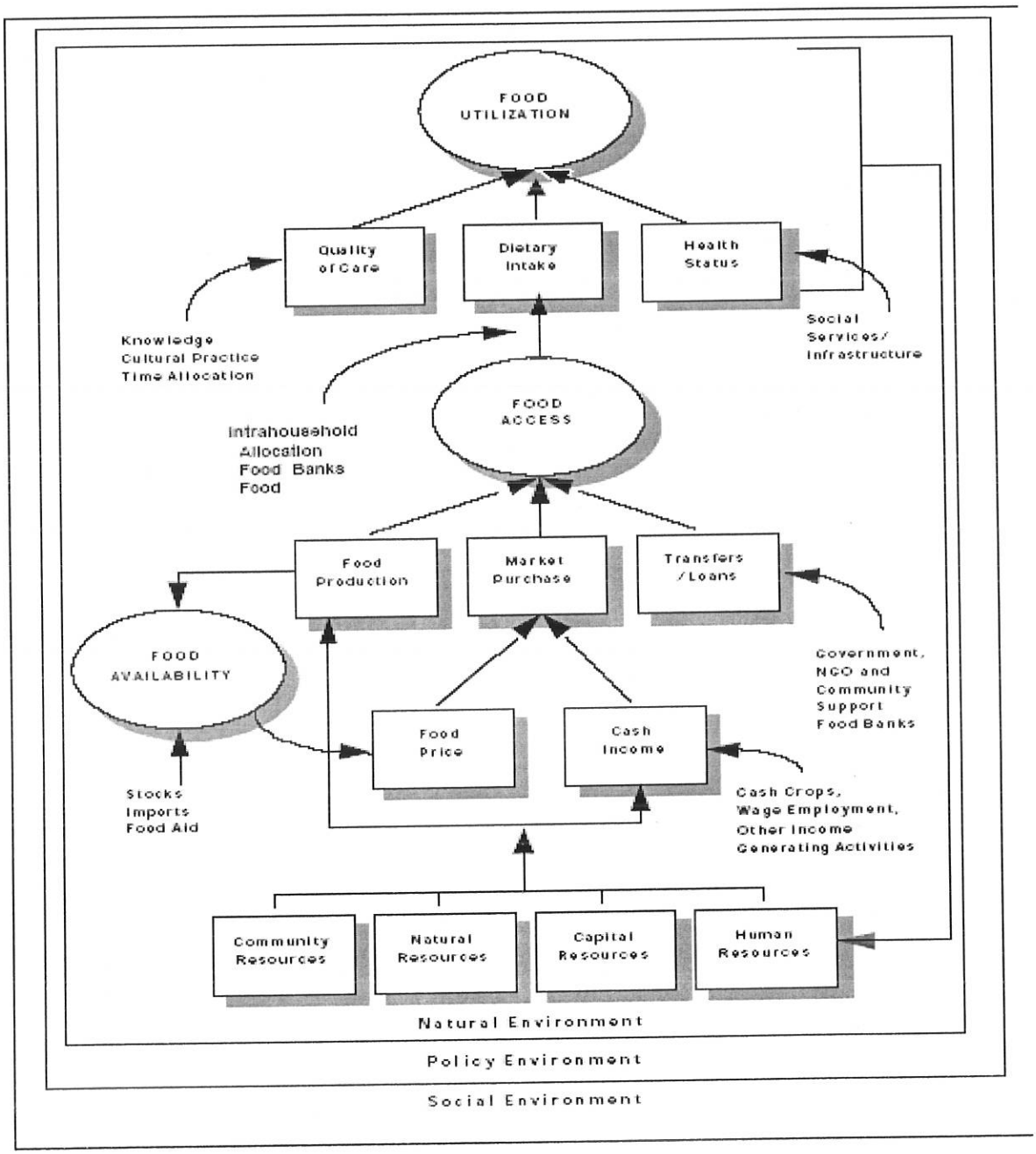
above definitions of food security, slight variations were observed. However, the overall basic principles and definitions of food security, that is, "availability, access and utilization" were stressed in the definitions cited above. Therefore, for the purpose of this study, the definition put forward by Word Food Summit (1996) was taken as a working definition of food security and the household level is considered as the key unit of food security analysis.

2.2 Food Security: Determinants and Measurement

As it is defined above, food security refers to access by all people at all time sufficient food for an active and healthy life, whereas food insecurity refers to the lack of access to enough food for an active healthy life. Thus, according to many researchers the determinants of food insecurity are also classified in to three groups within the framework of the general definition of food security, that is, food availability, access, and utilization (Hoddinott 1995; USAID 1995; Maxwell and Frankenberger 1992; Weber et al, 1988) while some other researchers gave more attention only on access and utilization of food and the determinant of food security can be seen as a combination of two distinct problems (Osmani 2001, Sen 1981).

In more precise way, diagram 1 is provided below, highlighting the three dimensions of food security that are availability, access, and utilization, and the nature of their relationship to one another, as well as a brief description of their determinants.

Diagram One: Flow Chart of the Conceptual Framework and Determinants of Household Food Security



(Source: Adopted from USAID 1999)

2.2.1 Food Availability and Its Determinants

Food availability refers to the physical presence of food at various levels from household to national level; such food can be supplied through household production, other domestic output, commercial imports, or food assistance. It will be achieved when sufficient quantities of food are consistently available at the regional or national/country level (Løvendal and Knowles 2005,USAID 1999) as well as it determined by each of these factors at the regional or national level. The domestic food production and food import contribute to national food availability, whereas increasing domestic food production reduces dependence on food import. In general, food availability may be constrained by inappropriate agricultural knowledge, technology, policies, inadequate agricultural inputs, family size, etc (Yared 2001, Hoddinott 1995).

2.2.2 Food Access and Its Determinants

Food access refers to the ability of a household and its members to acquire enough food through production, exchange or transfer. Access ensured when households and all individuals within them have adequate resources that used to meet the households access to food. Once the basic sources of food have been identified, it is necessary to investigate the often-complex interaction of agro-physical and socioeconomic processes that limit a household's ability to obtain sufficient quantities of food from each source (USAID 1999).

It is clear that the sources of food for a household are different, households typically whether: (a) grow it and consume from their own stocks; (b) purchase it in the marketplace; (c) receive it as a transfer from relatives, members of the community, the government, or foreign donors; or (d) gather it in the wild. Understanding these basic patterns and how they vary across locations, population groups, and over time will provide a particularly important starting point for understanding the general nature of the food security problem (USAD 1999).

Sen first developed the entitlements approach in 1981, replacing earlier theories that stressed shortages in food availability as causes of food insecurity. In contrast, Sen's approach focuses on household access to food, or 'entitlements' .The entitlement of a person stands for the set of different alternatives that the person can acquire through the use of various legal channels. According to Sen, people are usually starved mainly because of lack of the ability to access food rather than because of its availability. In a sense, income or purchasing power is the most limiting factor for food security. He recommended food security should aim at increasing people's ability to acquire food through the 'legal means available in the society' i.e., production, trade or exchange, inheritance and transfer. Analysis has also changed from macro (national) to micro (household and individual) levels (Maxwell 1994, Reutlinger 1987).

The majority of the poor people in developing country are engaged in subsistence farming. They also depend on agriculture both for their incomes and food entitlements. So agriculture production is the main determinant of food security of the household and that the role of agriculture is crucial to the eradication of poverty and food insecurity in the rural households. The leading determinant of food insecurity in the Horn of Africa is low levels of per capita food production. Insecurity can be tackled most effectively through policies that promote agricultural productivity, rural incomes and food production (FAO 2001).

The crucial assets for farming households are the productive ones such as land, labor, and traction-power (animal power). Farm resource and household asset is important indicator of poverty in the farming system. Farmland, labor and livestock and fertility of soil have important implication on households' food security status and poverty level. Production-based entitlements will also be affected by household access to agricultural inputs such as fertilizers and seeds. This will be influenced by price and availability of these inputs that, in turn, may be affected by liberalization. Government policies may also have an impact on the price of inputs through subsidies and price controls, and on availability through the actions of prostates (Devereux 2000, Maxwell and Frankenberger 1992, and Sen 1986).

Technology, institutions, and availability of knowledge and infrastructure will have impact upon the level of production and thus production-based entitlements. Again,

overall budgetary considerations, for example structural adjustment policies, may influence the provision of research and extension. Food access is also a function of the physical environment, social environment and policy environment that determine how effectively households are able to utilize their resources to meet their food security objectives (USAID 1999).

In rural economy men and women are face different constraints in accessing to different resources and adopting new technologies. It is so because they work within different sets of time constraints, work burden, responsibility and roles. Thus, the female-headed can find it more difficult than their men counterparts to gain access to valuable resources. Land, credit, agricultural inputs, technology, extension services, education, training, participate in off-farm activities and other services could be mentioned in this regard. These and other female problems have negative influence on food security (Aredo 1994).

On the other hand, Except for households that are entirely self-sufficient in all their food needs access to food through the market is an important component of household food security. The main factor affecting trade-based entitlements is the level and variability of the price of food relative to whatever individuals are able to exchange for it. Retail food prices at a point in time and their variability over time will in turn depend on by the total supply and demand of food, market integration and transport cost. Moreover, some of the basic sources that determine the possibility of increasing entitlement to food are cash,

labor, markets and public services, and other income gain from remittance and aid (Dercon 2001, Osmanis 2000, and Steven et al 2000).

Both the level and the location of employment opportunities will also influence labor-based entitlements. In addition it is affected by the labor power, technical knowledge and skills embodied in different individuals and households, which will be affected by the provision of health and education, and by nutrition and food security. All will be influenced by the rate of population growth. When we came to transfer entitlement, it differs from other entitlement categories because they are not produced or earned directly by the individual but are donated by others. Formal transfers come from the state, aid donors or NGOs, while informal transfers come from relatives and friends. Formal transfers will clearly depend on government policies: the existence and extent of transfers of cash or food will affect transfer-based entitlements. The existence and strength of social networks, including kinship networks, is an important determinant of informal transfers, as is the extent to which risks are correlated across kinship networks (Steven et al 2000).

In general access indicators measure that food access become apparent when governments and development agencies realize existence of household food insecurity and famine conditions are occurring despite the availability of food. In recent years, access indicators have been as relatively more valuable in development planning,

implementation and monitoring of food security interventions. Likewise, food access indicators are relatively effective because they show various strategies used by the household to get food from diversified sources, i.e., from own farm production, non-farm income, remittance etc. (Habtewold 1995, Frankenberger 1992).

2.2.3 Food Acquirement and Its Determinants

It refers to a proper biological use of food to obtain an appropriate energy and nutritious diet, potable water, and adequate sanitation. Biological utilization relates to individual level food security and is the ability of the human body to effectively convert food into energy. A household that has the capacity to *acquire* all the food it needs may not always have the ability to *utilize* that capacity to the fullest.

Food utilization, which is typically reflected in the nutritional status of an individual, is determined by the quantity and quality of dietary intake, general childcare and feeding practices, along with health status and its determinants. Effective food utilization depends in large measure on knowledge within the household of food storage and processing techniques, basic principles of nutrition and proper mother child care and feeding practices, and illness management (Mattews 2003).

Poor infant care and feeding practices, inadequate access to, or the poor quality of, health services are also major determinants of poor health and nutrition. While important for its own sake, as it directly influences human well-being, improved food utilization also has feedback effects, through its impact on the health and nutrition of a household members, and therefore, on labor productivity and household income-earning potential (Hoddinott 1995).

2.2.4 Measurements of food security

Measuring the required food for an active and healthy life and the degree of food security attained is a question to be addressed in a food security study. However there is no single indicator for measuring it. For this purpose different indicators are needed to acquire the various dimensions at the country, household and individual levels. At the national or regional level, food security can be measured in terms of food demand (requirements) and supply indicators. The supply of food may be from current production and stocks and from previous production where as the need has to be determined on the basis of biological or nutritional requirement of a given society for a certain period of time usually a year or a day (Hoddinot 1999).

The most commonly used indicators which used to measure household food securities are availability, food access and utilization indicators. These indicators embrace

meteorological data, information on natural resources, agricultural production data, marketing information, food balance sheet, sales of productive assets, diversification of income sources and household budget expenditure security. Thus, it is possible to say that there are no single and one best food security measure that is universally accepted. It is up to the researcher to select an indicator or a combination of indicators that suits the objective of the study, the level of aggregation and specific circumstances of the study and the study area. Therefore, in this study the minimum calorie requirement was used as a benchmark to differentiate food secure and insecure household among the total sampled households and to identify their determinants (Frankenberger, 1992).

2.3 Coping Mechanisms

Farm households respond to the problems caused by seasonal and disaster related food insecurity in different ways. Food availability can be affected by climatic fluctuations, depletion of soil fertility, or the loss of household productive assets or some other related problems. In that case farmers' try to reduce this problem by taking actions that result in trade-offs between current and future consumption. The range of coping and adaptive strategies is large and differs according to the particular conditions. It includes expansion of production and improving productivity, food grain purchase through sales of livestock and institutional and societal income transfer systems such as gift and relief food distribution.

Asset ownership insures household consumption when incomes are insufficient. Households acquire assets that can be sold to compensate shortfalls in consumption and income. Livestock is a classic indicator of asset and they are more likely to be marketed regularly or more readily. According to some literature most of the time households didn't sold livestock unless food insecurity is severe (Maxwell and Frankenberger 1992). In general asset and changes in the value of an asset index are a good indication of household vulnerability to more severe food insecurity. Especially during drought years, livestock, a major asset that can be easily liquidated, is more important in terms of implying better access to food. Moreover, in drought periods, households may shift their labor resources from crop production to non-farm wage employment to ensure continued income (USAID 2003, Yared 2001).

Non agricultural income Earning play an important role in providing additional income to rural household it enhances household economy and food security by giving additional income and decrease food deficit when agricultural production falls short and it also avoid grain sales. When shock occurred households might also adjust their consumption patterns, by reducing their dietary intake to conserve food and relying more on loans or transfers and less on current crop production and market purchases to meet their immediate food needs (Shiptone 1990).

Coping mechanisms used by farm households in rural Ethiopia include livestock sales, agricultural employment, and certain types of off-farm employment and migration to other areas, requesting grain loans, sale of wood or charcoal, small scale trading, selling cow dung (in central Ethiopia) and crop residues, reduction of food consumption, consumption of meat from their livestock, consumption of wild plants, reliance on relief assistance, relying on remittance from relatives, selling of clothes, and dismantling of parts of their houses for sale. Some of them are likely to be implemented only after the possibilities of certain other options have been pursued. In addition, households who have diversified source of income are often able to cope with crisis than others (FFP 2003, Yared 1999, Dessalegn 1991).

Households that spend a high portion of their income on food (i.e., more than 70 percent) are very likely to be food insecure. Thus, the percent of total household expenditure spent on food is used to show household vulnerability. To the extent that households rely on market purchases as an important source of food, cash incomes (or expenditure levels) are likely to be a more or less important indicator of their food security status (USAID 2003, Smith 2002).

Food aid, today, is mainly considered as an instrument in addressing for both transitory and chronic types of food insecurity in low-income country. It is noted that the humanitarian agencies, or donors, implement food aid programs in these countries in

order to give immediate response to the needy people, to increase income sustainability, to improve agricultural productivity, and improvement in health and nutrition among the residents. Moreover it leads to improvement in the availability of food supplies at the national or regional level, or to increase access to food at household levels through higher home production of food crops, market purchase and/or other means or to make more effective utilization of food at the individual level to meet human biological needs (USAID 1999).

According to some literatures (Habtewold 2001, WFP 1991) food aid can be classified based on its target or purpose. Even if there is no clear difference in the definition between the different types of food aid, however it is traditionally classified into three broad types. These are emergency food aid, project food aid, and program food aid. The emergency food aid is a response to sudden natural and man made disasters while the second type; i.e. project food aid, is aiming at transferring income to the poor or satisfying their nutritional requirements in normal years through development oriented works. The third type; i.e. program food aid, is providing to the government for balance of payment and budgetary support (ibid 2001).

In general, food aid is an important development resource, supporting programs with a wide range of development objectives. For example, investments in soil and water

conservation efforts supported by food-for-work programs have potential long-term implications for increased agricultural productivity and crop income, while school feeding programs are typically intended to improve student attendance and performance, factors which ultimately lead to enhanced labor productivity and higher wage earnings. Improved health and nutrition achieved through food-assisted maternal and child health programs or food-for-work efforts at improved water and sanitation have immediate implications for individual health and well-being and also promote productivity and income-earning potential over the long-term.

As it is mentioned above, it is believed that food aid has tremendous contribution in improving food insecurity problems of individuals, households, and regions of the developing countries. On the other hand, numerous researchers (Barrett 2006, Barrett and Maxwell 2005, Barrett and Hoddinott 2005, Barrett 2000, Maxwell 1991) have constructed a list of disincentive scenarios of food aid that could be mentioned as follows:

- Household-Level Effects of Food Aid (both cash and kind) according to some research it discourages them from working some thing to generate income. Moreover, food for work programs are relatively more attractive than work on own farms/businesses either because it pays immediately or because the household considers the payoffs to be higher than the returns from own labor. In

addition, poor timing and FFW wages that are above prevailing market rates can cause negative dependency by diverting labor from local private uses.

- *In addition* food aid can discourage household-level production. It is so because if food aid lowers local food prices, that may decrease the relative payoffs to investing in one's own production. In this case, both recipients of food aid and non-recipients of food aid discouraging from own production.
- *Changed Consumption Patterns:* the rationale for food aid partly has long been export promotion that entails some efforts to change consumers' preferences to introduce them to new foods and thereby endogenously stimulate demand for foods with which they were previously unfamiliar or which had formerly represented only a minor share of their diet.

In general when we see the last 30 years there is no year passes with out receiving food aid from donors. With this, all amount of continuous food aid from the donors, in this time has become a debating agenda and NGOs and others do numerous evaluation studies on the impact of food aid on food security program. There is a debate about incentive and disincentive effect of food aid as labor disincentive production, change consumption pattern, natural resource over exploitation, price effect, community level moral hazard, disrupting international market, real exchange rate, discourage policy reform.

2.4 Empirical Evidences

Causes of food insecurity facing farm households in various developing regions, particularly Africa, Latin America and Asia, have been documented in some literature. The productivity of Ethiopian agriculture is among the lowest in the world - around 1.2 tons per hectare (World Bank 1999). Although higher yields are possible through agricultural intensification, the evidence suggests that "average land holdings would be insufficient to feed a family of five (5) even if production could be successfully increased three times with the use of improved technology" (Masefield 2000).

The study in Nigeria using Tobit model found that sex of head, educational level, dependency ratio, network, farm size, input usage, commercialization extent, being a member of cooperative, food expenditure, remittance have negative influence on food insecurity, where as age of head, household size, positively influences the problem and all the variables are significant (IKPI et al 2004).

Study by Alarcon et al (1993) for smallholder farm households in west highland of Guatemala found that lack of access to credit and cash crop production displace food crops and household consumption of own production is reduced. Thus the household's vulnerability to food insecurity tends to increase. However another study in Malawi by Diagne .A. (1998) found that formal credit has marginally beneficial effects on household annual income. However, these effects are very small and do not cause any

significant difference between the per capita incomes, food security, and nutritional status of credit program members and non-current members.

Ramakrisha and his colleagues (2000) undertake an empirical study in the Amhara regional state of Ethiopia, in the case of North Wollo. The data analysis based on food balance sheet and aggregate food security index reveal that the north Wello zone is highly food insecure area and the majority of the sampled household depends on famine relief assistance. In addition they tried to find the cause of food insecurity using logit model and found that cereal production, education, fertilizer consumption, livestock, and land size reduce the probability of the household being food insecure while family size increase the probability of insecurity (Ramakrishna et al 2002).

Similarly, a research was conducted in the Oromia regional state of Ethiopia by Centre for Studies of African Economies (CSAE 2003) in collaboration with Addis Ababa University revealed the same. The study also used logit model regression to identify the determinants of food security in the selected area. The empirical evidence revealed that farmers' access to fertilizer or educational level of household heads or farmers' access to land or farmers' access to family planning improve the probability of food security in the study area. Barret and Clay (2003) also find that in rural Ethiopia food aid may change in a consumption pattern and shift the production pattern of agricultural system.

In community study on resource access and food security in North wello the most frequently mentioned income source were food for work, migrant labor and daily wage labor. Moreover the sales of fuel wood and charcoal, grain trading and handicraft were found to be more important non-farm activity for women (Yared et al 2000).

The Consortium for Southern Africa Food Security Emergency and the World Food Program have jointly implemented a food and livelihood security monitoring system in six countries in the Southern Africa region since 2002. Based on three round surveys the monitoring system that covered more than 12,000 households, the organizations conclude that food aid can have a positive impact on beneficiary households in several ways. The first is to provide a short-term safety net and a source of calories to individuals so that they can remain productive enough to endure the food security crisis. Food aid can also help households differ spending, avoid selling negative assets, and avoid invoking other negative coping behaviors. Evidence from the CHS clearly shows that food aid has contributed to declining use of coping strategies to meet food needs in beneficiary populations (WFP 2005).

A study conducted in Uganda on the main cause of seasonal food insecurity revealed a data associated with weather related problems (little or too much rain) followed by pests and disease. Factors that contribute to such insecurity were inadequate labor, inadequate land, not growing enough food during the seasons and soil infertility, poor health, lack of

planting materials, lack of oxen for plaguing and so on. The farmers coping strategies include donations from relatives and neighbors, reducing the number of meals or ration, sale of livestock and exchange of labor for food. The study also shows that female-headed households were more food insecure than male-headed households. Further more, no specific pattern that indicates the higher level of education of the household head, the more food source a household will be (Bahiigwa 1999).

Off-farm employment opportunities in rural Ethiopia are limited in both availability and income-generating potential. Only 44% of rural households surveyed by the Ministry of Labor in 1996 reported any non-agricultural sources of income, and these contributed only for 10% to household income (Befekadu and Berhanu 2000). Another survey in Hararghe Region confirmed that off-farm activities generated only petty incomes: women collect and sell firewood and forage, men and women seek irregular, low-paid work as farm laborers, and some men migrate seasonally (ICRA et al. 1996). In a survey conducted in the Amhara region, 25% of households had one or more members migrate during the dry season in search of work, mostly to nearby rural areas. One in three migrants had difficulty securing employment, while half brought back no food or income for their families (FSCO 1999).

Chapter Three

Data and Methodology

3.1 The Data Sources:

The study used the 1999/00 'Household Income, Consumption and Expenditure (HICE)' and 'Welfare Monitoring (WM)' Surveys that were conducted by the Central Statistical Agency (CSA) of Ethiopia. The Agency conducted both surveys at national level to assess income and non-income dimensions of poverty.

The WM survey covers households* that are participated in HICE and some other additional households. The method of data collection used two stages of stratified sampling. In the first stage it selects a Primary Sampling Units (PSUs) which is Enumeration Areas (EA). Then, in the second stage a fresh list of households was prepared from within each sample EA's. From the fresh list, by using systematic sampling method, 12 and 16 households were selected from each EA's for HICE and WM surveys, in their respective order. Accordingly, 1740 and 3393 households were covered in HICE and WM surveys, respectively. However, this research used the 1740 rural Amhara households who are common in the two surveys.

**CSA defines household as a collection of a persons who normally live together in the same unit or group of housing units and who have common cooking arrangement*

HICE survey includes data on the levels, distribution and pattern of household income, consumption and expenditure. On the other hand, the WM survey includes data that mainly show the status of education, health and vulnerability of the people including access to health, education, infrastructure and status of their living condition. In both surveys the data were collected at household and individual levels. For instance, Income receipt, expenditure payment, number of asset and land ownership are collected only at household levels. Moreover, the HICE survey data was collected in two rounds of the year that is slack and peak period to represent condition of the family in the whole year (CSA 1999/00).

3.2 Method of data Analysis:

3.2.1 Descriptive Method

Descriptive method was employed to explain the situation of demographic and socio-economic variables. It used to assess the level and extent of food insecurity problem of the population. The specific methods of data analysis involved tabulation and cross tabulation, frequency, percentages, and computation of descriptive statistics such as mean, and standard deviation.

3.2.2 Econometric Method of Analysis

To identify food insecure households and to analyze the contributing factors for food insecurity a minimum calorie requirement was used as food poverty line. Among the

most commonly used procedures for setting the poverty line direct calorie intake method were used for this research. According to this method poverty line is defined as the minimum calorie requirement for the survival; i.e., 2200 kilocalorie per adult per day was used as a minimum calorie requirement to enable an adult to live a healthy and moderately active life, as suggested by WHO. In line with this, a household who's per calorie intake was found to be greater than their demand were regarded as food secure and while households experiencing a deficit were regarded as food insecure (Household food security was measured by dietary calorie intake adjusted for household size, age and gender composition).

Based on the poverty line (Z) we measure the head count index (H) and the poverty gap (PG) index that are the class of measures proposed by Foster, Greer and Thorbecks in 1984.

Head -Count Index (H) shows the number of food insecure peoples relative to the total population. This measure has the advantage of being easy to interpret, but it tells us nothing about the depth of severity of poverty.

$H = q/n$ ..... (1)

Where n is population size and q is the number of individuals below food poverty line.

Poverty gap index (Pg) is defined as the mean distance below the food poverty line expressed as a proportion of that line, where the mean is formed over the entire population. It measures the depth of poverty. It is defined as:

$$Pg = \frac{1}{n}\sum_{j=1}^{q}\left[\frac{Z - Xj}{Z}\right]$$

Model specification

There is no single and one best food insecurity measure that is universally accepted. So, it is up to the researcher to select an indicator or a combination of indicators that suits the objective of the study. Therefore, depending on the empirical and theoretical evidences reviewed above in the literature and based on the research objective food access indicators are relatively effective. Because it shows the various strategies used by the household to get food from diversified sources, i.e., from own farm production, non-farm income, remittance etc. (Debebe 1995, frankenberger 1992). The factors that influence these dimensions have effect on food insecurity at household level in one way or another as mentioned in the literature part of the study.

To see the factors influencing food insecurity among the insecure part of population following Mc Donald and Moffit (1980), tobit regression model was adopted and estimated. It was used to examine and establish statistical relationships between the dependent variable (i.e., food insecurity) and independent variables (demographic and socioeconomic variables) that are expected factors that influencing food insecurity at household levels. It showed the marginal effect of the explanatory variables on the food insecurity status of the households.

The model used in this thesis research can be expressed as follows:

$F_{insi} = \beta Q_i + e_i$ .....(3)

Where, $F_{insi} = 0$ for $X_i \geq Z$, and

$F_{insi} = (Z - X_i)/Z$ for $X_I < Z$

$\boldsymbol{Q_i}$ = Vector at explanatory variables,

= Vector of respective parameters

e_i = Independent distributed error term

F_{insi} = Food Insecurity Status of Household i (0-1)

Z = Food Insecurity line (minimum calorie requirement)

X_i = Calorie Consumption of Household i

The independent variables are captured as:

Q_1 = Household Size (number)

Q_2 = Gender of Household Head (1, if male and 0, if female)

Q_3 = Educational Level of Household Head

Q_4 = Age of Household Head's (in years)

Q_5 = Agricultural Income (in Birr)

Q_6 = Non-farm Income (in Birr)

Q_7 = Livestock (number)

Q_8 = Share of food expenditure out of the total expenditure

Q_9 = Remittance and Gift (aid)

The model used the various household resources as the factor influencing food insecurity based on the following hypothesis:

Among the potential factor(s) influencing households' food insecurity, household size (Q_1) is one factor expected to have influence on food security status of a household. According to theoretical as well as empirical evidences in the previous works, in developing countries like Ethiopia, subsistence agricultural production with limited participation in non agricultural activities, large household size exert more pressure on consumption than the labor it contributes to production. The per capita food availability declines as family size increases due to population growth. Hence, large family size is more likely related to being food insecure in a household (Paddy 2003).

Sex of a household head (Q_2) could have an influence in a household's livelihood and food security. As explained in the literature female-headed households can find difficult than men to gain access to valuable resource. In view of this, we can expect negative sign for men, in the regression analysis. In addition, this variable is used as dummy variable, 0 for female and 1 for male.

Educational level of the household heads (Q_3) could also have an influence on the food security status of the households. Educational attainment by the household head could lead to awareness of the possible advantages of modernizing agriculture by means of

technological inputs; enable them to read instructions on fertilizer packs and diversification of household incomes which, in turn, would enhance households' food supply. In the survey 79.5 percent (1383) of the household heads were found to be illiterate. Therefore, instead of putting the household heads the grade level they have completed it is better to classify them based on their status of being literate and illiterate. Thus, households led by educated heads take a value of 1 while those who are led by uneducated (illiterate) heads take a value of 0 (Najafi 2003).

The age of a household head (Q4), as other demographic variable, was also tested for any association with food insecurity. The assumption here was the higher the age of the head, the better the food security situation as there may be more options of making food available from both agricultural and non-farm opportunities.

Traditionally, even if income used as indicator of material deprivation consumption viewed as the preferred welfare indicator. It is so because in most HICE survey of most developing countries the income statistics reported by the households usually tends to be underestimated than the actual income level due to various reasons. Moreover, consumption may also be a good indicator of long-term well being that take household expenditure as a proxy for household income (MEDAC 2002).

The main means of livelihood in rural Ethiopia is agriculture. Based on the theoretical and empirical underpinnings agricultural activity is expected to influence the food security situation of the households. For rural households, crop production is the main sources of food for consumption of the subsistence farmer, which is influenced by socioeconomic, agro-climatic and environmental characteristics. Farm size also another factor to increase the level of production (ECA 2004, Haile et al 2005). However both surveys had not have any information about land size and crop production. But it had information on the amount of income gain from agricultural activity, which could serve as a proxy. Agricultural income includes either direct consumption from it or consumption bought by selling agricultural products.

Livestock possession is also expected to reduce food security. Particularly the ownership of farm oxen forms the cornerstone of farm economy in the rural households. Here, an attempt was made to see the differences brought by the number of livestock available to a household's food security.

Employment in off-farm and non-farm activities has a paramount significance to diversify the sources of farm households' livelihoods. It enables farmers to modernize their production by giving them an opportunity for applying the necessary inputs, and reduces the risks of food shortage during periods of unexpected crop failures. From this

perspective, it was attempted to see any significant difference existing between households who worked in off-farm activities and those who did not.

Remittance and aid incomes that come from government and non-government organization are also additional income. In the literature there is different conclusion about the impact of remittance and food aid incomes on household food security. As it is an additional income for the household, it used to smooth consumption in the case of shock and shortage for the time of emergency.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

In search of the conditions of food insecurity problems and the related determinant factors in the Amhara rural households the data was analyzed by both descriptive statistic and econometrics analysis techniques to give empirical evidences for the basic research questions of this report. Descriptive methods employed to explain the level and extent of food insecurity problems among the different demographic and socio economic variables in the area while regression enlighten the contributing factors for determinants of food insecurity in the rural households.

4.1 Descriptive Analysis

This section reports the descriptive results of the characteristics of food insecurity determinants and the associations between food insecurity and some of its determinant factors.

4.1.1 Food Insecurity Status and Demographic Characteristic in The study Area

The different variables that include the household heads sex, age, education background, and family size were briefly analyzed.

A. Food security status by the Sex, Education and Age of Household Heads.

Table 2. Food security status by Sex, Education and Age of household heads

Household Heads' Sex, Education and Age		Total Households		Food Insecure Households		Food Secure Households	
		N	Percent***	N	Percent*	N	Percent**
Sex	Male	1379	79.25	743	75.97	636	83.46
	Female	361	20.75	235	24.03	126	16.54
	Total	1740	100.0	978	100.00	762	100.00
Educational Background	Illiterate	1379	79.25	805	82.31	574	75.33
	Literate	360	20.69	173	17.69	187	24.54
	Total	1740	100.0	978	100.00	762	100.00
Age of the Household	Children (<18)	3	0.2	3	0.3	-	-
	Adult (19-65)	1535	88.2	846	86.5	689	90.42
	Old age (>65)	202	11.6	129	13.2	73	9.6
	Total	1740	100.00	978	100.00	762	100.00

* Out of the total Food Insecure Households ** Out of the total Food Secure Households

*** Out of the total Sampled Households

Source: Authors' computation based on CSA data

In Ethiopia the head of a household strongly influences the household's livelihood and food security. Their demographic features would then influence, to a certain extent, the type and amount of food made available from different sources. In view of this, an attempt was made to assess the different status of food security situation that exists between households headed by men and those by women.

Much more common to observe a good deal of female headed households, especially in the developing countries like Ethiopia they are more likely to being food insecure as compared to their male-headed counterparts. In this specific survey, female headed households' accounts for 20.7 percent (361). Although this figure seemed to be small when compared to male headed ones (which accounts for 79.3 percent) it is enough to analyze the situation of female-headed families in the study area.

According to Table 2 above with such small rate of participation the rate of food insecurity among female headed households found to be highest and accounted for a quarter (235) of the total food insecure sampled households or 65.1 (235) percent of the total female-headed sampled households. On the other hand, the male headed food insecure households accounts for 75.97 (743) percent of the total sampled food insecure households or 53 (743) percent of the total sampled male-headed households. Hence, it showed us that sex differences in the headship of rural households have an influence in food insecurity status of the household.

In most of the rural parts of Ethiopia where illiteracy is pervasive different researches found that the illiteracy rate is high. Since the data used in this specific thesis research was collected from rural Amhara region the result showed us the same. Accordingly, in the survey 79.5 percent (1383) of the household heads were found to be illiterate who could not read and write while only 20.5 percent (357) of them were found to be literate.

Moreover, even in the literate subgroup those who could read and write accounts for 12.7 percent (221) that ranked the group first in number. 6.15 percent (107) of the household heads were also at their primary classes. Only insignificant number of the household heads was found to be grater than grade 7.

Similarly, with this huge number of illiterate household heads in the sampled households the percentage of households with illiterate heads is higher among food insecure households than among food secure households. This means that about 85.38 percent of the total food insecure households or 58.38 percent of the total illiterate households were found to be food insecure while 17.69 percent of the total food insecure households or 48.06 percent of the total literate households were food insecure.

Since the sampled households were household heads most of them (88.2%) were at early and late adulthood period of their development. Those sampled households who are children, according to the WHO's definition (below age of 18), were very few and accounted only for 0.2 percent (3). Moreover, old aged sampled households (above the age of 65) were also found to account only for 11.6 percent (202). Therefore, it is important to note that 11.8 percent (205) of the participant household heads were at their non-productive age while 88.2 percent (1535) were in the production period of their development. It became clearer that about half (423) of the whole sampled household

heads were found to be at the age group of 26-45 which is the most productive period of human development.

According to Table 2 above all those who were under 18 years of age and more than half (63.86%) of who were above the age of 65 years were found to be food insecure households as expected. While much more than 55 percent of the total adults (or 90 percent of the total food secure households) were found to be food secure households who were between the age of 19 and 65. It is what was expected since the later group is at productive period and the former groups are at their dependency or non-or-less production period of their development.

Table 3: Food Insecurity Status by Household Size

Food Insecurity Status	Statistic	Adult equivalent Household size	Household size	Age of the household head	Education of the household Head
Food Secure	Mean	2.4796	3.13	44.43	0.49
	Observations	762	762	762	762
	Std. Deviation	1.09982	1.420	14.704	1.230
Food Insecure	Mean	4.5223	5.68	46.10	0.34
	Observations	978	978	978	978
	Std. Deviation	1.48471	1.819	15.866	0.984
Total	Mean	3.6277	4.56	45.36	0.40
	Observations	1740	1740	1740	1740
	Std. Deviation	1.67196	2.084	15.386	1.101

Source: Authors' computation based on CSA data

On average, the mean age was found to be higher for food insecure households than food secure ones (see Table 3 above). It showed us a positive relationship because when the household heads became older and older the household income exhibits a decline eventually of food insecurity problem. The same is true both for adult equivalent household's size and household size that were found to be higher for food insecure households than the secured ones. Contrary to this, food insecure households achieved lower average grade level than those who are food secure households. This shows that when the household head improves his/her educational status the problem of food insecurity shows a difference (the household will come to be food secured).

B. Household Heads' Marital Status:

Table 4: Food Insecurity Status and Household Heads' Marital Status

Household Heads' Marital Status	Total Households		Food Insecure Households		Food Secure Households	
	Frequency	Percent***	Frequency	Percent*	Frequency	Percent**
Never Married	17	1.0	9	0.9	8	1.05
Married	1342	77.1	723	73.9	619	81.23
Widowed	211	12.1	132	13.5	79	10.37
Divorced	144	8.3	97	9.9	47	6.17
Separated	25	1.4	16	1.6	9	1.18
Unidentified	1	0.1	1	0.1	-	-
Total	1740	100.0	978	100.00	762	100.00

* Out of the total Food Insecure Households ** Out of the total Food Secure Households

*** Out of the total Sampled Households

Source: Authors' computation based on CSA data

The married (two-parent) households accounted for three-quarter (77.1%) of the whole sampled households. Accordingly, the separated, the divorced and widowed accounted for 1.4 percent, 8.3 percent and 12.1 percent in their respective order. Those households who have not yet married accounted for 1 percent (17).

C. *The Household Heads' Livestock Possessions*

Table 5: Household Heads' Livestock Possessions

Household Heads' Livestock Possession	Total Households		Food Insecure Households		Food Secure Households	
	Frequency	Percent***	Frequency	Percent*	Frequency	Percent**
<5	890	51.1	505	51.6	385	50.52
6-10	762	43.8	431	44.1	331	43.44
>10	88	5.0	42	4.3	46	6.07
Total	1740	100.0	978	100.00	762	100.00

* Out of the total Food Insecure Households

** Out of the total Food Secure Households

*** Out of the total Sampled Households

Source: Authors' computation based on CSA data

The minimum and maximum livestock possession among the participant households was found to be 0 and 32. Most households (accounts for 51.1 percent of the total) have possessed less than 5 livestock. Those who do not possess livestock accounted for 1.1 percent (19) while about a quarter (468) have owned four livestock. Based on the results depicted in Table 5 above more than half of the total food insecure households have possessed only from less than livestock while most of the rest households possessed 6 to

10 livestock This showed that when the livestock possession of a household increases the probability of being food insecurity among the households decreases.

Table 6 below might make it easy to understand the difference between food secure and insecure households in the study area. According to the table depicted below the mean differences in family size, adult household size, livestock possession, kilo calorie per adult, per capita expenditure as well as per capita food expenditure were found to show the difference.

Table 6: Households' Food Insecurity Status

Variables	Food Insecure Households			Food Secure Households			Total Households		
	N	Mean	Stan. Dev.	N	Mean	Stan. Dev.	N	Mean	Stan. Dev.
Per Capita Food Exp.	873	598.43	244.35	867	831.44	378.6	1740	714.5	339.00
Kilo Calorie per day per Adult Equivalent	978	1402.11	887.27	762	4094.1	2309.98	1740	2581.0	2135.9
Expenditure/Adult Equivalent	978	981.298	801.69	762	2577.1	2673.2	1740	1680.1	2028.7
Number of Livestock	978	5.85	2.43	762	6.01	3.02	1740	5.92	2.70

Source: Authors' computation based on CSA data

Based on table 6 above, the mean of all variables (per capita food expenditure, kilo calorie per day per adult equivalent, expenditure/adult equivalent and number of livestock possessed) found to be higher for food secure households than for food insecure households. It exhibited a negative relationship with food insecurity problem.

10 livestock This showed that when the livestock possession of a household increases the probability of being food insecurity among the households decreases.

Table 6 below might make it easy to understand the difference between food secure and insecure households in the study area. According to the table depicted below the mean differences in family size, adult household size, livestock possession, kilo calorie per adult, per capita expenditure as well as per capita food expenditure were found to show the difference.

Table 6: Households' Food Insecurity Status

Variables	Food Insecure Households			Food Secure Households			Total Households		
	N	Mean	Stan. Dev.	N	Mean	Stan. Dev.	N	Mean	Stan. Dev.
Per Capita Food Exp.	873	598.43	244.35	867	831.44	378.6	1740	714.5	339.00
Kilo Calorie per day per Adult Equivalent	978	1402.11	887.27	762	4094.1	2309.98	1740	2581.0	2135.9
Expenditure/Adult Equivalent	978	981.298	801.69	762	2577.1	2673.2	1740	1680.1	2028.7
Number of Livestock	978	5.85	2.43	762	6.01	3.02	1740	5.92	2.70

Source: Authors' computation based on CSA data

Based on table 6 above, the mean of all variables (per capita food expenditure, kilo calorie per day per adult equivalent, expenditure/adult equivalent and number of livestock possessed) found to be higher for food secure households than for food insecure households. It exhibited a negative relationship with food insecurity problem.

If we take kilocalorie intake per day per adult equivalent, for example, the mean value was 1402.11 for food insecure households while it is 4094.1 for food secure households. It is 2581.0 for all the sampled households. This shows that the food insecure households got much less calorie on average that is only 63.72 percent of what is considered as minimum required calorie. Whereas the food secure households got about 186.09 percent of the minimum required calorie on average that is much higher for human development. The whole sampled households also found to be in better position getting about 117.32 percent of what was considered as minimum required calorie. The same is true for all the variables except for the age of the household head. This means that all the variables, but the mean age, depicted similar profile although their specific figure showed a difference. . Thus, food secure households found to be much better in all the variables discussed above.

4.2 Econometric Analysis

4.2.1 Household Food Insecurity Status of the Amhara Region

From the data it is possible to classify the rural Amhara regional state as food insecure area. The head count ratio indicates that 978 sampled households (56.21%) out of the total 1740 rural households, who were food insecure. These huge numbers of the people could not get the daily minimum calorie requirement for their normal development. It means that they could not produce enough production or they don't have other means to cope with shortage in agricultural production that should exist to satisfy their daily

minimum requirement of calorie for proper development. Thus, only 762 (43.79%) of the sampled households could get the minimum and above recommended calorie level, i.e., 2200 kcal per capita per day.

Finding the factors that contribute to food insecurity goes beyond the descriptive analysis and requires employing econometrics analysis as it was mentioned in the methodology. It was briefly presented so far, now it is presented in details with analysis and interpretation of the data.

Before the tobit model was fitted in this section, the validity of the assumption imposed on the model was tested. The validity told us the significance of the determinant variable and the predictive efficiency of the model. The likely hood ratio test has shown no distributional violation. That is, we reject the null hypotheses that the selected determinant variables are not significantly different from zero. While to check the problem of multicollinearity for the determinants of household food insecurity a correlation matrix was computed for all explanatory variables. Because the problem of multicollinearity can be expressed as the violation of the assumption of covariance between variable should be equal to zero. Thus, the avoidance of such problem enable the explanatory variable can separately contribute to the variation in the dependent variable. In this study the result showed us there is a problem of multicolinerity in the two variables and drooped one variable. But the other variable show the maximum correlation exists between the two variables is 0.3 (see annex).

Based on our specification of the model in the methodology of study, tobit model was estimated to see the effect of expected determinant factors of food insecurity in the study area. The results are presented in table 7 below. The magnitude of the coefficient obtained from the model show the marginal effect of each explanatory variable on the probability of being food insecure.

Table 7: Tobit Estimation Result

Explanatory variable	Dependent variable (index of food security)	
	Coefficient	t-value
Sex of household head (male=1, female= 0)	-0.686815	(-3.96) *
Education of head	-0.66614	(-3.64) *
Age of household heads	0.0006484	(1.33)
Household size	0.1231374	(32.26)*
Agricultural Activity	-.00000113	(-10.00)
Off farm activity	-0.0006744	(-2.36)*
Remittance and Gift (Aid)	-0.000278	(-5.14)*
Livestock	-0.0020187	(-0.73)
Share of food expenditure	-0.015171	(-2.66)*
Constant	-0.288247 (-4.95)*	
Number of obs	1739	
LR chi2 (9)	1154.37	
Prob > chi2	0.0000	
Pseudo R2	.5427	
Log likelihood	-486.40101	
Left censored observation at foodins line <0		
978 uncensored observation		
0 right cencored observation		

Note: a) *significance at 1%, **significant at 5%, *** significance at 10%
b) Figure in brackets are t-values.

According to the estimation result, male-headship reduces food insecurity in the household and it is statistically significant at one percent relative to the female headed. It suggests that, male headed household has a probability of being food secured household

than a female headed one. This result is supported by both by theoretical and empirical evidence and strengthens the result obtained above from the descriptive statistics. Hence, it is possible to infer from the result that sex difference in headship of farm households may influence the households' food insecurity status.

In line with our expectation household heads' education has a coefficient of -0.66614. This result implies that households who have household heads with relatively better education are more likely to be food secure than those headed by uneducated (illiterate) household heads. The result coincides with the theoretical evidences that educational improvement could lead to awareness of the possible advantages of modernizing agriculture and improve the quality of labor. It is similar with what the findings of Ramakrishna et al (2002) and Hailu et al (2005) have been resulted in by using logit model in the case of North Wollo and Koredagaga woreda in the different parts of Ethiopia in their respective order.

The result that regards the age of the household head was found to be in contrary with what we were expecting for. The result showed us that age has a positive and insignificant influence on household food insecurity. Even if it is contrary to our expectation, it is related to the result we saw in the descriptive part. The possible reason

could be as the age of the person increase the transfer their land to others and they couldn't participate in other income generating activities.

The fourth determinant variable in the regression coefficient analysis was that household (family) size. The result shows negative and significant influence of household size on food insecurity of a household. This means that each additional member of a household increases household food insecurity. This finding is consistence with theoretical and empirical evidences. We have seen so far in the literature part household size exerts more pressure on consumption than it contributes to production (Paddy, 2003). In addition, this finding was supported by the research results of Hailu and his colleagues (2005) in Koredagaga farmer association in Ethiopia and another research in Nigeria by IKPI et al (2004). Moreover; it strengthens the results of the descriptive analysis, which was computed above in this chapter

The other determinant variable of food insecurity in the rural Amhara region is agricultural activity. Even if the result seemed to be insignificant, the sign showed us that agricultural activity used to decrease household food insecurity problem by 0.00000113.

Among the other explanatory variables, non-farm activity decreases the household food insecurity problem and it is statistically significant at one percent level As we discussed in the literature part off farm activity is one of copping mechanisms that provides additional income to rural household. It enhances household economy and food security

by giving additional income and decrease food deficit when agricultural production falls short and it also avoid grain sales.

The share of food expenditure as a percentage of total expenditure has a coefficient of -0.015171 and it is statistically significant at five percent level. This estimation suggests that as the share of food expenditure increase household food insecurity problem decreased. This is so because households that spend a high portion of their income on food are likely to be food insecure. Thus, the percent of total household expenditure spent on food is used to show household vulnerability. Particularly when the households rely on market purchases as an important source of food, cash incomes (or expenditure levels) are likely to be a more or less important indicator of their food security status.

Livestock are considered to be determinant for household food insecurity. It has a coefficient of -0.0020187. Meaning that ownership of livestock by farming households also significantly reduces food insecurity. Livestock contribute to households' economy in different ways; i.e., as a source of pulling power, source of cash income, source of supplementary food, and means of transport. Besides, livestock can be considered as a means of security and coping methods during crop failure and other calamities. These findings confirm the empiricale evidence of Ramakrishna et al (2002) in Wollo and strengthen the descriptive result discussed in above.

The other variable was income received through gift (aid) and remittance. Based on the tobit model it has a coefficient of -0.000278. This signifies that for a unit rise in remittance and gift (aid) income, the level of food insecurity will reduce by 0.000278. This is due to the fact that an increase in remittance and gift (aid) income will have an effect because the change in income will lead to constant change in expenditure. Thus, the income received from remittance and gift (aid) increases the stable income so that capacity of the households to consume more will increase.

CHAPTER FIVE

5. SUMMARY, CONCLUSIONS POLICY IMPLICATION

The problem of food insecurity is pervasive in Ethiopia in general and in the Amhara region in particular. With this in mind, the study has attempted to identify food insecurity problem and its determinants in rural households in the Amhara region. Accordingly, the 1999/2000 Household Income, Consumption and Expenditure (HICE) and Welfare Monitoring (WM) surveys as a secondary data were used to answer all the research questions of this specific research. The data was analyzed both through descriptive analysis and tobit model of regression.

5.1 Summary

Based on the characteristics of the selected households (Demographic and other socio economic variables) the following specific results were found.

- Among the 1740 sampled rural households 978 (56.21%) households were found to be food insecure while the rest 762 (43.79 %) households were food secured households. Thus, only 762 (43.79%) of the sampled households could not get the minimum and above recommended calorie level, i.e., 2200 kcal per adult per day.

- Although the participation rate of female-headed rural households was small in number the rate of food insecurity among them was found to be highest and accounted for a quarter (235) of the total food insecure sampled households or 65.1 (235) percent of the total female-headed sampled households.
- In the sampled household the percentage of households with illiterate heads were higher among food insecure households than among food secured households. In the survey 79.5 percent (1383) of the household heads were found to be illiterate who could not read and write while only 20.5 percent (357) of them were found to be literate.
- Although the prevalence and participation rate of single headed households were small in number 53.9 percent of the total married household heads found to be food insecure while 62.55 percent of the total widowed, 67.36 percent of the total divorced and 64 percent of the total separated household heads were found to be food insecure at all. Thus, about half of two parent households and more than 60 percent of single-headed households were found to be food insecure households in the study area.
- The minimum and maximum livestock possession among the participant households was found to be 0 and 32. More than half of the total food insecure households have possessed only less than 5 livestock while most of the rest households possessed 6 to 10 livestock This showed that when the livestock

possession of a household increases the probability of being food insecurity among the households decreases.

- Except for the mean age, the mean of all the rest six variables (per capita food expenditure, kilo calorie per day per adult equivalent, total expenditure per adult equivalent, adult equivalent household size, household size, and number of livestock possessed) were found to be higher for food secured households than for food insecure households.

Most of the findings in the descriptive analysis are consistence with the result obtained from the model. The model was fitted with 9 explanatory variables .The regression model shows that larger household sizes significantly increase the problem of household food insecurity. In addition female headed household increase the food insecurity problem than the male headed household. Similarly literate household have negative association with food insecurity.

The other result from the regression analysis reveal that agricultural income, non-farm activity and income gain from remittance and gift have significant impact on household food insecurity. Further more share of food expenditure has a negative impact on household food insecurity.

Even if the result is insignificant livestock possession and young household head have a negative correlation with food insecurity problem.

5.2 Conclusions

In light of the evidences that obtained from the study the following conclusions could be drawn:

The data analysis revealed that the study area, i.e., rural Amhara region is food insecure area. Through the use of recommended minimum calorie requirement (i.e., 2200 kcal) it was concluded that about 56 percent of the Amhara rural households are food insecure. These households could not cover the required minimum daily calorie from the income generated from their major activity of subsistence agriculture. Although their participation in non-farm activities and possession of livestock both in quality and quantity found to be minimal it also could not ripe enough daily required minimum calorie for the members of the family. Moreover, although the income generated from remittance and gift (aid) was also minimal they could not cope up with poverty.

The profile of the Amhara rural households was found to be more devastating. Illiteracy is more pervasive and accounts for 79.5 percent (1383) of the household heads. Even those who were found to be literate could not pass their primary education. Very insignificant number of them were found to be high school completers, certificate and

diploma holders. In addition, the prevalence of female headed and/or single headed households became more common. Most of these families were found to be food insecure at all. They could not carry the burden and fail to fulfill the daily minimum requirements of food for their family members. In general, households with large family size, illiterate and old household heads are more likely to be food insecure than those with smaller family size, educated and younger household heads.

Moreover, although the ownership of livestock has an impact on the food insecurity of rural households it could not ripe anything because of lower quality and quantity of the possession.

5.3 Policy Implications

The following are the possible areas of intervention which might decrease the food insecurity problem.

- Larger family size and female headed households have higher probability to be food insecure. Therefore technical assistance should be made to decrease women's burden. Accordingly, increasing awareness among rural women in using family planning to reduce fertility is in order. In addition, the causes for family distraction, separation and the related social evils should be studied. Both indigenous and scientific conflict resolution procedures should also get proper emphasis.
- To address the issue of illiteracy, based on the Millennium Development Goal

(MDG), rural household heads' enrolment ratio in adult education especially in the primary level should be increased.

- Since agricultural income is the main source to feed rural households, mechanism should be strength to increase productivity by increasing labor and land productivity through providing these chronically food insecure farmers with modern agricultural inputs (seed) and productive asset (oxen and other related farm assets) on subsidy base until they recover. Development of small-scale irrigation should be given a priority. Because rural households follow subsistence agricultural activity that solely depend on rain. Moreover, the livestock sector has to be improved by providing better animal health care because it increases productivity as well as it also used as coping mechanism for food insecurity problem.
- Income from non farm activity and remittance and gift (aid) has negative correlation with household food insecurity. It is because of low participation of the rural households' in civic, governmental and nongovernmental organizations. Therefore, the government should encourage and create non farm jobs for rural households.
- Finally, more intensive researches on the area should be undertaken specially in the area of agricultural productivity, non-farm job opportunity for the rural households, family distraction and similar issues that contributes for the food insecurity problem of the rural households.

Appendix I

BIBLIOGRAPHY

Amhara National Regional State (2000). *Three Years (1996-1998EC) Food security strategies Plan,* Bahir Dar (Amharic version).

Andersen, P. and Piazw (1985). The impact of the Green Revolution and proposed for future. In Gittinger, j. et al (editors). *Food policy, Integrating Supply Distribution and Consumption.* John Hopkins university press.

Aredo.D. (1995). "Transforming Peasant Agriculture: Conceptual Framework". In Demeke M. and Aredo D. (editors). *Problems and Transformation*, proceedings of the Fourth Annual conference on the Ethiopian economy.

---------- (1994). 'Female-headed farm household in two contrasting regions in Ethiopia" access and management of resources. In *Ethiopian Journal of Development research*, Vol.16.no.1, Addis Abab: Addis Ababa University Press.

Barrett, Christopher B. (2002). *Food Security and Food Assistance Programs.* Department of Agricultural, Resource, and Managerial Economics, 35, Warren Hall, Cornell University, Ithaca, NY

Babiigwa B.A (1999). *Household food security in Uganda*: An empirical analysis. Kampala, Uganda.

Clay, E.J. and Singer, H.W. (1985). *Food Aid and Development Issues and Evidence*: A Survey Literature Since 1977 on the Role and Impact of Food Aid in Developing Countries, Occasional Papers No. 3, Rome.

Clay D.C., Daniel Molla, and Debebe Habtewold (1998): *Food Aid Targeting in Ethiopia*: A Study of Household Food Insecurity and Food Aid Distribution, Working Paper, No. 12, Grain Market Research, Project Ministry of Economic Development and Cooperation, Addis Ababa.

Central statistical Agency (CSA) (1998). *The 1994 Population and Housing Census of Ethiopia*, country report. Addis Ababa: CSA printing press.

Diagne A.1998, Impact of Access To Credit on Income On Income and Food Insecurity in Malawi, Food Consumption and Nutrition Division, International Food Policy Research Institute 2033 K Street, N.W. Washington, D.C. 20006 U.S.A.

Dercon, S (2000). The *impact of reform on households in rural Ethiopia 1989-1995*, Center for the study of African Economics, Oxford University, memo.

Dessalegh Ramato(1991),famineand Survival strateraties ,ACase Study from Northeast Ethoipia, Nordiska Afrikaininstitutet, Uppsala

Diagne .A. (1998). *Impact Of Access To Credit On Income And Food Security In Malawi*, Food Consumption and Nutrition Division , International Food Policy Research Institute 2033 K Street, N.W. FCND Discussion Paper NO. 46 Washington, D.C. 20006 U.S.A.

Disaster prevention and Preparedness Agency (DPPA) (2000). *Food supply prospect: Early Warning system report 2000*. Addis Ababa. Ethiopia.

-------- (2001). *Food supply prospect in 2001*, Early Warning system report. Addis Ababa, Ethiopia.

---------(2002). *Food supply prospect in 2002*, Early Warning system report. Addis Ababa, Ethiopia.

---------(2003). *Food supply prospect in 2003*, Early Warning system report. Addis Ababa, Ethiopia.

---------(2004). *Food supply prospect in 2004*, Early Warning system report. Addis Ababa, Ethiopia.

---------(2005). *Food supply prospect in 2005*, Early Warning system report. Addis Ababa, Ethiopia.

---------(2006). *Food supply prospect in 2006*, Early Warning system report. Addis Ababa, Ethiopia.

Ethiopian Development Research Institute (EDRI) and The East Africa Food Policy Network of the International Food Policy Research Institute (IFPRI) (2003). *The State of Food Security and Agriculture Marketing in Ethiopia*

Ethiopian Economic Association (2005). *Report on the Ethiopian Economy*, Vol. IV, Rehobot Printers, Addis Ababa.

Federal Democratic Republic of Ethiopia (1996). *Food Security Strategy*, Draft Document, Addis Ababa.

Federal Democratic Republic of Ethiopia (FDRE) (2002). *Food Security Strategy*, Addis Ababa.

Food & Agricultural Organization (FAO) (1996). *Rome Declaration on World Food Security and World Food.* Rome, Italy.

Food and Agriculture Organization of the United Nation (2003*). Trade Reforms and Food Security:* Conceptualizing the Linkages, Rome.

Food and Agriculture Organization of the United Nation (2002*).Food Insecurity, Poverty and Agriculture:* ECA Working paper

Food Security Program (2003). *The New Coalition for Food Security in Ethiopia*, Vol. I, Addis Ababa.

Gebre-Selassie, Samuel (2005). Poverty and Food Security in Ethiopia: Some Evidences from Wollo. In Ethiopian Economic Association (2005*): Proceedings of the Second International Conference on the Ethiopian Economy*, Vol. II, EEA, Addis Ababa.

Habicht J., Pelto G., Frongillo E., Rose D. (2004). *Conceptualization and Instrumentation of Food Insecurity*. Cornell University, Tulane University. Paper prepared for National Academy of Sciences workshop, 15-16 July 2004.

Habtewold, Debebe (2001). Food Aid and Its Impact on Peasant Livelihood Strategies. In Forum for Social Studies (2001). *Food Security and Sustainable Livelihood in Ethiopia*, Proceedings of the Symposium of the Forum for Social Studies, Image Printing Press, Addis Ababa.

Haile, H.K, Alemu, Z.G and KUDH land G. (2005), causes of household food in security in Kcoredagaga peas and Association, Dromilya zone, Ethiopia, University of Free state.

Honddinott, J. (1999). *Choosing out come indicators of Household Food Security*, Technical Guide #7, IFPRI, Washington D.C. USA.

International Monetary Fund (IMF) Country Report (2004). *Ethiopia Poverty Reduction Strategy Paper Annual Progress Report*. The Federal Democratic Republic of Ethiopia, No. 04/37

KPI, A.E. and Kormawa P.M (2004), Factors influencing food insecurity among rural farming Households in Africa: Results of analysis from Nigeria; Ibadan, Nigeria.

Lovendal, C. Romer and Knowelis, M. (2005). *Tomorrow's Hunger*: A Framework for Analyzing Vulnerability to Food Insecurity, ESA Working Paper, and No. 05- 07, Agriculture and Economics Division, The FAO of the UN.

Madley, John (2000). *Hungry for Trade*: How the Poor Pay For Free Trade, Cox & Wyman, Cumbria, UK.

Masefield,A.(1996)The Grate Grain or Cash Debate: Food for Work versus Cash for Work In the context of employment base safety net policy in Ethiopia.

Maxwell.S.and Frankekberger.T. (1992). *Household food security: concepts, indicators, Measurement*. A Technical Review .UNICEF/IFAD

Maxwell, S. (1996). *Food security*: A post modern perspective. *Food Policy*, 21, 2.

---------- (1986*). Food Aid in Ethiopia*: Disincentive Effects and Commercial Displacement: Discussion Paper, No. 226, Institution of Development Studies, UK.

MEDAC (Minster of Economic Development and cooperative)(1999). Survey of the Ethiopian Economy: Review of post reform developments (1992/93-1997-98/, Addis Ababa Ethiopia.

MOFED- (2002). *Ethiopian: Sustainable Development and Poverty reduction Program*, , Addis Ababa Ethiopia.

---------- (2002). *Ethiopian: Sustainable Development and Poverty reduction Program*, Addis Ababa Ethiopia.

---------- (2002). *Development and poverty profile of Ethiopia* (Analysis based on the 1999/00 household in come consumption and expenditure and welfare Monitoring survey) FDRE. 2002, Addis Ababa Ethiopia.

Najafi, B. (2003). *An Overview of Current Land Utilization Systems and Their Contribution to Agricultural Productivity*. Report of the APO Seminar on Impact of Land Utilization Systems on Agricultural Productivity. Productivity Organization, Islamic Republic of Iran Asian.

Negatu W. (2004). *Reasons for food insecurity of farm households in South Wollo, Ethiopia:* Explanations at grassroots, collaborative research program, Basis, Department of agriculture and applied Economics, University Wisconsin Madison.

Osmanis, R. (2001). *Food security, Poverty and Women:* Lessons from rural Asia, IFAD

Paddy F. (2003). Gender differentials in land ownership and their impact on household food security: a case study of Masaka district. Masters' thesis. Uganda. Availableon:http://www.troz.unihohenheim.de/research/Thesis/MScAES/Paddy.pdf

Population Council (1996). *The Rome Declaration on World Food Security*, Population and Development Review, Vol. 22, No. 4, (Dec., 1996), pp. 807-809.

Rahji, M.A. (1995). *Gender Aspects of Farm Household Resources and Time Allocation and the impacts on Agricultural Commercialization in South Western Nigeria*, University of Ibadan

Ramakrishna, G. and Assefa D. (2002). An Empirical Analysis of Food Insecurity in Ethiopia: The Case of North Wollo. In *African Development*, Vol. XXVII, No.1 & 2, 2002, pp. 127-143.

Reutlinger, S. 1987.Food Security and Poverty in Developing Countries .In Food Policy Integrating Supply, Distribution and Consumption,edited by J.Gittinget.et al.Baltimore.Johns Hopkins

Sen, A. (1981). *Poverty and Famine*: An essay on entitlement and Deprivation, oxford, Oxford USAID 1999.

Shipton, P (1990). *African Famine and food security*: an anthropological perspective, Annual Review of Anthropology.

Smith, Lisa. (2002). *The Use of Household Expenditure Surveys for the Assessment of Food Insecurity*, Paper presented at the Measurement and Assessment of Food Deprivation, under nutrition International Scientific Symposium, Rome, Italy, 26-28 June 2002.

Stevens C.,Greenhill R.,Kennan J.,(2000).The WTO Agreement on Agriculture and Food Insecurity.

Steven, Christopher and Kennan, Jane (2001). Food Aid and Trade. In Devereux, Stephen and Maxwell, Simon (Editors) (2001). *Food Security in Sub-Saharan Africa.*

Transitional Government of Ethiopia (TGE) (1993). *National Policy on Disaster Prevention Management*, Addis Ababa.

USAId (2003). *Food Access Indicator Review* July 2003 Conceptualization and Instrumentation of Food Insecurity

USAID(1999).Food Security Indicators for the Use In the Monitoring and Evaluation of Food security Program

Valdes, A. (ed.) (1981). *Food security for developing countries*. Boulder, Colo.: Westview Press.

Webb,P.,Jvon Braun And Y.Yohannes (1992). *Famine in Ethiopia*: Policy Implication of Coping Failure at National and Household Levels, Research Report 92, Washington DC: International food policy Research Institute.

Wolde-Giorgis, Tsegaye; Aweke, Demlew; and Hagos, Yibrah (2000). *The Case of Ethiopia:* Reducing the impacts of Environmental Emergencies through Early Warning and Preparedness: the Case of the 1997-98 El Nino.

World Food Program (WFP) (2006*). World Hunger-Ethiopia overview*: hppt//www.org. wb

World Food Program (WFP) (2005) CHS Regional Analysis: Household Vulnerability and the Impact of Food Aid: Prepared by TANGO International, Inc. (Technical Assistance for Non Government Organization).

Yared,Amare (2001). *Food security livelihood strategies and food Security Policy in Ethiopia*, In *Food security and Sustainable livelihoods in Ethiopia,* AddisAbaba.

Appendix II

Nutrition (calorie) Based Equivalent Scales

Years of age	Men	Female
0-1	0.33	0.33
1-2	0.46	0.46
2-3	0.54	0.54
3-5	0.62	0.62
5-7	0.74	0.70
7-10	0.84	0.72
10-12	0.88	0.78
12-14	0.96	0.84
14-16	1.06	0.86
16-18	1.14	0.86
18-30	1.04	0.80
30-60	1.00	0.82
60plus	0.84	0.74

Source: Calculated From the World Health Organization (1985) by Stefan Dercon, cited in MOFED 2002

Appendix III

Test summary

1. Test of Multicollinearity

The problem of multicollinearity can be expressed as the violation of the assumption of covariance between variable should equal to zero. Thus, the avoidance of such problem enable the explanatory variable can separately contribute to the variation in the dependent variable. In this study the result of test of multicollinearity assure the problem does not exist. As a rule of thumb if the coefficients of correlation between the two explanatory variables are greater or equal to 0.8 one can conclude that there exists a problem of multicollinearity between these variables. But the test show the maximum correlation coefficient exists between the two variables is 0.3 except the two variables.

2. Likelihood Ratio Index (LRI)

The likelihood ratio index, equivalent to R^2 in a conventional OLS regression model, is used to measure the goodness of fit of the tobit model. It is computed using the formula, LRI =1- lnLr/ln Lo; where

lnLr is the value of unrestricted log-likelihood function and

lnLo is the value of log-likelihood function. Its value lies between 0 and 1.

If it is one it implies "perfect" fit. According to Green (1993) values between zero and one have no natural interpretation but as LRI approaches one it shows improvement in goodness of fit.

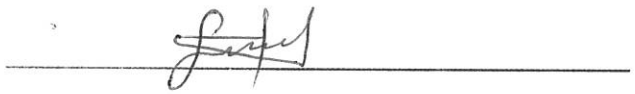
Then the computed value of LRI for our tobit model is:

LRI =1- (-471.80783 /-1064.569)

=0.4431914

Declaration

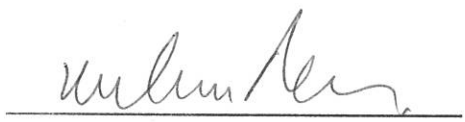
This thesis is my original work and has not been presented for a degree in any other university.



Frehiwot Fantaw Seid

Date: - February 23, 2007.

This thesis has been submitted for Examination with my approval as the university advisor.



Dr. Manohar Rao

Date: - February 23, 2007.