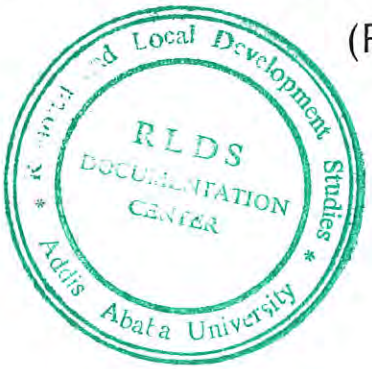
Assessment of Agricultural Production and Food Security Situation at Household Level: the case of Angolela Tera *Woreda* of Amhara Region

By Fassil Setargie

Advisor: Muluneh Wolde Tsadik PhD)

A thesis Submitted to the School of Graduate Studies of Addis Ababa University in partial fulfillment of the requirements for the Degree of Master of Arts (M.A. Degree) in Regional and Local Development Studies (RLDS)



July 2007

Addis Ababa

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ACKNOWLEDGEMENTS

I owe a great debt to many people who aided me in developing the idea of this paper and in the course of writing this paper. First of all, I would like to express my gratitude to my advisor Dr. Muluneh Wolde Tsadik. He has taken his valuable time in reading and providing me very useful comments from the beginning to the final version of the thesis with out which the paper would have been impossible.

I am also indebted to my families and friends for their priceless advice and moral support. Special thanks go to Biniyam Assefa, Binyam Yalem Tesfa, Meaza Eshetu, Bety Setargie, Aberash Wolde, Dereje Ademe, Firehiwot Daniel and Abayneh Haile Mariam for giving me continuous motivation and support in achieving my work. My thanks also go to Getahun Tefera, Genet Tefera, Abebayehu Bekele and Yirgu Shenkute for their cooperation and involvement in data collection. My appreciation also goes to my boss Birhanu Wolde who contributed a lot in this work.

I am very much indebted to the staff of World Vision Ethiopia Angolela ADP and Bahir Dar PrO for providing me a moral support and necessary data. Finally, I would like to express my gratitude to the staff of Angolela Tera woreda offices of agriculture and rural development, health, education and administrative council for providing me the necessary data.

Fassil Setargie

ABSTRACT

This study is about the assessment of food security situation in Angolela Tera Woreda and it identifies the main causes and copping mechanisms of food insecurity problems. In this study both primary and secondary data collection methods were employed to collect data. To ensure the representativeness of the sample population the area was stratified on the basis of agro-ecological differences (dega and weina dega). Household survey and key informants group discussions were carried out on the selected sample KAs in each stratum. Direct field observation was also employed to check and verify the collected data.

The populations of Angolelana Tera woreda are mainly subsistent farmers who heavily rely on the main rainy season for their annual crop and livestock production. Farming in the woreda is mainly practiced traditionally and prone to natural, technological and socio-economic constraints. As a result, the agricultural production in the woreda is very low. In order to *augment the low income obtained from the agriculture sector some community members engaged in non-farm activities such as daily laboring and petty trading. However, lack of access to non-farm job opportunities, shortage of start up capital, and lack of knowledge and working skills have constrained many not to expand non-farm job opportunities.*

Due to these reasons a significant proportion of community members unable to meet their food requirement and faced on average four months of food scarcity period yearly. To manage this situation the community members employed various copping mechanisms such as selling of trees and other assets such as livestock, borrowing from neighbors and relatives, renting of farm land and reducing the quantity and consuming of cheap and nutritionally poorer food such as Avena Sativa (sinnar). Some of these mechanisms will likely have a negative long term impact on the mental and physical development of children.

Hence, the government and other development organizations should build up on the already existing copping mechanisms such as strong social ties and net work and should devise appropriate strategies that enable the community to come out of food insecurity situation. This calls for joint research and joint action by all stakeholders.

ACRONYMS

ACSI:	Amhara Credit and Saving Institution
ADLI:	Agricultural Development led Industrialization
Belg:	A Minor Season or Small Rains which runs from March through May
CSA:	Central Statistical Authority
Dega:	Cool Humid Highlands with Elevations of 2500 to 3000 meters.
DPPC:	The Disaster Prevention and Preparedness Commission
EFSR:	Emergency Food Security Reserve
ETB:	Ethiopian Birr
EU:	European Union
FAO	The Food and Agricultural Organization of the United Nations
FEWS:	The Federal Early Warning System
GDP:	Gross Domestic Product
GNI:	Gross National Income
GoE:	The Government of Ethiopia
HH:	Household
HICE:	Household Income, Consumption & Expenditure Survey
HIPC:	Highly Indebted Poor Countries
IMF:	International Monitory Fund
KA:	Kebele Administration, the Lowest Administration Tier of the Government Next Lower to woreda
Meher:	The Main Rainy Season, which runs from May to September (also called *Kiremt*)
Mengistawi budin:	Farmers' Cadre
MoA:	Ministry of Agriculture
MoE:	Ministry of Education
MoH:	Ministry of Health
NDPPC:	National Disaster Prevention and Preparedness Committee
NDPPF:	National Disaster Prevention and Preparedness Fund
NPDPM:	National Policy on Disaster prevention and Management
PPP:	Purchasing Power Parity
PRA:	Participatory Rural Appraisal
PRSP:	Poverty Reduction Strategy Paper
RRC:	Relief and Rehabilitation Commission

SNNPR: Southern Nations, Nationalities & Peoples Region

SPSS: Statistical Packages for Social Studies

SSA: Sub-Saharan Africa

Timad: locally used land measurement that is equivalent to 0.25 hectares

Weina dega: Temperate, Cool, Sub-humid Highlands at Elevations between 1500 and 2500 meters.

WFP: World Food Program

WFS: World Food Summit

WM: Welfare Monitoring Survey

Woreda: The Lower Administration Tier of the Government Next to the Zone

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CHAPTER ONE INTRODUCTION

1.1. Background of the Issue

No human right has been so frequently and spectacularly violated in recent times as the right to food, despite the fact that it is one of the most consistently enshrined rights in international human rights law, as constantly reaffirmed by governments. Concerns generated by the food crisis of the mid-1970s led to world leaders accepting for the first time the common responsibility of the international community to abolish hunger and malnutrition (Clover, 2003). The latest estimates indicate that some 840 million people were undernourished in 1998-2000 11 million in the industrialized countries, 30 million in countries in transition, and 799 million in the developing world (FAO, *2002*).

The 1996 World Food Summit set a target of a reduction in the number of hungry people by at least 20 million every year between 2000 and 2015. While some regions made impressive progress over the two decades preceding the year 2000, demonstrating that hunger is not an intractable problem (Rajalakshmi, *2002)*, the latest figures on numbers of undernourished worldwide reveal that since the 1996 World Food Summit (WFS), the average annual decrease has been only 2.5 million, far below the level required to reach the WFS goal of halving the number of undernourished people by 2015. Progress will have to be accelerated to 24 million per year, almost ten times the current pace, in order to reach that goal (FAO, 2002).

Ethiopia is one of the poorest countries in the World, it faces sever food insecurity problems due to widespread poverty, rapid population growth, and recurrent droughts. In recent decades the country has suffered from severe political instability in the form of civil wars, military coups, and a series of drought-related food crises.

Major droughts in Ethiopia occurred in 1971-75, 1984-85, 1999-00 and 2002-03, and also nearly every year since 1980 at least some parts of the country have been affected by drought. Most droughts have been concentrated geographically in the central and north eastern highlands and in the southern lowlands. Some have been more sever than others, like the 1984's, which led to a famine and the 1999-00's and 2002-03's crises (Del Ninno, 2005).

In the midst of a severe famine that resulted in about one quarter million deaths, the Derg Marxist Government took power in 1974, which imposed numerous controls on market and investment. Economic output stagnated over the next fifteen years, during which a major famine occurred in the 1984-85 following an extended period of poor rains beginning in 1977. Almost eight million people were affected by food shortage during the crises and at least one million people are estimated to have died. The total production of cereals in 1984-85 was only 70 percent of the mean production of the previous three years (Del Ninno, 2005).

The severity of the production crises was exacerbated by the fact that Marxist Military Regime of that time had firmly refused to allow foreign aid in to the country meanwhile concentrating most of its budget on a massive military build up to finance the 20-year civil war in the Northern Provinces. The civil war from 1974 to 1991 strained public finances reduced international support and constrained agricultural production.

Then, following the overthrow of the Government and the adoption of a broad spectrum of reform measures for economic recovery and reconstruction in 1991, agricultural and overall economic growth increased. Gains in cereal production (mainly maize due to adoption of improved seeds and increased fertilizer use) since the early 1990s notwithstanding, the situation thus remains critical at present.

The 1999-2000 crises was the result of a series of events including repeated smaller weather shocks, lack of market access and the negative impact and

the restrictions of movements due to the conflict with Eritrea. The war with Eritrea from May 1998 to December 2000 reduced donor support and undermined investor confidence. At the same time, drought and late arrivals of food aid contributed to another food crises in 1999-2000. Even though the major famine was averted especially in the chronically vulnerable highlands, an estimated 10 million people needed food assistance at the height of the crises (Del Ninno, 2005).

In 2003 Ethiopia experienced one of the worse droughts in many years. Failure of the 2002 *belg* rains combined with delayed and sporadic 2002 *meher* rains were at the origin of the sever drought conditions and food insecurity in 2003.

1.2. Statement of the Problem

Food production in Ethiopia is heavily dependent on scarce and often erratic rainfall. Agriculture in the country is almost entirely rain-fed: only about 190 thousand hectares out of 11.3 million hectares of area cultivated (about 0.2 percent of total agricultural land is irrigated), and production is influenced by large fluctuations in the timing and volume of rainfall. Cereals (mainly maize, wheat, teff and sorghum) accounted for about 70 % of the area cultivated and 70 % of calorie consumption. About 95 % of cereal production takes place during the main rainy season (called *mehere* or *kiremt*), which runs from May to September. A minor season (*belg*) accounts for only about 5 % of cereal production (FAO/WFP, 2002).

The population of the country is increasing at a rate of about 2.9 percent per annum, while its annual agricultural growth is 2.4 percent. The agricultural performance in the country has not exceeded the population growth over the past four decades, and the gap between food needs and availability has continued to widen, requiring additional food aid. Food aid has accounted most grain imports in Ethiopia over the last few decades. Food aid flows to Ethiopia (including local procurement) averaged 728 thousand tons since 1990 and have ranged from 120 thousand tons in 1996 to 1.22 million tons (ten

times the 1996 total) in 2002. Most of this food aid was in the form of cereal (almost all wheat) imports, which accounted for almost 10 % of total cereal availability (Del Ninno, 2005).

In Ethiopia, food production and supply show substantial geographical differences; there are surplus producing areas (mostly in the central highlands) and chronic food insecure regions (a particular feature of the north, north-east, east and far south of the country). Both acute and chronic food deficits are linked in Ethiopia; consequently 15 percent of the population lives in conditions highly vulnerable to drought and other shocks (Hartmanshennn, 2002). The average per capita income in the country is estimated to be US $ 100 (World Bank Atlas, 2003), which is one of the lowest in the world. The per capita income of rural areas is 1244.00 Birr, including imputed values of freely obtained/owned goods. Total caloric intake per person is 2291.5 Kilocalories, which is a little more than the minimum calorie requirement of 2200 kilocalories (MEDREK, 2004).

The 1995/96 and 1999/00 Household Income Consumption Expenditure (HICE) and Welfare Monitoring (WM) Surveys indicated that about 44 percent of the population of Ethiopia live under absolute poverty. As a consequence about 51 percent of Ethiopians are considered food insecure and malnourished, and 27 percent of the population lives under conditions of extreme food poverty, unable to consume more than 1.650 calories per day. The survey results also indicated that, 6-7 million people are chronically food insecure, lacking sufficient resources to consume enough food even in good years. Malnutrition (stunting) among Ethiopian children is over 60 percent in some regions (Tigray and Amhara) reflecting a long-term impact of food security. Since the world first found out about the disaster caused by famine and drought in Ethiopia in 1974, the country has become one of the main recipients of international food aid.

The issue of food security in Ethiopia is complex and multi-dimensional. Food security problems exist at national, regional and household/individual levels.

Food security of households doesn't automatically go together with national food security; and also within the food security dimensions some strategies are likely to be better managed by household actions than by national actions and vice versa.

There is no single technological economic or political approach that offers an instant, dramatic solution. As a result, more effective programs and measures for an improved reduction of vulnerability must be sought. Therefore, interventions and strategies have to be tailored to the demands of each specific level. To this end, various studies need to be carried out in the most food insecure areas of the country in order to better solve the problems associated with food insecurity in each area.

The selection of the area for this research has emanated from the following reasons. The first reason that attracted me to undertake this research in the area is my previous experience in the area. I had an opportunity to work in the area from the years 2001-2004 as a field staff member of one development oriented organization that operates in the area.

Secondly, I realized that the research area, Angolela Tera *woreda*, is one of the most food insecure *woredas* in North Shewa Zone. As a result, a significant proportion of the population of the *woreda* has experienced hunger and malnutrition for the past many years. Furthermore, the unique topographic and agro-ecological features of the area have also contributed to the initiation of this research. The study area is predominantly highland (dega) and the topography of the area is dominated by plateau. A heavy wind, frost and water logging are the characteristic features of the area.

Despite these, the area has been by-passed by most of the previous research undertakings. Thus, this research could contribute to a certain extent in bridging the gap as well as in identifying policy implications for combating the constraints of food security in the country. In view of this, this study is

initiated to identify the major causes of food insecurity and the highly affected households/community groups in the study area.

1.3. Objectives of the Study

The general objective of the study is to assess the food security situation and explore the main causes of food insecurity in the study area and to foreword possible measures that could enhance the achievement of food security at household level in the study area and extrapolate it to areas, which have similar agro-ecological and socio-economic features.

The specific objectives of this study include:

1. To assess the current food security situation of the study area,
2. To explore the major constraints in agricultural and non-agricultural income generating activities
3. To identify food insecure community groups in the study area,
4. to assess food insecurity coping mechanisms of the community in the study area,
5. To forward possible alternative recommendations to improve the food security situation in the survey area

1.4. Research Questions

The research has addressed the following:

1. What are the main livelihood strategies of the community?
2. What constraints affect different livelihood strategies?
3. When and for how long does food shortage occur in different parts of the woreda?
4. How do food insecure households survive?

1.5. Materials and Methods of Data Collection and Analysis

1.5.1. Data Sources and Methods of Collection

In this research, methodological triangulation that is the utilization of several research methods such as field survey, key informants discussion and direct observations were used in order to supplement and check up on one to the other.

1.5.1.1. Data Sources

The sources of data for this research include both primary and secondary data sources. The primary data sources include: household survey, key informants discussions and direct field observations. On the other hand, secondary data sources include: reports and documents of various governmental and non-governmental organizations, and other relevant stakeholders, which are operating in the study area. Moreover, various publications, journals, books, findings of previous research undertakings, Internet and other sources were used.

1.5.1.2. Methods of Data Collection

1.5.1.2.1. Field Survey

1.5.1.2.1.1. Questionnaires

Both standardized (pre-coded) set of questions and open-ended questionnaires were used. The survey questions were constructed carefully by avoiding vague, leading and double-barreled questions. In order to minimize the number of non-responses and to avoid ambiguous responses, the survey questions were constructed to be simple and they were made to be within the comprehension level of respondents. The survey was preceded by pre-testing (pilot surveys) in order to pick up unanticipated problems. Thus, difficulties found out in the course of pre-testing were ironed out before undertaking the actual survey.

1.5.1.2.1.2. Enumerators

A total of six enumerators and one supervisor were recruited to undertake the survey. Prior to undertaking the survey, the enumerators and the supervisor were trained. While undertaking the survey the researcher closely supervised the enumerators and the supervisor.

1.5.1.2.2. Key Informants Discussion/Interview

In order to obtain explanations for the way in which survey respondents have responded and to check on and verify data obtained through quantitative survey methods, key informants discussions were used. In each sampled KAs key informants each containing 6 to 12 members that include of KAs' leaders, community elders, religious leaders, farmers and women were interviewed. The questions were less structured simple and clearly formulated.

1.5.1.3. Sampling Techniques and Sampling Design

In this particular research stratified, purposive and probability sampling techniques were used. To do this, first of all KAs were grouped according to their agro-ecological conditions (14 *dega* and 5 *weina dega* KAs) then from each cluster two from *dega* and one from *weina dega* KAs were drawn purposively based on accessibility and the severity of food insecurity problem.

A total of 150 sample households (respondents) were drawn from sample KAs proportional to the total population (household) size of each of the three sample KAs. To ensure representativeness of the sample household within the sample KAs, the sample households were randomly selected using lottery method. The sample size (number of respondents) in each sample *KA* was proportional to household size of the respective sample *KA* (see table 1).

1.5.1.4. Basic Survey Designs

1.5.1.4.1. Approximating Longitudinal Surveys

To answer questions involving processes or notion of change over time, approximation longitudinal surveys, with cross-sectional surveys were used. Approximating devices such as, asking respondents furnish data relevant to the past and logical interpretation of cross-sectional data to indicate process over time were used.

1.5.1.5. Sampling Distribution

Table 1 shows that the distribution of sample sizes in sample *kebeles* were based on the proportional household size of the respective *kebeles*. As a result a larger sample size is taken from Chefanen *kebele*-which has a larger household size.

Table 1: Sampling distribution

S/N	KA	AEZ	Total HH	% of HHs from all sample KAs	Sample Size
1	Chefanen	*Dega*	1778	36.5	55
2	Cheki	*Dega*	1654	33.9	51
3	Angada	*Weina dega*	1447	29.6	44
Total			4879	100%	150

1.5.1.6. Methods of Analysis

The data, which were gathered through the field survey, were entered in to a computer, processed and summarized using Statistical Packages for Social Studies (SPSS) statistical software. To produce concise summary of the data, measures of central tendency, measures of variability, cross tabulation and comparison of means were applied. The data are presented using of frequency distribution, and tabular and graphic forms of presentations. The food insecurity situation are compared and analyzed at household and KPA levels on the basis of agro-climatic and gender differences.

1.6. Significance of the Study

Previous research results indicated that the problem of food insecurity in Ethiopia is deep and complex and caused by different factors which vary from one region to another. As a result, they recommend the need to carry out different researches on different localities in order to identify the determinants and the way out of the problem in each area.

This research, therefore, unveils food insecurity situation and its level of severity and important determinates of food insecurity in the study area and also attempts to pin point appropriate measures that may curb the problems. Consequently, the findings of the research will help improve the efforts of all development stakeholders including government institutions, research organizations and other relevant development partners that operate in the study area and in areas which exhibit similar agro-ecological, socio-economic and demographic features. Hence, the research will have a significant contribution to the efforts being made in mitigating food insecurity in the area and in the country at large.

1.7. Scope and Limitations

The research was restricted in two *dega* and one *weina dega kebeles* of the study area, Angolela Tera *woreda* due to the limited time and budget available. A total of 150 respondents were selected randomly from all sample *kebeles* (from all wealth categories) of the study area. In spite of this, great care was taken to maintain the representativeness of the sample size by ensuring that the selected sample households and *kebeles* are actually represent the study area, and the reliability and validity of the research results by making use of a combination of various research methods.

1.8. Conceptual Framework

The four key components through which a household or a community would attain food security are producing it themselves (increasing availability), utilization (using and safeguarding the food available in a sanitary and efficient manner), purchasing it (having access) and creating assets that can be liquidated in times of stress.

However, the mix and relative weight of each of these four elements depends on the particular circumstance faced by a specific household or community. It is difficult to prescribe what this weighting should be but rather it is a combination of these factors that can ensure its existence.

Moving from household to individual food security requires consideration of: how is food allocated within the household and biological utilization-the ability of a human body to take food and translate it into either energy that is used to undertake daily activities or is stored. Utilization requires not only adequate diet, but also a healthy physical environment and an understanding of proper health care, food preparation, and storage process (Tadesse, 2001).

A distinction is also drawn between chronic food insecurity-the inability to meet food needs on an ongoing basis and transitory food insecurity-when the inability to meet food needs is of a temporary nature (Maxwell et al, 1992). Transitory food insecurity could be divided into two sub-categories: cyclical-where there is a regular pattern to food insecurity, for example, during the lean season that occurs in the period just before harvest; and temporary-which is the result of a short term, exogenous shock such as droughts or floods.

While this study will focus primarily on household and individual level food insecurity, attention will also be given to geographical food security disparities (KA level differences based on agro-ecological, accessibility and other factors). This study will also focus more on chronic and transitory

cyclical food insecurity problems and less on temporary transitory food insecurity problems.

Figure 1 snows a conceptual framework for analyzing food security. A theoretical framework is developed to guide the course of this study. The model is adopted from the works of Tadesse (2001). Some information is furnished to enrich the model and tailor it to the study at hand. The model presented below shows how household food entitlements could be the result of a range of possible conditions and activities, each of which is influenced by other factors.

The food security status of a household depends on its food production capacity supplemented by availability and use of alternative sources of income. The capacity of a household to produce food and earn income in turn is determined by its resource endowments, access to socio-economic services and the existence of responsive policies and agricultural institutions.

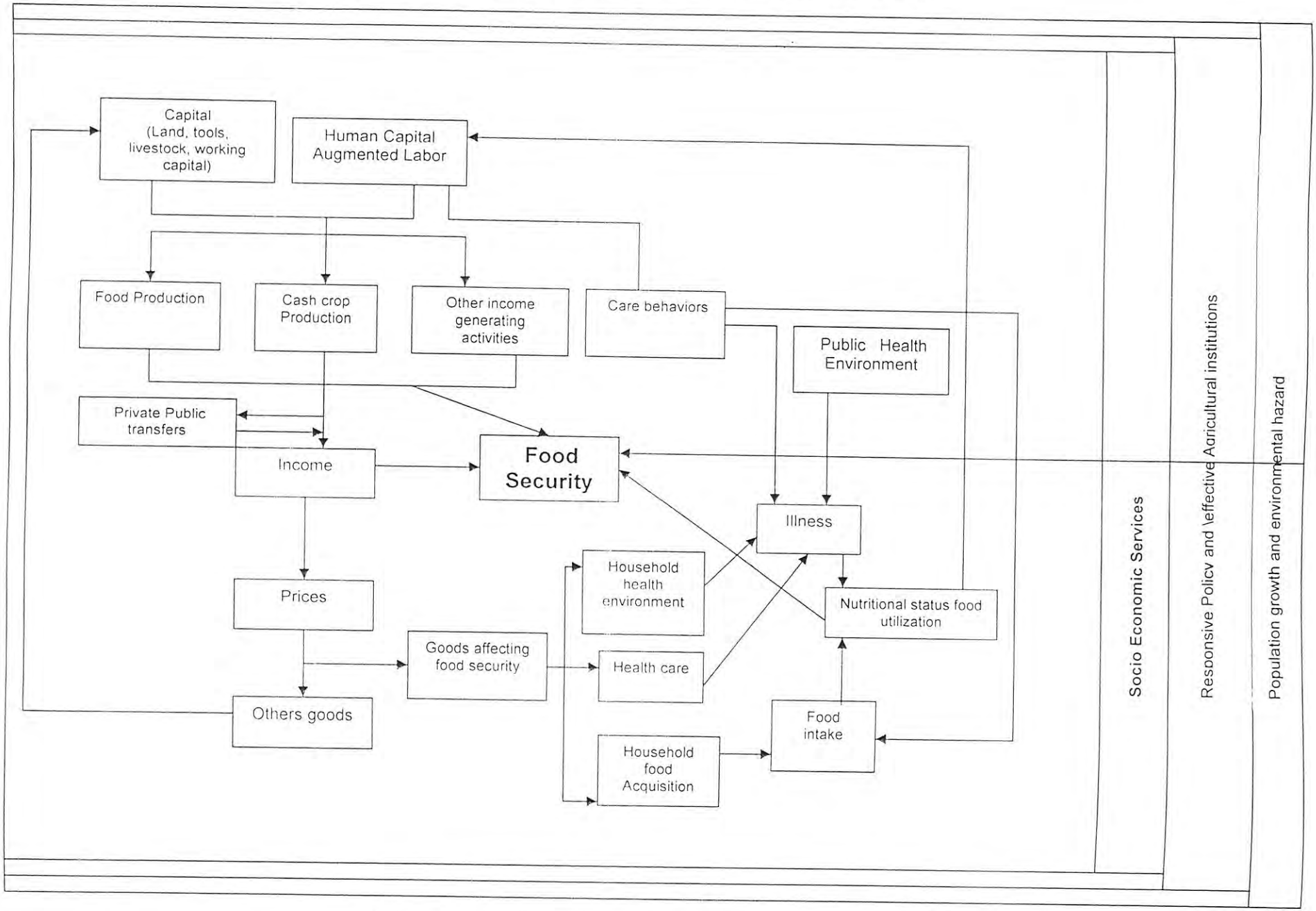
The diagram depicted that household food security issues cannot be seen in isolation from broader factors-namely physical and policy environment. Population growth and environmental hazards such as shortage of rainfall affect the productive capacity of assets and leads to depletion of assets and natural resources.

The resources of households can be divided in to two broad categories: labor and capital. Labor refers not only to a physical dimension of how many people are there available to work but also to a human capital dimension-formal or informal knowledge. Capital refers to those resources such as land, tools, and financial resources. Households allocate these endowments across different activities such as food production, cash crop production, and non-agricultural income generating activities. These in turn determine their level of income.

Knowledge and practice of good nutritional and health practices are called care behaviors. The public health environment such as sanitation and potable

water affect illness and individual food intake, which, in turn, generates nutritional status or food utilization. Allocations of food, expenditures on education, and health will affect the level and distribution of human capital within the household. This investment will also affect the household's ability to generate income in subsequent years.

Figure 4 the conceptual framework (the model employed) for analyzing food security.



Source: Adapted from the works of Tadesse (2001).

1.9. Organization of the Study

The thesis is divided into six chapters. The first chapter covers introduction part which includes the background of the study, statement of the problem, objective of the study, significance of the study, research method, scope and limitations of the study. Chapter two reviews related literatures on food security issues. Chapter three describes the study area, Angolela Tera *woreda*. Chapter four and five discuss results and findings of the study. The last chapter summarizes the findings of the study, forwards conclusions and recommendations drown from the findings of the study.

CHAPTER TWO LITERATURE REVIEW

2.1. Definition of Terms and Concepts

The conceptual framework of food security has undergone considerable evolution. Even a decade ago, there were about 200 definitions in published writings (Maxwell et al, 1992).

1. Food security was defined in the 1974 World Food Summit 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, 1975).

2. In 1983 FAO expanded its concept to include securing access by vulnerable people to available supplies. Accordingly it was defined to as "ensuring to all people at all times to have both physical and economic access to the basic food that they need" (FAO, 1983).

3. In 1986, the highly influential World Bank report "Poverty and Hunger" (World Bank, 1986) focused on the temporal dynamics of food insecurity. This concept of food security is further elaborated in terms of "access of all people at all times to enough food for an active, healthy life".

4. The 1996 World Food Summit adopted a still more complex definition: "Food security, at the individual, household, national, regional and global levels [is achieved] when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life"(FAO, 1996).

5. This definition is again refined in The State of Food Insecurity 2001: "Food security [is] a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life"(FAO, 2002).

The working definition of food security is access by all people at all times to enough food for an active and healthy life. (World Bank, 1986).

2.2. Measuring Food Insecurity: Assessing Nutritional Status

Anthropometric measurements can be used to assess the degree of malnutrition among population groups. Children are chosen for the purpose of anthropometric analysis for they are more susceptible to nutritional deficiencies, which could be an indication of lower food security status of households. In addition, nutritional indices in the case of children are sensitive indicators and signal serious problems that might require an immediate policy response.

A child is considered as wasted, stunted or underweight if his/her weight-for-height, height-for-weight or weight-for-age Z-score is -2 SD or less. The Central Statistical Authority welfare monitoring survey (2004) analytical report shows prevalence of wasting, stunting and underweight of children under five years of age in the year 2004, by region.

Weight-for-height is an age independent nutritional status indicator of acute malnutrition or wasting (which is an important indication of short-term food insecurity) based on the principle that a child of a certain height has an expected weight. Wasting, a condition of low weight-for-height is a reflection of recent malnutrition in a population, which may be caused by acute food shortage or serious infections. A child is considered wasted, if his/her weight-for-height Z-score is -2 Standard deviations or less.

According to the result of the survey, the prevalence of wasting is higher among rural children than urban. Among the regions, the prevalence of wasting is highest (16.2 percent) for children in Afar Region. Somali and Tigray Regions have a prevalence rate of more than 10 percent. The lowest prevalence of wasting is indicated for Harari and Addis Ababa (about 5 percent).

Height-for-age is a nutritional status indicator of chronic malnutrition or stunting (which is an important indication of long-term food insecurity) based

on the principle that a child has an expected height for his/her age. It is an indicator of long-term or accumulated nutritional deficiency resulting from lack of adequate dietary intake over a long period of time or recurrent illness. A child is identified as stunted if his/her height-for-age Z-score is less than -2 standard deviations or less from the reference population.

According to the survey results, at country level about 47 percent of the total children aged 3 to 59 months suffer from chronic malnutrition. The high prevalence among rural children (48.5 percent) than urban (29.6 percent) suggests that rural children are more prone to stunting than urban children. The survey result indicates that the prevalence of stunting is higher in Amhara region (58.3 percent) followed by SNNPR region (47.0 percent), Tigray (45.0 percent), Oromia (42.4 percent) and Benishangul Gumuz (41 percent) regions. The lowest level of stunting is registered in Addis Ababa (22.7 percent). The proportion of stunted children in the rest of the regions ranges from 26 percent in Dire Dawa to 37 percent in Somali region.

Weight-for-age is a nutritional status indicator of malnutrition (either acute or chronic food insecurity) based on the principle that a child has an expected weight for his/her age. It is a nutritional deficiency caused by recent and past malnutrition. According to the survey result, the prevalence of underweight among children of the country is 37.1 percent. This considerable proportion of underweight, which reflects both wasting and stunting, also signals the extensive distribution of malnutrition among young children of the country. The findings of the surveys also indicate that nutritional deficiency is more serious in the rural than in urban areas.

The prevalence of underweight among the regions varies from as low as 12.7 percent for Addis Ababa to as high as 45.4 percent for Amhara region. More than two out of five children in Amhara and Tigray regions are observed to be underweight. Whereas children in Addis Ababa, Harari and Dire Dawa regions showed less than 25 percent prevalence rates of underweight. A significant difference is also observed between urban and rural areas. The findings of the

survey showed that the prevalence rates of underweight of rural children ranges from 28.4 percent in Harari region to 46.3 percent in Amhara region while in urban areas it ranges from 12.2 percent in Addis Ababa to 32.1 percent in Afar Region.

Generally, all the four welfare-monitoring surveys have revealed that the prevalence of malnutrition (which is a result of food insecurity) as measured by wasting, stunting and underweight are more prone in rural areas. Boys are also indicated to be more vulnerable to malnutrition than girls with respect to the three indices. The results of the successive surveys have indicated that there is a tremendous decrease in the rate of malnutrition in both urban and rural areas. This might be due to an improvement of food security situation in both urban and rural areas.

2.3. Theories and Perspectives

2.3.1. Demographic Theories

There exist two divergent and competing theories regarding the relationship between population growth and food availability. The first one argues that population growth takes place geometrically, while production and means of subsistence increase only arithmetically. So, unless population increase is checked, food production increase can not keep pace with it. This notion is originally the work of Thomas Malthus, who regarding the threat advanced the theory of rapid population growth as a cause of food shortage (Malthus 1798).

The second set of theory regards large population size as a positive stimulus for growth. Marx disagreed with Malthus, finding the root causes of hunger and other forms of human misery in relation to oppression and exploitation tied to the organization of production (Millman & Kates 1990). Easter Boserup has developed a theory, which demonstrates the relationship between population growth and the transformation of agriculture. She sees population growth as a force favoring an adoption and diffusion of technological

innovation that expands agricultural production, thereby reducing vulnerability to food insecurity and hunger (Boserup 1965).

2.3.2. Shift from Food First to Livelihood Perspective

The conventional perspective that put food at the top priority of a hierarchy for human needs is expressed as: lower order needs are dominant until satisfied, where upon the higher order needs come in to operation. If you are starving, your needs for esteem or status will be unimportant; only food matters (Handy 1985, cited in Maxwell and Smith 1992).

However, a number of authors argue that food security constitutes a sub-system of a broader livelihood security. An empirical observation which is mostly cited for demonstrating this is the findings by de Waal (1989) in Darfur (Sudan) during the 1984-85 famine, that the people chose to go hungry in order to preserve assets and future livelihood; people are quite prepared to put up with considerable degrees of hunger in order to preserve seeds for planting, cultivate their own fields or avoid having to sell an animal (Rosegrant et al, 2005).

2.4. Country Experiences in Food Security

The overall progress achieved in decreasing the number of undernourished in the developing world between 1990-92 and 1997-99 hide sharply contrasting trends in individual countries. Some countries have made outstanding progress, while some have moved forward more slowly or stood still. Still others, however, have suffered reverses, in most cases moderate but occasionally sever.

Countries that perform well may do so by following one or more routes. They may have devoted more resources to increasing agricultural production-the best option for the purposes of increasing economic growth and if small farms and poor consumers are able to participate and benefit, for creating a more

equitable society. Alternatively, they may have imported larger amounts of food, either purchased on international commodity markets or received as food aid. Countries afflicted by long-standing civil wars or recent short-term shocks may achieve better than anticipated performances by the latter route. 12 countries may be singled out as "best performers", i.e., they reduced their proportion of undernourished by more than one percentage point per year from 1990-92 to 1997-99. At the opposite extreme, there are ten countries that may be classified as "worst performers", since their proportion rose by more than one percentage point per year.

The best and worst performing countries are found in all developing regions, including Sub-Saharan Africa, where the proportion of undernourished in the total population is highest. In fact, seven of the best performers and four of the worst performers are in Sub-Saharan Africa. This partly reflects the extreme diversity of production responses to different and rapidly changing agro-ecological conditions and policy environments in the region.

However, in the majority of these African countries, the proportion of undernourished was very high in 1990-92 and, even in the case of best performers such as Chad, Mozambique, Malawi and Angola, the proportion remained high in 1997-99. Because of their high population growth rates (3.2% percent per annum), Mozambique and Angola did not manage to reduce their number of undernourished significantly, despite their good performance. This underscores the role of high population growth in curbing reductions in the number of undernourished. The effect of a substantial population size is illustrated by India, where the percentage of undernourished is estimated to have declined from 25 to 23 percent but the number of undernourished rose by 11 million, owing to rapid population growth.

The severe impacts of sever war and politico-economic crises are illustrated by the listing of the Democratic Republic of the Congo, the Democratic People's Republic of Korea, Afghanistan and Iraq among the worst performers. In these countries (three of which are classified as worst performers in terms

of proportional change) there has been a considerable increase in the number of people suffering from undernutrition and other forms of deprivation. The explanations across these four cases of human tragedy vary, but all involve civil war or extreme problems in the functioning of the political economy.

Among the 98 countries analyzed, the two extremes of performance are represented by China, a country that achieved stunning aggregate economic growth in the 1990s and a socio-economic transformation rivaling that of Southeast Asia in the 1970s and 1980s; and the conflict-stricken Democratic Republic of the Congo, a potentially very rich country which has seen its proportion of undernourished grow from 35 percent in 1990-92 to 64 in 1997-99. It should be noted that, despite China's good performance, the country is still home to the world's second largest number of undernourished people after India (World food submit, 1996).

No country can claim that it has completely eliminated chronic hunger and food insecurity. Therefore, there is as yet no country that can present itself as an example of complete success in this regard. Even if it were possible to find such a country, the paths followed to success are not likely to be replicated in, or appropriate to, other countries, given the complexity of the food security problem already mentioned and the diversity of its dimensions, causes and consequences. Yet despite this, the discovery of significant, and indeed meaningful, general consistencies at the global level linking status of food security and level of economic and social development suggests that there may be many success stories to be told.

Successes may be about specific experiences of countries in improving certain, but not necessarily all, aspects of their food security, and they can be accompanied by shortcomings in other aspects, sometimes being involved even in trade-offs with competing objectives not necessarily related to immediate food security considerations.

Burkina Faso has a history of fairly low household food security. Up until the beginning of the 1990s, Burkina Faso had severe food insecurity problems, with an energy deficit of nearly one-third of the national requirements. The situation since then has improved significantly and the country is no longer considered to have a critically low level of household food security with the food inadequacy level reduced to about one-tenth of the national requirements.

The trend in food security identified above is the net result of many factors, the most important of which are: restructuring of public financing in favor of the rural sector; changes in agricultural sector and food security policies; and demographic factors and State-sponsored or spontaneous rural-to-rural migration. Over the 1983-1989 period, the government undertook major macroeconomic and sectoral policies aimed at restoring macroeconomic equilibria. A system of expenditure redistribution was implemented to allow the financing of sectoral programmes, including agriculture, while adhering to government deficit reduction targets.

As Burkina Faso suffered through the major drought years of the late 1960s to mid-1970s, awareness at the political level of the vulnerability of the country to natural conditions developed, leading to an increasing policy effort to stabilize and increase land productivity. Soil conservation measures (primarily the use of manure and compost and the construction of stone dykes to reduce water runoff) were promoted through the provision of government trucks and food-for-work programmes. The conservation policies led to increased yields on the degraded soils of the central plateau, thus increasing and stabilizing production (Clover, 2003).

Mozambique, after nearly a decade of economic liberalization, and only four years after the country's devastating civil war, remains among the poorest countries in the world. Hunger remains a stark fact of life for a large number of households. Despite adverse conditions, dramatic progress towards sustainable food security has been achieved in recent years. Three dimensions

of this progress are evident: first, increasing per caput food energy availability in the face of drastic reductions in food aid; second, lower and more stable prices for the principal domestically produced staple, white maize; and third, a food system that now provides consumers with a broader range of low-cost staples from which to choose.

The ending of the war was the precondition for improvements in food security, yet the rapid progress the country has made in the past few years has been based on more than just the end of the war. Policy choices made prior to the peace accords created the conditions for rapid recovery once hostilities ceased. The key policy changes relate to general food marketing policy as well as to specific policies on the monetization of yellow maize food aid.

China is highly acclaimed for its ability to feed over one-fifth of the global population with only one-fifteenth of the world's arable land. Starting from a level of 1,500 Calories per caput per day at the beginning of the 1960s, China increased food availability to over 2,700 Calories per caput per day by the beginning of the 1990s, achieving this almost exclusively through increases in domestic production. The Chinese experience, especially the post-1978 reforms, demonstrates the importance of incentives and of a conducive institutional framework in maximizing the effects of agricultural infrastructure, as well as of research on new technologies and their successful dissemination. Over the years, China has successfully met the challenge of achieving universal food security in the face of increasing population (Food Insecurity: 2001).

Following the period of crisis and famine of 1959-1961 a number of reforms took place. Tight controls of the agricultural commune system were relaxed in favor of a more decentralized management system. Infrastructural investment continued alongside a remarkable effort and achievements in the area of seed improvement. The combination of a decentralized research system and successful extension resulted in the replacement by the end of the 1970s of 80

percent of the traditional varieties of rice and wheat by modern dwarf varieties. For more than a decade China was the only country in the world in which hybrid rice was commercially produced. Modern varieties of corn, cotton and other crops were also introduced and promoted in the 1960s and 1970s. The pace of mechanization also accelerated after 1965, especially during the 1970s.

India is a vast country covering a total area of over 297 million hectares and with a population of just over 935 million people. It is considered a low-income country with a per caput gross national product (GNP) of approximately US$300. It has had an economic growth of around 5.2 percent per annum since the early 1980s, three points above the average annual population growth for the same period. Despite rather wide variability in food availability since the 1960s, India has maintained a determined effort to develop domestic food production, reduce aid dependency and improve household food security throughout this period.

India has managed to avoid major famines since gaining independence in 1947. Although gains in productivity and production in the food sector and an extensive public food distribution system have been important elements in this endeavor, India's experience with rural employment schemes seems to be the critical factor differentiating it from other countries that frequently suffer the drastic consequences of famines. The schemes tend to vary across states, but they all aim at providing employment to the rural poor who are willing to do unskilled manual work on a piece-rate basis. Self-selection is usually built in, as no choice of work is offered, the wage rate is usually below the agricultural wage rate and workers may have to travel long distances to participate. The projects chosen are usually labor-intensive and create productive assets. The scheme in Maharashtra, for example, where there is a rural workforce of 20 million people, can provide up to about 100 million person-days of employment in a typical year (Gaiha, 1995).

This short collection of country case-studies demonstrates how a variety of countries with different economic and social structures, natural and social resource endowments and political orientations have managed to cope with some of the problems posed by national and household food insecurity. They illustrate the relative importance of the policy environment in shaping the economic and social processes that ultimately determine the food security status of the people in any country.

Despite the varied nature of the specific policies employed in different countries and at different times, it is clear that there are always trade-offs involved in securing the food security of vulnerable groups. Moreover, the multiplicity of policy objectives that have to be pursued within any setting must ultimately be politically, socially and economically feasible if they are to have any chance of succeeding.

2.5. An Overview of the Food Security Situation in Ethiopia

Ethiopia has been facing a complex poverty, which is broad, deep and structural. Poverty in Ethiopia is widespread and multifaceted. The proportion of the population below the poverty line is 44 percent in 1999/00. The poverty incidence was much higher in rural areas than in urban areas, the poverty head count indices being 45 and 37 percent in rural and urban areas respectively in 1999/00 (MEDREK, 2004).

Hunger and malnutrition are common phenomena in rural areas. Malnutrition affects all groups; however, those at a particularly high risk include the developing fetus, infants and young children, and pregnant and lactating women. On average children suffer form 4-5 episodes of diarrhea per year, which accounts with well over half of all deaths in children under five years of age (The Food Security Strategy, 1996).

Between 1983 and 1992 the national prevalence of stunting (an indicator of chronic malnutrition, general poverty and deprivation) among children under five years of old increased from 60% to 64%, before falling to 52% in 1998, which is still the highest rate in sub-Saharan Africa. According to a survey made in 1998, Amhara region had the highest level of stunting in the country (60%). This is often taken as an indicator of long-term or chronic nutrition difficulties (The New Coalition for Food Security in Ethiopia, 2003).

Ethiopia exhibits poor standard of living as compared to the Sub-Saharan African Countries in terms of all development indicators. According to the World Bank Atlas (2003), life expectancy at birth in the country is 43.8 years for female and 42.8 years for male for the years 2000-05. Moreover, the Gross National Income, the Per Capita Income and the GNI Per Capita (PPP) for the country were 6.7 billion dollar, 100 dollar and 800 dollar respectively. The Gross Domestic Product of the country for the year 2001 was 6,233 million dollars, of which 52% was generated from the agricultural sector. According to the World Bank Atlas (2003), 81.9% of the population of Ethiopia earns 1 dollar per day and 45% of rural and 37 % of urban population of the country live below the poverty line.

The average total fertility rate in the country between the years 2000 and 2005 was 6.8 which is higher than that of the SSA average. Infant mortality (for the years 2000-05) and child mortality (per 1000 live births, for the year 2000) rates were 106 and 174, respectively. For rural Ethiopians, lack of basic health care and potable water services are common problems. Only 12% of the rural population has access to safe water services and only 7% of rural and 33% of urban population have access to improved sanitation services. As a result, thousands of children die every year due to water born diseases (http://earth trends.wri.org,).

In addition to these, 52% of the children in the country under age 1 took measles immunization in the year 2001. A significant number of children (47%) under age 5 were under weight during the years 1993-2001 (the World Bank

Atlas 2003). It is also indicated that only 10% of the births were attended by trained personnel in the years 1994-2000 (http://earth trends.wri.org,) and the contraceptive prevalence rate for the country for the same time period was only 8% (the World Bank Atlas 2003).

A study on food security constraints in Ethiopia by Wolday (1997) was made based on sample survey results of three woredas in northern Ethiopia, namely Habru and Gonder Zuria in Amhara region and Ofla woreda in Tigray region. The result of the survey indicated that land holding size was the main constraint for achieving food security. Moreover, other constraints such as high prices of inputs, insufficient rainfall, high population growth, pest and disease, land degradation, malaria, limited access to credit affect the level of food security.

Markos (1997) also carried out a study in Northern part of Ethiopia and found out that land holding size, means of farming (oxen holding, farming system, and labor), crop and livestock production, non-farm incomes, expenditure and household assets are the determining factors of household food security situation. The study also indicated that household's average cereal production during normal harvest years is persistently lower than annual food requirements hence many households feed themselves from their farm output only for less than three-fourth of the year.

Yared (1999) also conducted a study in North Shewa zone and argued that the seasonality of agriculture brought about fluctuation in income, expenditure and nutritional pattern of households and the coincidence of diminishing grain supplies and increasing grain prices is a liability for the economic status and food security of farmers. According to him the copping strategies employed by the respondents during harsh seasons include change in cropping and planting practices, reducing food consumption, sale f livestock, collecting and eating wild foods, migration to urban areas in search of employment, inter-household transfers and loans, sale of possessions (eg. Jewelry), sale of firewood, and charcoal, food aid, sale of productive assets and migration to other places.

The study conducted by Kifle and Yosef (1999) revealed that the major factors of food insecurity in Ethiopia in the last few decades are fragile natural resource base, inadequate and variable rainfall condition, improper farming practices, lack of production capital, low farm size and tenure insecurity, human capital, poor storage technology, inaccessibility of the areas, lower productivity of livestock and other socio-cultural barriers.

2.6. The Food Security Strategy of Ethiopia

At first sight 1996 appears to have been a landmark year in terms of Ethiopia's recent efforts to overcome dependency on external assistance and achieve food security. In November 1996 an official announcement was made that Ethiopia had apparently crossed the great divide and could now be said to have attained national food self sufficiency. At the end of 1996 prices of maize had dropped by over 25 percent from the previous year and for wheat, barely, teff and bean prices were either similar or up to 10 percent lower in some cases. Although production has improved, incomes may still not be increasing.

What remains unclear was the extent to which this rise can be attributed to the implementation of sound agricultural policies and mass fertilizer distribution to small holders, widespread economic and political stability or climatic factors. In effect, FAO/WFP officially attributed a 20 percent of the crop production increase to the expansion and intensification of the extension program and at least 50 percent of the agricultural increase to climatic factors (Masefield, 1997).

According to Masefield (1997), there was a growing fear that Ethiopia's next wide spread drought shock is probably only just round the corner. Relief needs continue and around 200,000 MT of relief food aid was requested by the DPPC for 1997 to meet the needs of 1.932 million people excluding pastoralists and

refugees. Food aid has played a crucial role in increasing food supply and averting major famines since the 1990's.

The Government Food Security Strategy was issued in November 1996. The World Bank has undoubtedly played a decisive role in the formulation of the strategy. The strategy begins by making explicate an appreciation of the fact that narrowing the food gap is not the same as resolving the problem of food insecurity more generally, but goes on to confirm that the focus of the strategy remains on narrowing of the food gap through diffusion of simple technological packages within small holder agriculture in areas of reliable rainfall.

Clearly the strategy is particularly focused on the attainment of national food self sufficiency which is prioritized as a short term goal. The almost total focus on the extension package and intensification is perceived by many to be problematic from an environmental perspective. In drought prone areas, the application of external inputs leads to accelerated erosion and greater vulnerability.

The national and international commitment to food security in Ethiopia is geographically focused on Tigray, Amhara, Oromia and SNNPR Regions. Within the food security strategy of the country 158 out of 532 woredas have been identified as most vulnerable to food insecurity (Food Security Strategy, 1996). The regional analysis of food insecurity is weak, with little provided in the way of specifics to classify regions and provinces according to their special need so as to ensure appropriate response. The strategy's underlying rationale is premised on the assumption of an inevitable food security trickle down to areas marginalized by intensification programs.

It should also be noted that low potential groups are neglected to the same extent as low potential areas. Women, the landless, and oxless are neglected in the strategy despite their continual over-representation among the ranks of the food insecure. Little concern appears to be paid to the plight of a

significant number of female headed households (30%) who are highly vulnerable to an inescapable poverty trap (Masefield, 1997).

The strategy identifies two choices, one is to decrease the reliance on rain fed agriculture by identification of opportunities for cost effective irrigation and the other option is identification of appropriate technologies such as water harvesting and shorter duration crops for dry land agriculture. However, enhancing agricultural productivity alone will only partially address the task of significantly improving the food security situation of the population.

A comprehensive safety net program will help households to smooth consumption during good times and bad times, and will protect assets during a shock. According to The New Coalition for Food Security in Ethiopia (2003) the potential for safety net programs to effectively protect or build assets will be maximized when they are planned and implemented under a framework of multi-annual programming and when the resources available are not solely in the form of food, but also in the form of cash. To further enhance the effectiveness of the program human and technical capacity should be strengthened at the woreda level.

CHAPTER THREE DESCRIPTION of the STUDY AREA

3.1. Physical and Socio Economic Settings

Angolela Tera *woreda* is located in North Shewa Zone of the Amhara National Regional State. The woreda capital, Chacha, is located 110 km north-east of Addis Ababa (Addis- Dessie Highway). It is 20 km away from the Zone capital, Debre Berhan. The *woreda* shares boarders with Berehet, Hagere Mariam, and Kessem *woredas* in the south-west, Oromia region in the west, Baso-Worana *woreda* in the north, Asagirt *woreda* in the north-east and Ankober *woreda* in the east.

The *woreda* consists of 19 *Kebele* Administrations (16 rural and 3 urban (peri-urban). Agro-ecologically, the *woreda* is 84% *dega* and 16% *weina dega* agro-climatic zones. Elevation varies from 1450 to 2800 masl. The rainfall pattern is bimodal and ranges from 930 to 1500 mm per annum. The mean annual temperature of the *woreda* is 14 ^{0}c (*woreda* MoA, 2006). Table 2 shows rainfall pattern of the woreda from the year 2001-2006. The data indicated that the woreda receives insufficient rainfall for the production of crop and grass.

Table 2. Rainfall Pattern of Angolela Tera Woreda

Year	Total Amount of Rainfall (mm)	Number of Days of Precipitation	Remark
2001	790.6	71	
2002	841.5	96	
2003	919.7	90	
2004	1209.5	73	
2005	255.74	42	Incomplete data
2006 (May-Sept)	194.89	31	Incomplete data
Average	803.4	74	The average excludes 2006's data

Source: woreda MOA 2006

The total population of the *woreda* is estimated at 90,907 of which about 49,2% are female and 50.8% are male. The total number of households in the *woreda* is 21,386. The majority of the inhabitants of the *woreda* are Orthodox Christians, which constitute 98% and the rest 2% are Muslims. In the *woreda* both Amhara and Oromo ethnic groups exist. Amhara ethnic group comprises 88% while Oromo ethnic group constitutes 12%. The total number of adult males and adult females are 13859 and 13935 respectively. The total number of boys and girls constitute 32350 and 30763 respectively (*woreda* Administration Office, 2006).

The main source of livelihood for the population is mixed agriculture. About 98% of the population in the *woreda* depends on agriculture for their livelihood. Most of the people depend on the main rainy season for their annual crop production. Perennial and seasonal springs are found in most of the rural *kebele* Administrations and they are mostly used for traditional irrigation practices and for animal and human consumptions (*woreda* MoA, 2006).

The total area of the *woreda* is 98,900 hectare of which 1602 ha is irrigable and 1576 ha is already irrigated. The topography is dominated by flat land. The land use pattern of the *woreda* is such that 48.9% is cultivated land, 2.2% cultivable land, 36.89% grazing land, 2.89% forest covered, 5.79% shrubs and bush, and the remaining 2.33% is covered with water bodies. The average land holding size of the community in the *woreda* is estimated at about 1.88 hectors per households. Despite these, there are 4750 landless households in the *woreda* (*woreda* MoA, 2006).

The major farming practices in the *woreda* include crop rotation, inter-cropping and fallowing. The fallowing practice is intended for regaining of soil fertility to increase crop yield. The major types of crops grown in the *woreda* include: barley, wheat, faba bean, lentil, chick pea, field pea haricot bean, teff, & linseed. Moreover, horticultural crops such as carrot, cabbage,

swisschard, tomato, onion, garlic, peeper, potato and hops (Rhammns paranoids) are grown in the woreda.

The area is among those *woredas* with highest livestock population in the Zone. In the *woreda* there are an estimated number of 37,185 cows, 25,467 oxen, 10,226 calves, 120,132 sheep, 14,876 goats and 57,452 poultries. There are also 7,332 horses, 12,065 donkeys, and 365 mules (*woreda* MoA, 2006).

Regarding the social services there are one health center, three clinics and two health posts that are meant to address health problems of the community. The number and type of health professionals serving in different health institutions are 2 nurses, 2 health assistants, 2 junior clinical nurses, 4 front line health workers, 3 midwives and 2 sanitarians. The ratio of nurses and health assistants to the total population is almost 1:44,486 each. The primary health service coverage in the *woreda* has reached 89% (*woreda* MoH, 2006).

The number of schools in the *woreda* is 28, out of which 14 are 1st cycle primary (1-4), three are from grade 1-6, four are from grade 1-7, six are from grade 1-8 and one is secondary (grade 9). The number of 1st cycle primary school students (grade 1-4) is 12595 of which females are 47.1%. The number of 2nd cycle primary school students (grade 5-8) and high school students (grade 9) are 4516 and 406 respectively of which females are 44.9% and 41.1% respectively. There are also 12 alternative schools with a total of 1433 students of which females constitute 48.4% (*woreda* MoE, 2006).

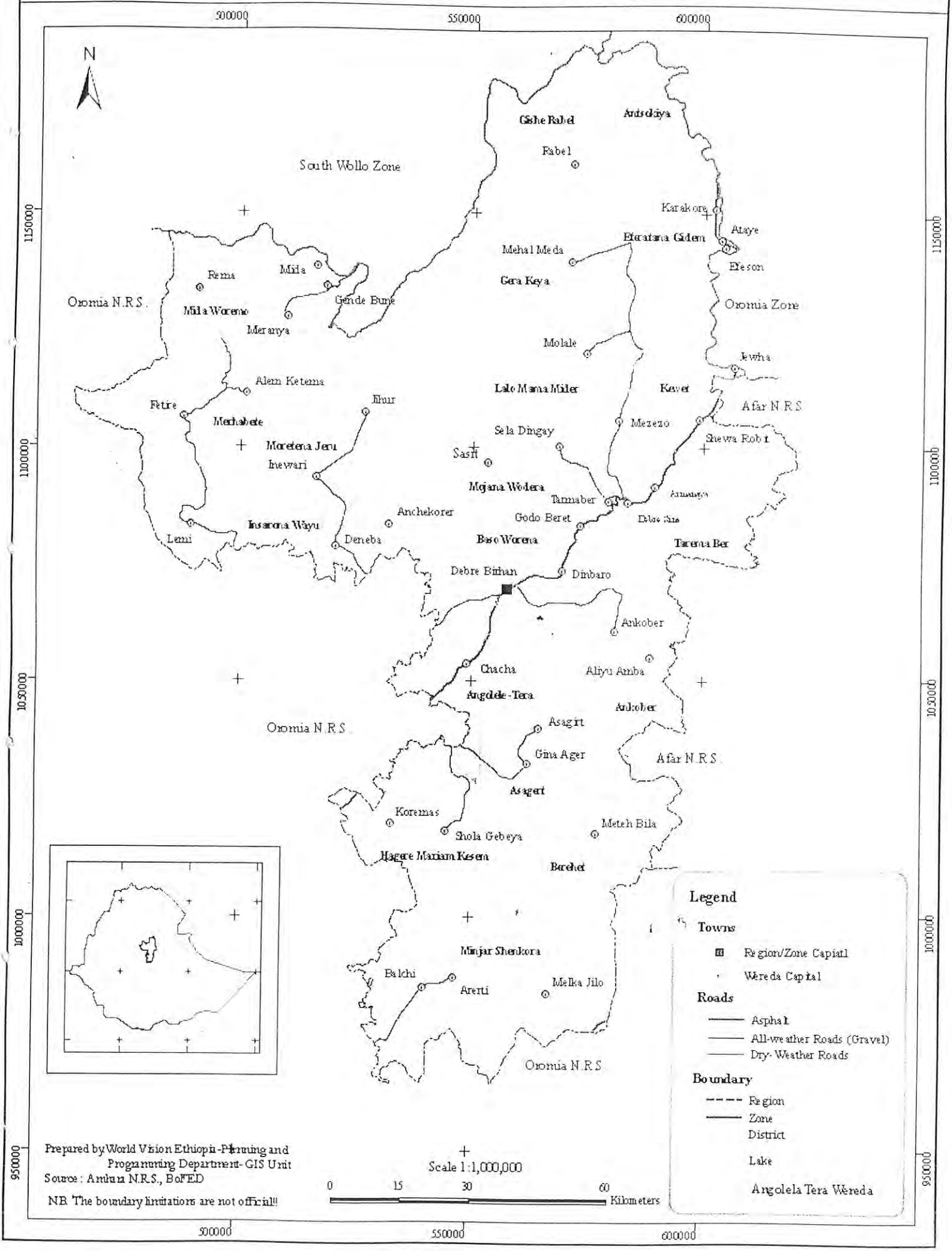
The gross enrollment rate for male students is 79.32% and for that of female students is 75.58%. The number of teachers at all levels is 348 of whom 198 are male and 150 are female. From these, 91 are diploma holders and 257 have certificates. There is also one kindergarten in the *woreda*. Moreover, there is one Community Skill Training Center which renders off-farm training services like blacksmithing, weaving, carpet making, tailoring and pottery making (*woreda* MoE, 2006).

There are about 5 veterinary posts and 1 veterinary clinic in the *woreda* that are rendering animal health services for the community. There is also one Cooperative Promotion Office in the *woreda*. In addition, Amhara Credit and Saving Institution (ACSI) and WISDOM microfinance institution operate in the *woreda*. The clients of ACSI MFI have reached 3933 (of whom females constitute 48%) and that of WISDOM MFI has reached 445 (of whom females constitute 37.5 %). The credits are delivered for group of individuals organized in small groups. Most of the time the credits are offered for clients for the purpose of rearing and fattening livestock and purchasing commercial fertilizers.

The total length of roads in the *woreda* extends over 148 Kms of which 85 kms are dry weather roads and 63 kms are all weather roads. From the total of all weather roads, 28 km is gravel road while the rest 35 km is asphalt road. There is also one post office, and one telephone station operating in the *woreda*. Moreover, three of the 19 KAs namely, Chacha, Cheki and Kotu have a 24 hour electric power service (*woreda* Administration Office, 2006).

Angolela Tera *woreda* has been subjected to recurrent drought and crop failure emanating from unfavorable climatic conditions. The livestock sub-sector has also been suffered from shortage of feed and water. As a result, the *woreda* is selected as one of the few productive safety net program (PSNP) target *woredas* of the zone. Different public works like rural road construction and conservation schemes have been carried out on cash for work basis in the eleven PSNP target *kebeles* of the *woreda*.

North Showa Administrative Zone



3.2. Characteristics of the Sample Population

3.2.1. Demographic Characteristics

3.2.1.1. Sex Composition and Marital Status

The sex composition of the respondents shows that from the total of 150 sampled households, about 83% were male-headed and about 17% were female headed. As far as the marital status of the respondents is concerned, about 73% of the respondents were married, whereas, 20% of the respondents were widowed. On the other hand 4% of the respondents were divorced and the rest 3.3% were unmarried. The survey finding reveals that about 81% of female-headed households were widowed and about 19% were divorced. On the contrary, about 88% of male-headed households in the study area were married and only 0.8% were divorced (see table 3).

Table 3. Marital status by agro-ecological zones

Marital status	Agro-ecological zone				Total	
	Dega		*Weina dega*			
	Number	%	Number	%	Number	%
Never married	4	3.8%	1	2.3%	5	3.3%
Married	78	73.6%	31	70.5%	109	72.7%
Widowed	20	18.9%	10	22.7%	30	20%
Divorced	4	3.8%	2	4.6%	6	4%
Total	106	100.0%	44	100.0%	150	100.0%

Source: household survey results 2006

3.2.1.2. Age Structure

The survey result depicts that 88% of the respondents (91.5% in *dega* areas and 79.5% in *weina dega* areas) belong to age group 15-64 and the rest 12% of the household heads (8.5% in *dega* and 20.5% in *weina dega* areas) were found to

constitute economically inactive persons (i.e. >65 years of age). The average age of respondents was found to be 47.53. In *dega* areas, it was 46.91 and in *weina dega* areas it was 49.02. These indicated that, the great majority of the respondents have the potential to be engaged in income earning economic activities (see table 4).

Table 4. Age structure of respondents in dega and weina dega areas.

Age Group	Agro-ecological zone				Total (%)	
	Dega		*Weina dega*			
	Number	*%*	*Number*	*%*	*Number*	*%*
15-64	97	91.5%	35	79.5%	132	88%
>64	9	8.5%	9	20.5%	18	12%
Total	106	100.0%	44	100.0%	150	100.0%

Source: household survey results 2006

3.2.1.3. Household and Population Size

The survey finding indicates that. the average household size of the respondents in the survey area was found to be 5.27. The household size of the respondents in *dega* and *weina dega* agro-ecological zones showed considerable variations. Annex 1 shows that household size of the respondents in *dega* areas ranges from 1-11 whereas, the household size in *weina dega* areas ranges from 1-8. The total population size of the survey population was found to be 790. In weina dega agro-ecological zone it was 198 and in dega agro-ecological zone it was 592 (see annex 2).

In general, as it is indicated in table 4 above, the average family size in *dega* parts of the survey area was higher than (5.6) that of the *weina dega* parts of the survey area (4.5).

3.2.3. Socio-Cultural and Economic Characteristics

3.2.3.1. Social Position of the Respondents

The finding of the survey showed that the respondents have different socio-political status in the community. About 33% of the respondents (36.8% of respondents in *dega* and 25% of respondents in *weina dega* parts of the survey area) were found to be farmers' cadres or leadership group member of the respective *kebele* administrative office. In a similar fashion, 10 % of the respondents (7.5% of the respondents in *dega* parts and 15.9% of the respondents in *weina dega* parts) were found leaders of community-based social organizations or faith-based organizations (*edirs* and churches).

Besides, 27.3 % of the respondents (21.7% of the respondents in *dega* and 40.9% of the respondents in *weina dega* parts) were found to be community elders in the survey area. On the other hand, 29.3% of the respondents in the survey area (34% of the respondents in *dega* and 18.2% of the respondents in *weina dega* parts) didn't have any socio-political position in the community. As far as gender is concerned, about 31% of female-headed households and 79% of male-headed households were represented in one of the aforementioned leadership positions in the survey area (see table 5).

Table 5. The social status of the respondents by sex.

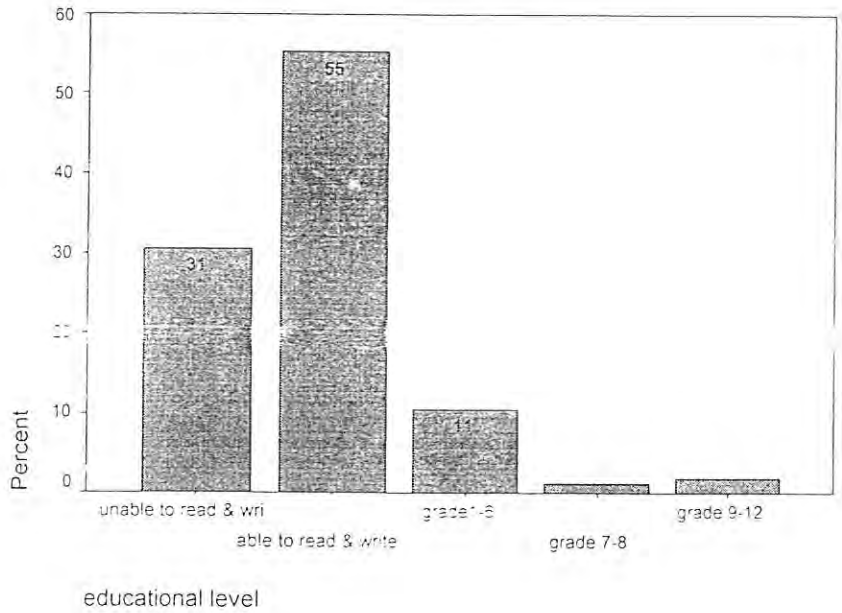
The social status within community	Respondent's sex				Total	
	Male		Female			
	Number	%	Number	%	Number	%
KA Leadership	14	11.3%	0	0%	14	9.3%
Mengistawi budin	30	24.2%	6	23.1%	36	24%
Community elder	40	32.3%	1	3.9%	41	27.3 %
Religious leader	9	7.3%	9	34.6%	6	4%
Leadership member of *edirs*	5	4%	1	3.9%	9	6%
No position	26	21%	9	34.6%	44	29.3%
Total	124	100.0%	26	100.0%	150	100.0%

Source: household survey results 2006

3.2.3.2. Literacy and Educational Level of the Respondents

It is found that about 31% of the respondents could not read and write, while about 55% were able to read and write. The remaining 14% of the respondents have attended formal schooling. The graph in figure 2 displays the level of education, literacy and attainment of the respondents in the survey area. Hence, it appears that more than half of the people in the survey area are literate. This may create an opportunity for easy communication and transfer of modern agricultural technologies and other new inputs.

Figure 3. Level of education, literacy and attainment



Source: household survey results 2006

Table 6 below indicates that the level of literacy has not showed a significant variation across different agro-ecological zones in the study area. However, the proportion of respondents who reached beyond grade 6 has sharply decreased in *weina dega* areas. It appeared that the level of literacy didn't show much difference across different agro-ecological zones in the survey area. However, the secondary school enrollment rate in *weina dega* areas appears very low due to inavailability of secondary school in the area.

Table 6. Level of education by agro-ecological zones

Educational level	Agro-ecological zone				*Total*	
	Dega		*Weina dega*			
	Number	%	Number	%	Number	%
Unable to read & write	33	31.1%	13	29.5%	46	31%
Able to read & write	59	55.7%	24	54.5%	83	55%
Grade 1-6	9	8.5%	7	15.9%	16	10.7%
Grade 7-8	2	1.9%	0	0%	2	1.3%
Grade 9-12	3	2.8%	0	0%	3	2%
Total	106	100.0%	44%	100.0%	150	100.0%

Source: household survey results 2006

The survey result shows that about one-third (34%) of the respondents (23.2% in *weina dega* and 65.6% in *dega* areas) used contraceptives (see annex 3). About two-third of the respondents (66.1%) did not use contraceptives mainly due to fear of side effects and need for many children. Besides, some respondents have also expressed that they do not have information about the use of contraceptives. Table 7 below depicts that as the level of education increases, the proportion of respondents who used contraceptives increased with some exceptions.

Table 7. Educational level and use of contraceptives

Use of contraceptives		Educational level				
		Unable to read & write	Able to read & write	Grade 1-6	Grade 7-8	Grade 9-12
Contraceptive users	%	26.5%	32.4%	57.1%	0%	66.7%
	Number	9	24	8	0	2
Non-users	%	73.5%	67.6%	42.9%	100.0%	33.3%
	Number	25	50	6	2	1
Total (*woreda*)	%	100.0%	100.0%	100.0%	100.0%	100.0%
	Number	34	74	14	2	3

Source: household survey results 2006

3.2.3.3. Control over Productive Resources

The result of the survey indicates that although both the husband and the wife have equal ownership right over all household assets, about 85% of the respondents (78.3% in *dega* parts and 100% in *weina dega* parts) verified that the husband have controlled and made important decisions over farm land and major household assets such as livestock and other financial and material assets, while 15.3% of the respondents (21.7% of the respondents in *dega* parts of the survey area) replied that, both the husband & the wife have equally controlled and made important decisions over major household assets.

CHAPTER FOUR FOOD PRODUCTION and VARIOUS LIVELIHOOD STRATEGIES

4.1. Production Characteristics and Land Use

In this section emphasis is given on cultivated, fallow and grazing land holding sizes and the fertility of the soil in dega and weina dega parts of the area.

4.1.1. Cultivated Land

The survey result shows that 99% of the respondents (99.1% in *dega* and 97.7% in *weina dega* areas) have possessed farmland. Only 1.3% of the respondents (0.9% in *dega* and 2.3% in *weina dega* areas) were found to be landless. The average cultivated land holding size of the survey population was 1.15 ha per household. The average cultivated land-holding size of the respondents in *dega* and *weina dega* areas were found to be 1.3 ha and 0.88 ha per household respectively. This clearly indicates that there is a shortage of land in *weina dega* areas than in *dega* areas. The respondents have owned from 0.25 ha to 2.8 ha of cultivated land in the survey area. Besides, 27.3%, 16.7% and 16% of the respondents have owned 1 ha, 1.5 ha and 0.8 ha of cultivated land respectively. Whereas, 14.3%, 8.7% and 14.7% of the respondents owned < 0.5 ha, 1.1-1.3 ha and >1.8 ha of cultivated land respectively.

However, the average cultivated land holding size of the survey population 10 years ago was 2.1 ha (in *dega* areas it was 2.8 ha and in *weina dega* areas it was 0.9 ha (see table 8).

On the other hand, the average land holding size in *dega* areas has decreased from 2.8 to 1.3 ha of land in the last 10 years time. On the contrary, the average land holding size of the respondents in *weina dega* parts of the survey area was remained 0.9 ha in the last 10 years time. From these it can be inferred that, the average cultivated land-holding size in *weina dega* parts of the study area has not showed a significant variation in the past 10 years

time. However, it showed a significant variation in *dega* part of the study area mainly due to the ever-increasing population growth (see table 8).

Table 8. The average cultivated land-holding size of the respondents in different agro-ecological zones in *hectare* now and 10 years ago.

Agro-ecological Zone	The average cultivated landholding size	
	2007	1997
Dega	1.3	2.8
Weina dega	0.9	0.9
Total	1.2	2.1

Source: household survey results 2006

Moreover, the result of the survey showed that the quality of land in the study area showed a considerable variation within the survey area. About 77% and 79% of the respondents in *weina dega* and *dega* parts respectively replied that, their plot of land was moderately fertile (medium), while 20 % and 1.3% of the respondents replied that they owned infertile & sufficiently fertile land respectively (see table 9).

Table 9. Fertility of farmland in different agro-ecological zones.

Quality of land	Agro-ecological zone				Total	
	Dega		*Weina dega*			
	Number	%	Number	%	Number	%
sufficiently fertile	0	0%	2	4.5%	2	1.4%
Fertile (medium)	82	78.8%	34	77.3%	116	78.4%
Infertile	22	21.2%	8	18.2%	30	20.2%
Total	104	100.0%	44	100.0%	148	100%

Source: household survey results 2006

4.1.2. Fallow Land

The study shows that only 22% of the respondents practiced fallowing. It is also found that fallowing was practiced only in *dega* areas, where average cultivated land holding size was higher than that of *weina dega* areas. The result of the study revealed that about one-third (31.1%) of the respondents in *dega* areas have practiced fallowing. Moreover, 42.4% of the respondents fallowed less than 0.3 ha of their farmland. Similarly, 42.4% of the respondents fallowed 0.4-0.5 ha of their farmland. The rest 15.2% the respondents have fallowed 0.75-1.5 *ha* of their farmland (see annex 4).

4.1.3. Grazing Land

The result of the survey indicated that there existed communally owned grazing lands in *weina dega* parts of the study area. However, in *dega* parts of the survey area there were no communally owned grazing lands. It is found that about 88% of the respondents in *dega* areas and 75% of the respondents in *weina dega* areas owned grazing lands individually (see table 10). The respondents owned from 0.05 to 1.5 ha of grazing land. To put it in more detail, 20.7%, 18% and 16% of the respondents owned 0.1, 0.5 and 1 ha of grazing land respectively. The survey result also showed that the average size of grazing land in the area was about 0.6 ha per household.

According to the survey result, the average grazing land-holding size in the survey area was found to be 0.6 ha of land. Respondents in *dega* parts of the survey area owned on average 0.7 ha of grazing lands, whereas in *weina dega* parts of the survey area they owned on average 0.15 ha of grazing land. The respondents indicated that, they owned from less than 0.25 to as large as 4 *ha* of grazing land ten years before. The average grazing land-holding size of the respondents ten years ago was 0.7 ha of land per household. Respondents in *dega* parts of the survey area have owned on average 1.1 ha of grazing land, whereas in *weina dega* parts of the survey area they owned on average 0.2 ha of grazing land ten years before. From these, it can be inferred that in *dega*

parts of the survey area, the average grazing land-holding size per households has significantly decreased as compared to that of 10 years ago. However, in *weina dega* parts of the study area, the average grazing land holding size haven't showed a significant difference as compared to that of 10 years ago (table 10).

Table 10. The average grazing land-holding size of the respondents in different agro-ecological zones in hectare now and 10 years ago.

Agro-ecological zone	The average sizes of grazing land owned	
	1997	2007
Dega	0.7	1.1
weina dega	0.15	0.2
Total	0.57	0.72

Source: household survey results 2006

4.2. Livelihood Strategies

The result of the survey revealed that there are various types of livelihood strategies adapted by the community members. The main source of livelihood for the population of the area is mixed agriculture. However, the production and the income obtained from the agriculture sector in the woreda was very low. The community also adapted other non-farm livelihood strategies in order to complement the income obtained from the agriculture sector. However, the community members faced different challenges while practicing various livelihood strategies.

4.2.1. Crop Production

4.2.1.1. Crop Production during *Meher* Season

The survey finding revealed that, only 7.2% of the respondents have practiced mono cropping, while 92.5% of the respondents have practiced multiple cropping. Out of these, 74.2% have grown a combination of barley, bean,

wheat and *Avena Sativa (sinnar)*. Besides, the rest have also grown different combinations of other crops such as pea, lentil, teff, sorghum, and flex (see table 11).

Table 11. Type of crops harvested during the last Meher season (2006).

	Agro-ecological zone				Total	
	Dega		*weina dega*			
Type of crops cultivated	%	Count	%	Count	%	count
Barley only	2.9%	3	0%	0	2.0%	3
Beans only	1.0%	1	0%	0	.7%	1
Barley, beans wheat	16.3%	17	48.8%	21	25.9%	38
Barley, beans, wheat, other	1.0%	1	0%	0	.7%	1
Barley and bean	9.6%	10	14.0%	6	10.9%	16
Barley, bean, *sinnar*	18.3%	19	0%	0	12.9%	19
Barley, wheat, flex	1.0%	1	0%	0	.7%	1
Barley, bean, wheat & *sinnar*	13.5%	14	0%	0	9.5%	14
Barley & *sinnar*	9.6%	10	0%	0	6.8%	10
Barley, bean, flex	1.0%	1	0%	0	.7%	1
Barley & wheat	1.9%	2	0%	0	1.4%	2
Barley, flex, *sinnar*	1.0%	1	0%	0	.7%	1
Barley, wheat,bean,*sinnar*,flex	1.0%	1	0%	0	.7%	1
Bean. wheat,*sinnar*	2.9%	3	0%	0	2.0%	3
Barley, wheat,bean,lentil	1.0%	1	2.3%	1	1.4%	2
Barley, bean,pea,sinnar	3.8%	4	0%	0	2.7%	4
Bean & *sinnar*	3.8%	4	0%	0	2.7%	4
Sinnar	6.7%	7	0%	0	4.8%	7
Pea & *sinnar*	1.0%	1	0%	0	.7%	1
Bean & wheat	1.0%	1	0%	0	.7%	1
Barley, wheat,*sinnar*	1.0%	1	0%	0	.7%	1
Wheat, pea,*sinnar*	1.0%	1	0%	0	.7%	1
Barley, bean,wheat,teff	0%	0	11.6%	5	3.4%	5
Barley, bean,wheat,pea,teff	0%	0	2.3%	1	.7%	1
Barley, wheat,bean,sorghum	0%	0	7.0%	3	2.0%	3
Barley,wheat,bean,teff,sorghm	0%	0	7.0%	3	2.0%	3
Barley, bean,teff,sorghum	0%	0	2.3%	1	.7%	1
Barley, bean,wheat,lentil,teff	0%	0	2.3%	1	.7%	1
Barley, wheat,bean,pea	0%	0	2.3%	1	.7%	1
Total	100.0%	104	100.0%	43	100%	147

Source: household survey results 2006

The survey result also showed that, the total amount of field crops harvested during the last *meher* season ranges from 2 to 46 quintals per household, out

of which 68.9% of the respondents harvested from 5 to 15 quintals of field crops. The survey result indicated that 98% of the respondents have cultivated from 0.2 to 4.3 ha of land during *meher* season. From this, 41.6% and 41.4% of respondents have cultivated from 0.25 to 1 and from 1.25 to 2 *ha* of land respectively (see table 12).

Table 12. Average amount of crops harvested and area cultivated during the last *meher* season (2006).

Agro-ecological zone	Amount of crops (cereals & pulses) harvested per HHs (in quintal)	Area of land farmed per HHs (ha)
Dega	12.1	1.5
Weina dega	6.9	0.9
Total *(woreda)*	10.5	1.4

Source: Household survey results 2006

4.2.1.2. Crop Production during *Belg* Season

It is found that 36% of the respondents have harvested during *belg* season. From these, 55.6% belong to *weina dega* agro-ecological zone and the rest 44.4% belong to *dega* agro-ecological zone. In other words, 68.2% of respondents in *weina dega* areas and only 22.6% of respondents in *dega* areas have harvested in both seasons. It is also found that out of the total number of respondents who grew during *belg* season, $3/4^{th}$ of them grew barley alone. The rest 24.1% grew a combination of field crops such as barley, bean, wheat, lentil and pea (see table 13).

Table 13. Type of crops harvested during the last belg season.

Type of crops harvested during the last *belg* season	Agro-ecological zone				Total	
	Dega		*Weina dega*			
	Number	%	Number	%	Number	%
Barley only	18	75.0%	23	76.7%	41	75.9%
Beans only	1	4.2%	0	0%	1	1.9%
Barley and bean	1	4.2%	1	3.3%	2	3.7%
Wheat & lentil	1	4.2%	0	0%	1	1.9%
Wheat & barley	1	4.2%	4	13.3%	5	9.3%
Wheat & pea	1	4.2%	0	0%	1	1.9%
Barley, bean, wheat, pea	1	4.2%	0	0%	1	1.9%
Barley, pea	0	0%	1	3.3%	1	1.9%
Barley, wheat, pea	0	0%	1	3.3%	1	1.9%
Total	24	100.0%	30	100.0%	54	100.0%

Source: household survey results 2006

The total amount of crops harvested per household ranges from 0.5 quintals to 16 quintals of crops. More than $2/3^{rd}$ of the respondents who harvested during the *belg* season have obtained less than 3 quintal of crops. The total area cultivated during the last *belg* season ranges from 0.08 to 1.4 ha of land. From the total number of respondents who harvested during *belg* season, 46.3 % and 20.4% have cultivated 0.25 and 0.5 ha of land respectively (see table 14).

Table 14. Average amount of crops produced and area cultivated during the last *belg* season (2006).

Agro-ecological zone	Amount of crops (cereals & pulses) harvested/HHs (quintal)	Area of land cultivated/HHs (ha)
Dega	4.812	0.414
Weina dega	2.258	0.425
Total (*woreda*)	3.394	0.420

Source: household survey results 2006

From table 14 it can be easily computed that the average yield of field crops obtained in the survey area was 8.1 quintals/*ha*. In *dega* areas, the average yield of field crops was more than double (11.6 quintals/*ha*) that of *weina dega* areas (5.3 quintals/*ha*).

4.2.1.3. Sharing in/out Cropland

The finding of the survey indicated that about 93% of the respondents cultivated their own land. Whereas, 31.3% and 14.7 % of the respondents have shared in and rented in on average 0.7 and 0.3 ha of farmland respectively. The total land rented in/shared in ranges from 2.5ha to less than 0.25 ha of farmland. The result of the survey showed that renting in and sharing in of farmland have mostly been practiced in *dega* parts than in *weina dega* parts of the area so as to boost the income obtained from own farmland. This is due to a larger landholding size in *dega* area.

The result of the survey has also showed that, 22% of the respondents have shared crop out and rented out on average 0.88 *ha* of farmland (see table 15). The total area shared crop out/rented out ranges from 1.5 to less than 0.25 ha of farmland. The survey result showed that sharecropping out/ renting out of farmland has been practiced in both *dega* and *weina dega* parts of the area as one means of copping strategies during food deficit seasons.

Table 15. Total number of respondents and average size of land in the last (2006) cropping season.

Agro-ecological Zone		Own land (ha)	Sharecropped out/ rented out land (ha)	Share cropped In/ Rented In land (ha)
Dega	Mean	1.22	0.762	0.916
Weina Dega	Mean	0.793	1.445	1.094
Total	Mean	1.097	0.869	1.016
Respondents	Number	140	33	69
	%	93.3%	22%	46.0%

Source: household survey results 2006

It is also found from the survey result that, the main reasons for sharing out/renting out land were inavailability of oxen, lack of farm implement and enough labor (see table 16).

Table 16. Reasons for renting out/ share cropping out in the last farming season (2006) in the survey area.

Reasons for sell, rent out, share crop out any land	Agro-ecological zone				Total (%)	
	Dega		*Weina dega*			
	Number	%	Number	%	Number	%
need of cash to buy food and non-food items	0	0%	4	40.0%	4	24.9%
Lack of enough labor	1	16.7%	4	40.0%	5	31.3%
Lack of farm implement & oxen	3	50.0%		10.0%	4	25%
Lack of enough labor, plough ox and farm implement	2	33.3%	1	10.0%	3	18.8%
Total	6	100.0%	10	100.0%	16	100%

Source: household survey, results 2006

4.2.1.4. Horticultural Crop Production

The major types of horticultural crops grown in the survey area include: hops (Rhammns paranoids), onion, garlic, green pepper, vegetables and sugarcane. It is found that about one third (32%) of the respondents have grown horticultural crops. Of this about 81% and 19% of the respondents who, respectively, lived in *weina dega* and *dega* agro-ecological zones cultivate horticultural crops. It is also found that about 89% of respondents in *weina dega* areas and only 9% of respondents in *dega* areas have grown horticultural crops in the survey area. From the total of the respondents who have grown horticultural crops in the area about 40% have grown vegetables such as onion, garlic and green pepper, whereas, about 56% have grown both vegetables and perennial crops such as hops (Rhammns paranoids) and sugar

cane. It is also found that about 4% of the respondents have grown perennial crops such as hops (Rhammns paranoids) alone (see table 17).

Table 17. Type of horticultural crops grown in the survey area.

Type of horticultural crops grown	Agro-ecological zone				Total	
	Dega		*Weina dega*			
	Count	%	Count	%	Count	%
Hops	0	0%	2	5.1%	2	4.2%
Onion	0	0%	1	2.6%	1	2.1%
Garlic	6	66.7%	1	2.6%	7	14.6%
Green pepper	0	0%	1	2.6%	1	2.1%
Garlic & vegetables	2	22.2%	0	0%	2	4.2%
Vegetables	1	11.1%	0	0%	1	2.1%
Hops	0	0%	1	2.6%	1	2.1%
Hops, garlic, onion	0	0%	11	28.2%	11	22.9%
Hops, garlic, onion, pepper	0	0%	5	12.8%	5	10.4%
Hops, sugar cane, onion	0	0%	4	10.3%	4	8.3%
Garlic, onion, pepper	0	0%	4	10.3%	4	8.3%
Hops, sugarcane, onion, garlic, pepper	0	0%	6	15.4%	6	12.5%
Garlic, onion	0	0%	3	7.7%	3	6.3%
Total	9	100.0%	39	100.0%	48	100.0%

Source: household survey results 2006

The annual income earned from sale of horticultural crops ranges from 3 birr to 4197 birr, the average being birr 814.8. In *dega* parts of the survey area, the average annual income earned from sale of horticultural crops was estimated to be 759.8 birr. Whereas, in *weina dega* parts of the area, the average annual income earned from sale of horticultural crops was about 828 ETB. This helped them as an important income source to purchase food and other non food items.

4.2.1.5. Application of Modern Inputs and Farm Management Practices

The survey finding indicates that about 61% of the respondents applied modern inputs such as chemical fertilizers and improved seeds on their farmland. Besides, 36% of the respondents have applied manure and mulch on their farmland. On the contrary, about 11% of the respondents applied neither

organic nor inorganic chemicals on their farm. But about 17% of the respondents have made use of irrigation. It is also found that about 63% of the respondents in the *dega* parts of the survey area have made use of modern inputs such as chemical fertilizer and improved seeds on their farmland. Whereas, about 15% of the respondents in *dega* parts of the survey area haven't made use of organic and inorganic fertilizers, improved seeds and irrigation. On the other hand, in *weina dega* parts of the survey area about 57% of the respondents have made use of modern inputs such as chemical fertilizers and improved seeds. Whereas, it is found that only about 7% of the respondents have access to irrigation (see annex 5).

The finding of the survey revealed that about 96% of the respondents have practiced different land management practices such as, fallowing, crop rotation, inter-cropping, manuring and application of commercial fertilizers. It is also found that agro-ecological variations have been observed in terms of the types of practices chosen; in *dega* areas farmers practiced application of manures, commercial fertilizers, crop rotation, and fallowing. Whereas, in *weina dega* areas, farmers practiced inter cropping, and application of manures and commercial fertilizers. In other words, although manuring and application of commercial fertilizers were commonly practiced in both *dega* and *weina dega* parts of the survey area, fallowing and crop rotation were more practiced in *dega* areas and inter-cropping was more practiced in *weina dega* areas alone (see annex 6).

4.2.1.6. Soil Conservation Mechanisms

In order to minimize soil erosion, farmers in the survey area have adopted different soil conservation mechanisms. The findings of the survey indicated that 94% of the respondents (91.5% in *dega* and 100% in *weina dega* parts of the survey area) practiced various physical and biological soil and water conservation measures such as terracing, soil/stone bunds construction, tree planting and strip cultivation. From these, 77.3% practiced terracing, 14.2% practiced tree planting, and the rest 8.4% practiced combinations of physical

and biological soil and water conservation techniques. It is also found that 68% and 97.7% of the respondents have practiced terracing alone in *dega* and *weina dega* parts of the survey areas respectively. Besides, 20.6% of *dega* inhabitants have practiced tree planting to replenish the soil (see annex 7).

4.2.1.7. Constraints of Crop Production

The result of the survey indicates that about 91% of the respondents have expressed that the main constraints of crop production include: frost, poor soil fertility, inadequate farm size, erratic rainfall, pest and disease, and weeds (see annex 8). Moreover, 16% of the respondents have expressed that shortage of farm oxen as the main constraint of crop production. Furthermore, 5% and 4% of the respondents also expressed that ice and water logging are the main constraints for crop production respectively. In *weina dega* parts of the survey area about 90% of the respondents have expressed that the main constraints of crop production were erratic rainfall, crop pest and disease, shortage of farmland and poor soil fertility. It is also found that frost and waterlogging problems occurred in *dega* areas alone.

4.2.2. Livestock Production

4.2.2.1. Breed Type, Number and Value of Livestock

As far as livestock are concerned about 97% of the respondents (96.2% in *dega* and 97.7% in *weina dega)* have owned livestock such as cattle, small ruminants, equines and chicken (see table 18).

Table 18. Number of respondents who owned different types of livestock.

Types of livestock owned													
Varity		Cows		Oxen		Sheep		Equines		Chicken		Beehives	
		Local	Improved	Local	Improved	Local	Improved	Local	Improved	Local	Improved	Traditional	modern
Respondents who own livestock	Number	121	15	114	11	101	0	76	0	41	1	0	0
	%	80.7%	10.0%	76%	7.3%	67.3%	0%	50.7%	0%	27.3%	.7%	0%	0%

Source: household survey results 2006

Table 19 demonstrated that the total estimated value of livestock owned by respondents ranges from 20 to 23200 ETB in *dega* parts of the survey area and from 30 to 7800 ETB in *weina dega* parts of the survey area. The average value of livestock per individual households was found to be 4838 ETB (5467.94 in *dega* and 3346 ETB in *weina dega).*

It is found that about 81% of the respondents owned one or more local breed cows. From these about 27% of respondents owned one cow, 43% of the respondents owned two cows, and 18.2% of the respondents owned three cows. On the contrary, 19.3% of the respondents did not have cow. In *weina dega* areas, the number of cows per households ranges from one to four, whereas in *dega* areas the number of cows per household ranges from one to fourteen. The average number of cows per households in the survey area was found to be 2.4 (2.7 in *dega* and 1.6 in *weina dega* parts). Similarly, the ratio of respondents who owned cows in *dega* areas (85%) is greater than that of weina dega areas (71%). As far as improved variety of cow is concerned only

10% of the respondents were found to own one to six improved varieties of cows. The average number of improved cow breeds per households in the survey area was found to be 1.6. Surprisingly, all of them are found in *dega* areas of the *woreda*.

It is found that 24% of the respondents did not have any oxen (26.4% from *dega* and 18.2% from *weina dega* parts). The remaining 76% of the respondents owned one to five local variety oxen. Of this 35 % owned only one ox, while 51.8% owned two oxen. The average number of local variety oxen per households in the survey area was found to be 1.84 (1.95 in *dega* and 1.61 in *weina dega* parts). Besides, only about 7% of the respondents owned improved variety of oxen/bulls. From this, about 46% owned only one ox/bull and 27.3% owned two oxen/bulls. The average number of improved oxen breeds per households in the survey area was found to be 2.27. All of the respondents who owned improved variety of oxen were found in *dega* areas.

The result of the survey revealed that about 67% of the respondents (69.8% of *dega* inhabitants and 61.4% of *weina dega* inhabitants) owned two to fourteen local variety sheep/goats. Of this, more than three-fourth (77.3%) of the respondents owned three to seven sheep/goat per head. The number of sheep/goat per head was higher in *dega* areas (2 to 14) than in *weina dega* areas (2 to 7). The average number of local variety sheep (goat) per households in the survey area was found to be 5.56 (6.12 in *dega* and 4.04 in *weina dega* parts of the survey area). None of the respondents owned improved variety of sheep and goat.

The result of the survey indicated that about 51% of respondents (58.5% from *dega* areas and 31.8% from *weina dega* areas) owned one to 11 equines. Of this, 88.1% owned one to two equines per head. The average number of equines per households in the survey area was found to be 1.76 (1.9 in *dega* and 1.14 in *weina dega* parts of the survey area). The lower number of equines in *weina dega* areas was attributed to the shortage of forage/grazing land in the areas.

The survey finding clearly showed that only 27.3% of the respondents (14.2% from *dega* areas and 59.1% in *weina dega* areas) owned one to ten local varieties of chickens. From this, 75.6% owned one to two chickens per head. The average number of chicken per households in the survey area was found to be 3 (4 in *dega* and 2.38 in *weina dega* parts of the survey area). Although the average number of chicken per households in *weina dega* parts of the survey area is lower than that of *dega* areas, the result of the study indicates that, chickens have mainly been raised in *weina dega* parts of the survey area. Mainly poor households have reared chickens in the area and the income earned from them was insignificant. On the other hand, only one respondent is found to own improved variety of chickens (see table 16). As far as beekeeping is concerned, none of the respondents owned traditional and/or modern beehives.

Table 19. Average number of livestock owned in a HH, number of respondents who own livestock and estimated values of livestock by agro-ecological zones

Agro-ecological zone		Average number of livestock owned								Estimated value of all livestock owned in (ETB)
		local breed cows	improved breed cows	local breed oxen	improved breed oxen	local breed shee p/ goat	Local breed equines	local breed chicken	improved breed chicken	
Dega	Mean	2.72	1.60	1.95	2.27	6.12	1.90	4.00	15.00	5467.9
	HHs	90	15	78	11	74	62	15	1	102
weina dega	Mean	1.58	0	1.61	0	4.04	1.14	2.38	0	3346.00
	HHs	31	0	36	0	27	14	26	0	43
Total (woreda)	Mean	2.43	1.60	1.84	2.27	5.56	1.76	2.98	15.00	4838.7
	HHs	121	15	114	11	101	76	41	1	145

Source: household survey results 2006

4.2.2.2. Potentials and Constraints in Rearing Livestock

Secondary data from the *woreda* office of Agriculture and Rural Development office indicates that the topography and climate of the highland parts of the area are suitable for rearing livestock. Moreover, attempts have been made to distribute improved varieties of cattle in the *woreda* with the help of artificial insemination center. Efforts have also been made in forming different milk producing cooperatives in order to help members boost their income from sale of milk and milk products-butter and cheese. Despite these, the predominant livestock rearing practice is traditional and subsistent. The office has indicated that, the main cattle diseases in the *woreda* include: black leg, anthrax and render pest. These diseases usually outbreak during end of June to end of October. The major sheep diseases include: pastrolosis bovine, mastitis, Pneumonic, contagious bovine pre-pneumonic (CBP), and contagious caprine pre-pneumonic (CCP). These diseases usually outbreak from the beginning of September to end of November. Besides, the commonly poultry disease in the *woreda* is Newcastle disease (*woreda* MoA, 2006).

90.7% of the respondents reported that the main constraints to rearing livestock were livestock diseases and shortage of grazing land and additional fodder (see annex 9). Lack of capital and productive manpower, inavailability of veterinary posts and attack by wild animals were also the other constraints in livestock rearing. In *weina dega* parts of the survey area the main constraints (as indicated by 86.3% of the respondents) of rearing livestock were shortage of grazing land and unavailability of veterinary services. On the other hand, in *dega* parts of the survey area, the main constraints (as indicated by 94% of the respondents) of rearing livestock were livestock disease prevalence, shortage of grazing land and lack of additional fodder.

4.2.3. Sale of Fuel Wood and Cow Dung

It is found that about 40% of the respondents (50.5% in dega and 15.9% in *weina dega* areas) sell fuel wood and animal dung to complement their HH income. The only source of fuel for *weina dega* inhabitants was wood unlike that of *dega* inhabitants who relied on both livestock dung and wood as their source of fuel. From the total of respondents who lived in *dega* parts of the survey area, about 17% sale livestock dung, while the remaining about 83% sale both livestock dung and woodlots to earn income (see table 20).

Table 20. Number of respondents engaged in selling fuel wood and cow dung.

Sources	Agro-ecological zone				Total	
	Dega		*Weina dega*			
	Number	%	Number	%	Number	%
Own wood lots	0	0%	7	100.0%	7	11.9%
Livestock dung	9	17.3%	0	0%	9	15.3%
Own wood lots and livestock dung	43	82.7%	0	0%	43	72.9%
Total	52	100.0%	7	100.0%	59	100%

Source: household survey results 2006

It is also found that, 73.3% of the respondents (70.8% in *dega* and 79.5% in *weina dega* parts) owned woodlots. However, 99.1% of the respondents preferred to grow and cut eucalyptus species.

The respondents expressed that the main reasons for growing eucalyptus trees were the ability of the tree to grow in a relatively short periods of time (easily regenerating and coppicing), and because of its multipurpose usages-for construction, fuel wood, and means of earning income during slack seasons (see table 21).

Table 21. Reasons for growing and cutting eucalyptus tree species.

Reasons for growing and cutting trees	Agro-ecological zone				Total	
	Dega		Weina dega			
	Number	%	Number	%	Number	%
For construction	1	1.3%	2	5.7%	3	2.7%
For selling	7	9.3%	0	0%	7	6.4%
During emergency situations	1	1.3%	0	0%	1	0.9%
For construction and fuel wood	17	22.7%	1	2.9%	18	16.4%
For construction and selling	33	44.0%	0	0%	33	30%
For construction, fuel wood & selling	15	20.0%	0	0%	15	13.6%
Because it adds to the fertility of soil	1	1.3%	32	91.4%	33	30%
Total	75	100.0%	35	100.0%	110	100%

Source: household survey results 2006

In line with these, about 59% of the respondents (60.4% in *dega* and 54.5% in *weina dega* parts) have planted 5 to 3000 eucalyptus species in the last 12 months. Of this, 68.2% planted less than 100 seedlings; 26.1% planted between 100 & 1000 seedlings, and 5.6% planted more than 2000 seedlings per head. The average number of seedlings planted per households in the survey area has found to be 260.77. In *dega* parts of the survey area, the average number of tree seedlings planted was 336.8, whereas in *weina dega* parts, it declined to 58.04. As far as the rate of deforestation is concerned, 35.3% of the respondents (34.9% in *dega* and 36.4% in *weina dega* parts) have cut 1 to 160 eucalyptus trees. Of this, 62.3% cut less than 10 trees per year. The average number of trees cut in the survey area was found to be 25.51 per households. In *dega* parts of the survey area, the average number of trees cut

was found to be 34.49 per household, whereas, in *weina dega* parts of the survey area, it declined to 4.75 per household (see table 22).

Secondary data obtained from the *woreda* MoA (2007), indicated that the two main government nurseries and other individual nurseries have the capacity of raising 11.2 million seedlings every year of this 80% constitute eucalyptus camaldulensis. Despite this, survival rate of tree seedlings planted has been considerably lower. The office has also expressed that, the predominance of eucalyptus species in the area has contributed very little to maintain the balance of ecosystem.

Table 22. Average number of trees planted and cut by agro-ecological zones.

Agro-ecological zone		Number of tree seedlings planted in the last 12 months/HH	Number of trees cut in the last 12 months
Dega	Mean	336.80	34.49
	Number of respondents	64	37
Weina dega	Mean	58.04	4.75
	Number of respondents	24	16
Total	Mean	260.77	25.51
	Number of respondents	88	53

Source: household survey results 2006

In spite of its advantages of fast growing, multi-purpose usage and income earning mechanism, eucalyptus tree species has a number of disadvantages. The key informants in the sampled *kebeles* have expressed that, with the expansion of eucalyptus tree species, the amount of springs and other water sources have reduced. They also said that, 'no plant grows around the tree', to indicate its allelopathic effect. Besides, the tree has degraded the available soil nutrients in the survey area for a significant period of time.

In line with these, the majority of farmers in *dega* parts of the *woreda* sale cow dung in the nearby towns (Chacha and Debre Birhan) in order to get additional income. As a result, application of cow dung on their farmland is non-existent in the highland parts of the area. This in turn, has contributed to depletion of the fertility of soils in the area. Consequently, the amount of crops harvested in a given land (the productivity of the land) has lowered from time to time.

4.2.4. Off-Farm Activities

It is found that, 21.3% of the respondents (23.6% in *dega* and 15.9% in *weina dega* parts of the survey area) were engaged in non-farm activities. Of this, 53.1% and 40.6% were engaged in petty trading and daily laboring respectively (see table 23).

Table 23. Number of respondents engaged in off-farm activities by agro-ecological zones.

Types of off-farm activities	Agro-ecological zone				Total	
	Dega		*Weina dega*			
	Number	%	Number	%	Number	%
Daily laboring	13	52.0%	0	0%	13	40.6%
Government employment	1	4.0%	0	0%	1	3.1%
Petty trading	11	44.0%	6	85.7%	17	53.1%
Daily laboring, petty trading	0	0%	1	14.3%	1	3.1%
Total	25	100.0%	7	100.0%	32	100%

Source: household survey results 2006

From the total number of respondents who were engaged in petty trading, 35.3% undertook retailing of food grains, equal proportion of respondents carried out selling of local alcoholic drinks and 23.6% performed selling of

consumer products and commodities. As far as non farm job opportunities are concerned, for 86.4% of the respondents, the main constraints in expanding non-farm activities were lack of access to non-farm job opportunities, shortage of start up capital, lack of knowledge and working skills (see table 24). The finding of the survey also revealed that 30% of the respondents (32.1% in dega and 25% in weina dega parts) were clients of micro-finance institutions. The survey result has also showed that 19.2% of female-headed households and 32.3% of male-headed households were found to be members of the existing micro finance institutions (MFIs), namely Amhara Credit and Saving Association (ACSI) and WISDOM MFI.

Table 24. Number of respondents engaged in petty trading by agro-ecological zones

Type of petty-trade	Agro-ecological zone				Total	
	Dega		*Weina dega*			
	Number	%	Number	%	Number	%
Food grain retailing	6	54.5%	0	0%	6	35.3%
Selling consumer products	0	0%	2	33.3%	2	11.8%
Sale of local alcoholic beverages	2	18.2%	4	66.7%	6	35.3%
Buying & reselling commodities	2	18.2%	0	0%	2	11.8%
Mini shop	1	9.1%	0	0%	1	5.8%
Total	11	100.0%	6	100.0%	17	100%

Source: household survey results 2006

However, the rest 70% were not clients of micro-finance institutions due to fear of risk of repayment, failure to meet group collateral requirements, and

shortage of effective and active human labor and intense workload (see table 25).

Table 25. Problems encountered in getting credit services in the survey area.

Reasons for not getting credit services	Agro-ecological zone				Total	
	Dega		*Weina dega*			
	Number	%	Number	%	Number	%
I don't want credit/fear of risk	35	50.0%	*7*	*21.2%*	*42*	*40.8%*
Not comfortable with group collateral system	13	18.6%	3	9.1%	16	15.5%
I have enough	3	4.3%	0	0%	3	2.9%
Lack of knowledge/skill & market	2	2.9%	1	3.0%	3	2.9%
Lack of labor/old age, sickness/	9	12.9%	9	27.3%	18	17.5%
Work load (too busy)	1	1.4%	5	15.2%	6	5.8%
Not aware of MFIs (details)	2	2.9%	1	3.0%	3	2.9%
Fear of risk (but have plan in the future)	2	2.9%	0	0%	2	1.9%
Failure to repay previous debt	1	1.4%	1	3.0%	2	1.9%
Lack of property for collateral	2	2.9%	6	18.2%	8	7.8%
Total	70	100.0%	33	100%	103	100%

Source: household survey results 2006

CHAPTER FIVE FOOD INSECURITY SITUATION: HH INCOME & EXPENDITURE

5.1. Annual Consumption Food Requirements

For 90% of the respondents, the annual cereal consumption requirement was less than three quintals. For 9.3% of the respondents, the annual cereal requirement ranges from 3.5 to 8 quintals. The survey finding revealed that, the average annual cereal consumption requirement of the respondents was found to be 2.8 quintals per household. In *dega* parts of the survey area, the average annual cereal consumption requirement of the respondents was 3 quintals per household, whereas, in *weina dega* parts of the survey area, it was found to be 2.2 quintals per household. This is mainly due to the larger family size in dega than in weina dega areas. For 35% of the respondents, the annual pulse consumption requirement didn't exceed 6 quintals. For 54% of the respondents, the annual pulse consumption requirement ranges from 6-10 quintals. On the other hand, 11% of the respondents required more than 10 quintals of pulses for their annual consumption. The survey finding also indicated that, the average annual pulse consumption requirement of the respondents was found to be 7.9 quintals per household. In *dega* parts of the survey area, the average annual pulse consumption requirement of the respondents was 8.4 quintals per household, whereas, in *weina dega* parts of the survey area, it was found to be 7.3 quintals per household. This is mainly due to the larger family size in dega than in weina dega areas.

5.2. Annual Cash Requirement to Purchase Food

The total amount of cash requirement to purchase the annually required cereals and pulses ranges from birr 350-5600. These estimations are based on the prevailing market prices of cereals and pulses in the major markets of the survey area (Chacha & Kotu markets). It was found that, 19.2% of respondents require less than 1000 birr per annum to purchase pulses and cereals for their consumption. Whereas, 40.4% of the respondents required birr 1000-2000 per

year to purchase cereals and pulses for their consumption. On the other hand, 25.3% of the respondents required birr 2000-3000 per year to purchase cereals and pulses for their consumption. In addition to these, 11% of the respondents required birr 3000-4000 per year for the purchase of cereals and pulses for their consumption. Moreover, 4.1% of the respondents required more than birr 4000 per year for the purchase of cereals and pulses for their consumption. The average annual cash requirement for the purchase of cereals and pulses in the survey area was found to be birr 1946.80 per household. In *dega* parts of the survey area, the average annual cash requirement for the purchase of cereals and pulses was found to be birr 1834.61 per household, whereas, in *weina dega* parts of the survey area, it was found to be birr 2206.9 per household.

5.3. Income Sources

The survey finding revealed that, the major income sources in the study area include: sale of food crops, livestock/livestock products, fuel wood and vegetables. Besides, petty trading and daily laboring were also other income earning mechanisms for the significant proportion of the respondents. Sale of fuel wood/cow dung was also widely practiced in *dega* parts of the area, whereas, sale of vegetables were widely practiced in *weina dega* parts of the area. On the other hand, sale of livestock/livestock products and sale of grains were commonly practiced across all agro-ecological zones of the *woreda*.

About 70% of the respondents explained that they earned an annual income of less than 1000 ETB from sale of food crops, livestock/livestock products, fuel wood and vegetables. On the other hand, 21.8% of the respondents earned ETB 1000-2000 per annum. The remaining 8.4% of the respondents earned an annual income of more than 2000 ETB in the study area. The survey results showed that, although the annual income of households depicted a wider range of disparities, 90.7% (87.1% in *dega* and 97.6% in *weina dega* areas) of respondents obtained birr 101-2000 annually. The proportion of households earned more than ETB 2000 constituted 13% in *dega* and nil in the *weina dega*

areas. The average annual income earned by the respondents in the survey area was found to be 1450 ETB. In *dega* parts of the survey area, the average income of the respondents was found to be birr 1552.17 per annum, whereas in *weina dega* parts of the survey area, the respondents have earned an annual average income of 1204 ETB (see table 26). Furthermore, 66% of the respondents have expressed that their income has increased in the last 12 months; whereas, 28.7% of the respondents have expressed that their income has decreased in the last 12 months.

Table 26. Average annual income received by respondents during the last 12 months (ETB)

Agro-ecological zone	Mean	Number of respondents
Dega	1552	106
Weina dega	1204	44
Total	1450	150

Source: household survey results 2006

5.4. Expenditure

5.4.1. Spending for Food Items

The survey finding revealed that 25% of the respondents spent less than 206 ETB per annum for the purchase of food items. Whereas, the other 25% of the respondents spent between 206 and 540 ETB per annum to purchase food items. Besides, other 25% of the respondents spend between 540 and 1080 ETB per annum to buy food items. Moreover, the remaining quarter of the respondents spend between 1080 and 2300 ETB per annum for the same purpose. The mean annual spending for the purchase of food items in the survey area was 658.36 ETB per household. In *dega* parts the mean annual expenditure for the purchase of food items was 910.90 ETB per household, whereas in *weina dega* parts it was 282.49 ETB per household (see table 27 and annex 10).

Table 27. Average annual spending for food items (ETB).

Agro-ecological zone	Mean
Dega	910.9
Weina dega	282.5
Total (woreda)	658.4

Source: household survey results 2006

5.4.2. Spending for Non-Food Items

The result of the survey has revealed that about 38% of the households spent an annual expenditure of less than birr 100 for the purchase of non-food items. On the other hand, about 38% of the households have spent an annual expenditure of between birr 100 & 200 to buy non-food commodities. Furthermore, 12.1% of the respondents have spent an annual expenditure of less than birr 500 for the purchase of non-food items. The remaining 6.1% and 5.3% of the respondents have spent an annual expenditure of less than birr 1000 and less than birr 2000 respectively, for the purchase of non-food items. The average annual expenditure for the purchase of non-food items in the survey area has been found to be birr 261.50 per household. In *dega* parts of the survey area, the mean annual spending for the purchase of non-food items was found to be birr 244.3, whereas, in *weina dega* parts of the survey area, it was found to be birr 302.55 (see table 28 and annex 10).

Table 28. Average annual spending for non-food items

Agro-ecological zone	Mean
Dega	244.30
Weina dega	302.55
Total	261.50

Source: household survey results 2006

5.5. Availability of Food in the Household

The food deficit months for 29.2% of the respondents in the survey area range from July-September that is for three months. However, for 18.8% and 13.2% of the respondents, the food deficit months range from May-October (six months) and May-September (five months) respectively. For 11.8% and 9.7% of the respondents, the food deficit months range from June-September (four months) and July-October (four months) respectively. It is also found that, the major food deficit months also vary on the basis of agro-ecological differences. Accordingly, 41% of the respondents in *dega* parts of the survey area expressed that the food deficit months range from July to September. On the other hand, 34.1% of the respondents in *weina dega* parts of the survey area expressed that the food deficit months range from May to September (see table 29).

Table 29. The food deficit seasons in the survey area.

Food deficit months	Agro-ecological zone				Total	
	Dega		Weina dega			
	Number	%	Number	%	Number	%
May-Oct	15	15.0%	12	27.3%	27	18.8%
May-Sep	4	4.0%	15	34.1%	19	13.2%
June-Oct	5	5.0%	5	11.4%	10	6.9%
June-Sept	9	9.0%	8	18.2%	17	11.8%
July-Aug	4	4.0%	0	0%	4	2.8%
Aug-Sep	5	5.0%	0	0%	5	3.5%
July-Sep	41	41.0%	1	2.3%	42	29.2%
Aug-Oct	2	2.0%	0	0%	2	1.4%
May-Jun	1	1.0%	1	2.3%	2	1.4%
Sept-Oct	2	2.0%	0	0%	2	1.4%
Jul-Oct	12	12.0%	2	4.5%	14	9.6%
Total	100	100.0%	44	100.0%	144	100%

Source: household survey results 2006

According to the findings of the survey, the average number of food deficit months in a year in the survey area was found to be 4.1 months. In *dega* parts the average number of food deficit months was found to be 3.7, whereas in *weina dega* parts it was found to be 4.9. The number of food insecure months in weina dega areas is higher than that of dega areas mainly due to the lower crop production in weina dega areas. *Keremt* season appears food insecurity period for many respondents.

5.6. Consumption Pattern

According to the finding of the survey, about 72% of the respondents in the survey area (59.6% in *dega* and 100% in *weina dega* parts) usually consume *injera* with *wot* while, 28.4% of the respondents in the survey area (40.4% in *dega* and none in *weina dega* areas) often consume *injera* and bread with *wot*. At normal circumstances more than two-third (68.7%) of adults (93.2% in *dega* areas) often consume three times a day, whereas, 30.6% of adults (88.6% in *weina dega* areas) consume only twice a day. In the same manner, during the worst circumstances, 63.3% of adults in the survey area (88.3% in *dega* areas) often consume twice a day, whereas, one-third of adults in the survey area (93.2% in *weina dega* areas) often consume once a day.

On the other hand, at normal circumstances about 61% of children in the survey area (81.6% in *dega* areas) often consume four times a day, whereas, 39.5% of children in the survey area (88.6% in *weina dega* areas) often consume three times a day at normal circumstances. In the same manner, during the worst circumstances food insecure months about three-fourth (72.1%) of children in the survey area (99% in *dega* areas) often consume three times a day, whereas, 27.2% of children in the survey area (90.9% in *weina dega* areas) often consume twice a day during the worst circumstances (see table 30).

Table 30. Frequency of consumption of children and adults at normal and worst circumstances/seasons.

Agro-ecological zone		Number of times adults consume in normal months	Number of times children consume in normal months	Number of times adults consume in food insecure months	Number of times children consume in food insecure months
Dega	Mean	2.95	3.82	1.96	3.01
Weina dega	Mean	2.11	3.11	1.09	2.09
Total	Mean	2.70	3.61	1.70	2.73

Source: household survey results 2006

5.7. Coping Strategies

It is found that 96% of the respondents for short or long were found food insecure. About, 31% of the respondents cope up the food deficit situations by reducing the amount and frequency of meals consumed per day, by seasonally migrating to nearby towns in search of daily wage labor, by renting out the whole/some portion of their farmland and by selling of fuel woods and farm oxen. The other 18.2% of the respondents cope up the situation by reducing the amount and frequency of meals consumed per day, by seasonally migrating to nearby towns in search of daily laboring, by selling of livestock and by borrowing of food or cash from close relatives or neighbors. Moreover, 17% of the respondents cope up the situation by reducing the amount and frequency of meals consumed per day, by selling of livestock and by borrowing of food or cash from close relatives or neighbors (see annex 11).

5.8. Reasons for Shortage of Food

The survey result revealed that 61% of the respondents attributed the main reasons for food shortage to relying only in one rainy season for production of food crops. Moreover, inadequate and infertile farmland was also identified as the other factor that contributed to the shortage of food stock in *weina dega* areas. Besides, production and consumption of *Avena Sativa (sinnar)*, which is actually recommended to livestock feed, is found to be one of the major factors that resulted in diminishing of household food stocks in *dega* parts of the survey area. According to the respondents, the main reasons for growing *Avena Sativa (sinnar)* include: its less water requirement, ability to grow in sandy/stony soils, and its stress resistance capacities (resistance to frost, rainfall shortage and water logging). Despite these, the straw part of the harvest outweighs the grain content. Besides, the grain is rich in a very little nutritious content (MoA, 2007). The result of the survey has also showed that saving of significant amount of grains (seed) for sawing is the other factor that contributed to the shortage of food stock in the study area (see table 31).

Table 31. Reasons for shortage of food in the survey area.

Reasons for shortage of food	Agro-ecological zone				Total	
	Dega		*Weina dega*			
	Number	%	Number	%	Number	%
Only one production season	59	59.6%	28	63.6%	87	60.8%
We save for sawing	2	2.0%	1	2.3%	3	2.1%
One production season & we save for sawing	10	10.1%	0	0%	10	7%
Only one season, inadequate & infertile farm land	6	6.1%	15	34.1%	21	14.7%
Only one production season & produce *Avena Sativa*	22	22.2%	0	0%	22	15.4%
Total	99	100.0%	44	100.0%	143	100%

Source: household survey results 2006

5.9. Productive Safety Net Program (PSNP)

From the three sample *kebeles*, two of them are the Productive Safety Net Program (PSNP) target *kebeles*. It was found that about 71% of the respondents, from PSNP target *kebeles*, participated in public work in terms of food-/cash-for-work basis. Besides, 3% were direct beneficiaries because they were too old to participate in laborious food/cash-for-work activities (see table 32).

Table 32. Participation in Productive Safety Net Program.

Have your HH received any benefit from PSNP?	Agro-ecological zone				Total	
	Dega		*Weina dega*			
	Number	%	Number	%	Number	%
Yes, public work beneficiary	36	65.5%	34	77.3%	70	70.7%
Yes, direct beneficiary	0	0%	3	6.8%	3	3%
No	19	34.5%	7	15.9%	26	26.3%
Total	55	100.0%	44	100.0%	99	100%

Source: household survey results 2006

The PSNP target beneficiaries explained that they ate all of the food they received and purchased food with the cash they received. On the other hand, 26.3% of the respondents explained that they have been excluded from Productive Safety Net Programs (PSNP), 70% of which attributed the reason for their exclusion to their relative better socio-economic situation. 14.8% of non-PSNP target respondents complained that they did not get the chance to participate in the program. The remaining non-PSNP respondents attributed their exclusion to factors such as, availability of more land/livestock, receiving remittances from relatives, lack of productive labor force and workload in other businesses.

5.10. Utilization of Food and Sanitary Conditions

According to the result of the survey 81% of the respondents did not properly utilized and consumed their meals. They have poor nutritional knowledge and their sanitary conditions are poor. It was also found that only 12.1% of the respondents (18.2% in *weina dega* and 9.5% in *dega* parts) have pit latrines. On the other hand, the data obtained from MoH (2007) showed that only 1.8% of HHs in the *woreda* have pit latrines (see table 33). The rest 98.2% of HHs in the *woreda* disposed human wastes in open fields. The other problems associated with poor utilization of food in the survey area were poor post harvest handling and lack of saving traditions. The prevailing post harvest technologies are very traditional. According to the respondents, during the harvest time they spent much and do not properly save their produce for the subsequent slack season.

Table 33. Reasons for lack of proper utilization of food

Problems responsible for improper utilization of food	Agro-ecological zone				Total	
	Dega		*Weina Dega*			
	Number	%	Number	%	Number	%
Prevalence of human diseases	0	0%	1	3.4%	1	1.1%
Lack of access to clean and potable water	1	1.7%	1	3.4%	2	2.3%
Sanitary problems	2	3.4%	0	0%	2	2.3%
Lack of nutritional knowledge	1	1.7%	0	0%	1	1.1%
Poor post harvest handling	0	0%	5	17.2%	5	5.7%
Lack of saving tradition	5	8.5%	17	58.6%	22	25%
Sanitary problems, lack of saving traditions	34	57.6%	0	0%	34	38.6%
San.prob.,lack of nut. Know. & saving tradition	13	22.0%	0	0%	13	14.8%
Lack of clean water, saving tradition	1	1.7%	0	0%	1	1.1%
San.problem, mismanage. of products,lack of saving	2	3.4%	5	17.2%	7	8%
Total	59	100.0%	29	100.0%	88	100%

Source: household survey results 2006

5.10.1. Sources of Water for Household Consumption

The research findings revealed that during dry seasons about 64% of the respondents (90.9% in *weina dega* and 53.4% in *dega* parts) have obtained water for their consumption from unprotected/uncapped springs and ponds. Whereas, about 36% of the respondents (9.1% in *weina dega* and 47.7% in *dega* parts of the survey area) have access to safe/protected sources during dry seasons. On the other hand, during wet/rainy seasons, about 66% of the respondents (90.9% in *weina dega* and 55.3% in *dega* parts) obtained water for their consumption from unsafe/unprotected sources. Whereas, about 34% of the respondents (44.8% in *dega* and 9.1% in *weina dega* parts) explained that they get access to safe/clean water during rainy seasons.

The survey result disclosed that during dry seasons about 62.1%, 34.3% and 3.6% of the respondents the sources of water for livestock consumption were rivers, springs and ponds respectively. On the other hand, during wet/rainy seasons for about 61%, 25% and 13.6% of the respondents, the sources of water for their livestock consumption were ponds, rivers and springs respectively. According to the data obtained from the *woreda* MoH (2007), the potable water coverage in the rural areas was about 50% and that of urban areas was 100% (see table 34).

Table 34. The sources of water for HHs during dry and rainy season

source of water	Agro-ecological zone			
	Dega		*Weina dega*	
	Dry season (%)	Rainy season (%)	Dry season(%)	Rainy season(%)
Pond	0%	0%	6.8%	6.8%
Unprotected spring	52.4%	54.3%	84.1%	84.1%
Hand-dug well	1.0%	0%	0%	0%
Tap/pipe water	46.7%	44.8%	9.1%	9.1%
Unprotected hand Dug well	0%	1.0%	0%	0%
Total	100.0%	100.0%	100.0%	100.0%

Source: household survey results 2006

The research finding has also indicated that on average, it took 15 minutes round walk for about 48% of the respondents to obtain water for the household and livestock consumption. On the other hand, it is also found that about 39% of respondents used to travel a 30 minutes round walk to obtain water for the household and livestock consumption. Besides, 11.4% of respondents indicted that; it took 45 minutes round walk to obtain water for the household and livestock consumption. The remaining 2% of the respondents used to travel more than a one-hour round walk to obtain water for the household and livestock consumption (see table 35).

Table 35. Distance traveled by respondents to fetch water

Distance traveled in minutes (round trip)	Respondents		
	Number	Percent	Cumulative Percent
5	9	6.0%	6.0%
6	1	.7%	6.7%
10	33	22.1%	28.9%
15	28	18.8%	47.7%
20	23	15.4%	63.1%
25	14	9.4%	72.5%
30	21	14.1%	86.6%
35	5	3.4%	89.9%
40	10	6.7%	96.6%
45	2	1.3%	98.0%
60	1	.7%	98.7%
90	2	1.3%	100.0%
Total	149	100.0%	

Source: household survey results 2006

The average distance traveled (round trip) to collect water in the survey area was found to be 21.1 minutes. In *dega* parts of the survey area, on average it took 24.7 minutes of round walk to fetch water from the nearest water source, whereas in *weina dega* parts of the survey area, it took on average 12.64 minutes of round trip to collect water from the nearest water source. This indicated that the majority of the respondents in both *dega* and *weina dega* parts did not waste much of their productive time in fetching water owing to the proximity of the water sources (see table 36).

Table 36. Average distance traveled by respondents to fetch water (round trip walk) in different agro-ecological zones.

Agro-ecological zone	Average distance traveled by respondents in minutes	Respondents
Dega	24.67	105
Weina dega	12.64	44
Total	21.11	149

Source: household survey results 2006

CHAPTER SIX SUMMARY, CONCLUSION and RECOMMENDATION

6.1. SUMMARY

Most of the people in the survey area depend on the main rainy season for their annual crop production. In *dega* areas, both the total crop production and total area of land cultivated were found to be twice as large as that of *weina dega* areas. On the other hand, the average productivity (yield) of field crops in the survey area was found to be 2 quintals/*timad* of in both *dega* and *weina dega* areas. This clearly indicated that, the average annual crop production in the survey area was found to be insufficient for the prevailing large family size (5.3).

The average livestock holding size is higher in *dega* areas than in *weina dega* areas for all types of livestock. Besides, only 10%, 7.3% and 0.7% of the respondents owned improved breeds of cows, oxen and chicken respectively. All of the respondents who own improved variety of livestock were found in *dega* parts of the survey area. For 90.7% of the respondents the main constraints to rearing livestock were livestock diseases, shortage of grazing land and additional fodder.

On the other hand, 86.4% of the respondents expressed that, they faced challenges in expanding off-farm activities. The main constraints in expanding non-farm activities in the survey area include: lack of access to non-farm job opportunities, shortage of start up capital, and lack of knowledge and working skills. Besides, 70% of the respondents failed to be clients of micro-finance institutions due to fear of risk of repayment, failure to meet group collateral requirements, and shortage of effective and active human labor and intense workload.

The survey finding revealed that the major income sources in the study area were petty trading, daily laboring, sale of food crops, livestock, and livestock products, fuel wood and horticultural crops. It was also observed that some of

the livelihood strategies showed agro-ecological difference. The survey finding also showed that the average annual income obtained in both *dega* and *weina dega* areas is lower than the annual cash required to purchase food and non-food items. However, the magnitude of the problem is very high in *weina dega* areas than in *dega* areas.

It was also found that the food deficit months vary on the basis of agro-ecological differences. The average number of food deficit months per annum in the survey area was found to be 4.1 months. Although the majority of respondents in both *dega* and *weina dega* areas were food self insufficient, in *weina dega* areas the food deficit months prolonged up to 4.9 months as compared to *dega* areas which lasted only for 3.7 months. As a result, at normal circumstances and during the worst months adults and children in *weina dega* areas consume less frequently than those in *dega* areas.

It is found that 96% of the respondents did not met the all year round food requirements of the household members from own crop production. Accordingly, the inhabitants of the study area cope up the food deficit situations by reducing the amount and frequency of meals consumed per day, by seasonally migrating to nearby towns in search of daily laboring, by renting out the whole/some portion of their farmland, by selling of fuel woods, farm oxen and other types of livestock, and by borrowing of food or cash from close relatives or neighbors.

The respondents attributed the main reasons for food shortage to relying only in one rainy season for production of food crops. Moreover, inadequate and infertile farmland was also identified as the other factor that contributed to the shortage of food stock in *weina dega* areas. Besides, production and consumption of *Avena Sativa (sinnar)*, which is actually recommended to livestock feed, is found to be one of the major factors that resulted in diminishing of household food stocks in *dega* parts of the survey area.

6.2. CONCLUSION

Both the primary and secondary sources of data clearly indicated that a large number of people in the study area are food insecure by taking in to consideration all the four components of food security: increasing food availability, purchasing it (having access), using and safe guarding the food available in a sanitary and efficient manner, and creating assets that can be liquidated in times of stress. The causes of food insecurity in the *woreda* are diverse and complex in nature and vary across different agro-ecological zones.

To curb food insecurity problem, the population in the study area has adopted various copping strategies. These strategies also vary in different agro-ecological zones. However, in most cases the strategies only helped them in sustaining their lives and not in improving their food security situation. Some strategies contribute to depletion of household assets and unsustainable livelihood conditions for the next generation.

Despite the fact that food insecurity problem is manifested in both *dega* and *weina dega* areas, the magnitude of the problem is wide spread in the latter than in the former areas. In *weina dega* part the community owned largely infertile and very small farm land. Besides, the area has a very little access to various socio-economic services due to its distant location and non conducive topographic features.

Although the government and other NGOs have attempted to resolve the food insecurity situation in the *woreda* by spending a huge amount financial and capital resources, large proportion of the community still leads indecent life. Therefore, other alternative means of reducing the magnitude of food security situation of households needs to be in place. This study suggests alternative mechanisms that likely minimize the food insecurity situation in the study area.

6.3. RECOMMENDATIONS

The following recommendations shall likely improve the food security situation (increasing the availability or production of food, increasing on-farm & off-farm income earning opportunities and enhancing proper utilization of the available food & water) of different communities in the *woreda*.

- The pertinent stakeholders (Debre Birhan research institution, governmental and non-governmental organizations) are required to work together in identifying, and analyzing problems and opportunities and in suggesting possible food insecurity mitigation strategies of various groups of community members (joint research & joint action need to be in place)
- Diverse and context specific farming practices that enhance agricultural productivity need to be promoted in *dega* and *weina dega* parts. In *dega* parts diffusion of frost and moisture stress resistant crops shall likely result in a better amount of crop yield.
- Besides, efforts in introducing temperate fruit varieties in *dega* areas shall be strengthened so as to increase the income of farmers.
- In *weina dega* parts promotion of agricultural intensification (application of agricultural inputs like fertilizer & improved seeds) along with agro-forestry and inter-cropping practices shall likely enhance the fertility of the soil and result in a higher crop yield from the existing small plot of farm land
- To enhance the quality of the dietary intake of the community, nutrition education need to be promoted
- Since the *dega* part is very suitable for rearing livestock, research supported improved livestock production practices need to be promoted. Emphasis need to be given on improving the breed quality of livestock and forage production practices
- Constraints associated with off-farm income earning opportunities need to be tackled by expanding the services of MFIs
- To diversify the income sources of the community, other non-farm income earning opportunities based on production and market potential

of the area(for instance skill training on weaving and spinning in *dega* areas where there is a larger potential of wool production) need to be promoted

- Awareness creation of community members on personal hygiene and environmental sanitation shall improve proper utilization of food and water
- Community members training on improved post harvest handling and food preservation; and promotion of improved post harvest technologies need to be in place

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Annex 1. The household size of the Respondents in different Agro-Ecological Zones

HH size	Agro-ecological zone				Total (%)	
	Dega		*weina dega (%)*			
	Number	%	Number	%	Number	%
1	3	2.8%	4	9.1%	7	4.7%
2	2	1.9%	4	9.1%	6	4%
3	12	11.3%	4	9.1%	16	10.7%
4	19	17.9%	9	20.5%	28	18.7%
5	14	13.2%	8	18.2%	22	14.7%
6	17	16.0%	9	20.5%	26	17.3%
7	18	17.0%	4	9.1%	22	14.7%
8	16	15.1%	2	4.5%	18	12.0%
9	4	3.8%	0	0%	4	2.7%
11	1	0.9%	0	0%	1	0.7%
Total	106	100.0%	44	100.0%	150	100%
Average	5.58		4.50		5.27	

Source: household survey results 2006

Annex 2. The total population size of the Respondents in different Agro-ecological Zones

Agro-ecological zone						
Dega			Weina dega			
Family size	frequency	Total	family size	frequency	total	grand total
1	3	3	1	4	4	7
2	2	4	2	4	8	12
3	12	36	3	4	12	48
4	19	76	4	9	36	112
5	14	70	5	8	40	110
6	17	102	6	9	54	156
7	18	126	7	4	28	154
8	16	128	8	2	16	144
9	4	36	9	0	0	36
11	1	11	11	0	0	11
Total		592			198	790

Source: household survey results 2006

Annex 3. Contraceptives usage by type of marital status in different agro-ecological zone

Marital Status	Agro-ecological zone							
	Dega				Weina Dega			
	Respondents' marital status		Respondents who use contraceptives		Respondents' marital status		Respondents who use contraceptives	
	Count	%	Count	%	Count	%	Count	%
Never married	4	3.8%	0	0%	1	2.3%	0	0%
Married	78	73.6%	22	23.2%	31	70.5%	21	65.6%
Widowed	20	18.9%	73	76.8%	10	22.7%	11	34.4%
Divorced	4	3.8%	0	0%	1	2.3%	0	0%
Separated	0	0%	0	0%	1	2.3%	0	0%
Total	106	100.0%	95	100.0%	44	100.0%	32	100.0%

Source: household survey results 2006

Annex 4. Total size of fallow land in different agro-ecological zones

total sizes of fallow land (timad)	Agro-ecological zone				Total	
	Dega		Weina dega			
	Respondents		Respondents		Respondents	
	Count	%	Count	%	Count	%
.0	7	21.2%	0	0%	7	21.2%
.3	1	3.0%	0	0%	1	3.0%
.5	1	3.0%	0	0%	1	3.0%
1.0	5	15.2%	0	0%	5	15.2%
1.5	1	3.0%	0	0%	1	3.0%
2.0	13	39.4%	0	0%	13	39.4%
3.0	1	3.0%	0	0%	1	3.0%
4.0	1	3.0%	0	0%	1	3.0%
5.0	2	6.1%	0	0%	2	6.1%
6.0	1	3.0%	0	0%	1	3.0%
Total	33	100.0%	0	0%	33	100.0%

Source: household survey results 2006

Annex 5. Application of modern farm inputs in order to augment/ boost crop production.

Type of modern farm inputs applied	Agro-ecological zone				Total	
	Dega		*Weina dega*			
	Number	%	Number	%	Number	%
Chemical fertilizers	44	48.9%	14	31.8%	58	43.3%
Improved seeds	5	5.6%	0	0%	5	3.7%
Irrigation	6	6.7%	0	0%	6	4.5%
Manure and mulch	12	13.3%	17	38.6%	29	21.6%
Chemical fertilizer, irrigation	2	2.2%	1	2.3%	3	2.2%
Chemical fertilizer, improved seed, irrigation	3	3.3%	0	0%	3	2.2%
Chem., irrigation, manure	2	2.2%	0	0%	2	1.5%
Irrigation and manuring	5	5.6%	2	4.5%	7	5.2%
Chem. fert & improved seed	1	1.1%	0	0%	1	.7%
Chem. Fertilizer & manuring	6	6.7%	10	22.7%	16	11.9%
Imp.seed/herbicide/,irrigation	4	4.4%	0	0%	4	3.0%
Total	90	100.0%	44	100.0%	134	100%

Source: household survey results 2006

Annex 6. Land management practices applied to replenish soil fertility

Types of land management practices	Agro-ecological zone				Total	
	Dega		*Weina dega*			
	Count	%	Count	%	Count	%
Fallowing/field rotation	0	0%	1	2.3%	1	.7%
Crop rotation	24	23.8%	0	0%	24	16.7%
Manuring/use of compost	6	5.9%	2	4.7%	8	5.6%
Fallowing and chem. Fertilizer	2	2.0%	0	0%	2	1.4%
Fallowing, crop rotation & chemical fertilizer	35	34.7%	0	0%	35	24.3%
Fallowing, crop rotation, Manuring, chem. Fertilizer	13	12.9%	0	0%	13	9.0%
Fallowing, crop rotation, compost, intercropping	1	1.0%	0	0%	1	.7%
Use of manure & chem. Fertilizer	1	1.0%	0	0%	1	.7%
Fallowing, manuring, chem. Fertilizer	1	1.0%	0	0%	1	.7%
Fallowing & crop rotation	2	2.0%	0	0%	2	1.4%
Fallowing & manuring	1	1.0%	0	0%	1	.7%
Crop rotation &	12	11.9%	0	0%	12	8.3%

Types of land management practices	Agro-ecological zone				Total	
	Dega		*Weina dega*			
	Count	%	Count	%	Count	%
manuring						
Crop rotation & chem. Fertilizer.	3	3.0%	0	0%	3	2.1%
Manure & inter cropping	0	0%	17	39.5%	17	11.8%
Chemical fertilizer, manure & inter cropping	0	0%	20	46.5%	20	13.9%
Chem. fertilizer, intercropping	0	0%	1	2.3%	1	.7%
Crop rotation, manuring, chemical fertilizer	0	0%	2	4.7%	2	1.4%
Total	101	100.0%	43	100.0%	144	100.0%

Source: household survey results 2006

Annex 7. Conservation measures practiced to minimize soil erosion

Which measures do you practice to minimize soil erosion on your own farm?	Agro-ecological zone				Total	
	Dega		*Weina dega*			
	Count	%	Count	%	Count	%
Terracing	66	68.0%	43	97.7%	109	77.3%
Tree planting	20	20.6%	0	0%	20	14.2%
Terracing and bunds	3	3.1%	0	0%	3	2.1%
Terracing and tree planting	4	4.1%	1	2.3%	5	3.5%
Terracing & strip cultivation	2	2.1%	0	0%	2	1.4%
Terracing, tree plant, strip cultivation	2	2.1%	0	0%	2	1.4%
Total	97	100.0%	44	100.0%	141	100.0%

Source: household survey results 2006

What have been the main constraints to expanding your crop production?	Agro-ecological zone				Total	
	Dega		*Weina dega*			
	Count	%	Count	%	Count	%
rainfall, shortage of farm oxen, poor soil						
Frost, water logging, erratic rainfall, poor soil fertility	2	1.9%	0	0%	2	1.4%
Frost, water logging, pest and disease, poor soil fertility	2	1.9%	0	0%	2	1.4%
Pest/disease & poor soil fertility	1	1.0%	0	0%	1	.7%
Frost, pest & disease, poor soil & lack of access to appropriate technology	1	1.0%	0	0%	1	.7%
Frost, pest, erratic rainfall, poor soil	3	2.9%	0	0%	3	2.1%
Frost, water logging, poor soil fertility	1	1.0%	0	0%	1	.7%
Frost, disease, weeds, shortage of	4	3.9%	0	0%	4	2.8%

What have been the main constraints to expanding your crop production?	Agro-ecological zone				Total	
	Dega		*Weina dega*			
	Count	%	Count	%	Count	%
farm oxen, poor soil						
Frost erratic rainfall, poor soil, ice	2	1.9%	0	0%	2	1.4%
Frost, weeds, poor soil, ice	1	1.0%	0	0%	1	.7%
Frost, disease, weeds, poor soil	2	1.9%	0	0%	2	1.4%
Erratic, disease, /inadequate land/ poor soil	5	4.9%	31	81.6%	36	25.5%
Frost, erratic rainfall, weeds, poor soil fertility	1	1.0%	0	0%	1	.7%
Frost, disease, poor soil	2	1.9%	0	0%	2	1.4%
Frost, disease, poor soil, ice	2	1.9%	0	0%	2	1.4%
Frost, poor storage, poor soil	1	1.0%	0	0%	1	.7%
Rainfall shortage & poor soil	2	1.9%	0	0%	2	1.4%
Total	103	100.0%	38	100.0%	141	100.0%

Source: household survey results 2006

Annex 9. The main constraints in rearing livestock in the survey area

Constraints to rearing livestock	Agro-ecological zone				Total	
	Dega		*Weina dega*			
	Count	%	Count	%	Count	%
Shortage of grazing land	18	18.0%	24	54.5%	42	29.2%
Lack of additional forage	15	15.0%	1	2.3%	16	11.1%
Disease prevalence	3	3.0%	0	0%	3	2.1%
Shortage of grazing land & disease prevalence	36	36.0%	1	2.3%	37	25.7%
Shortage of grazing & lack of additional fodder	16	16.0%	1	2.3%	17	11.8%
Shortage of grazing, lack of additional forage, disease	5	5.0%	0	0%	5	3.5%
Shortage of labor/due to old age & disease/	4	4.0%	2	4.5%	6	4.2%
Lack additional forage & disease	1	1.0%	0	0%	1	.7%
Lack of capital	2	2.0%	0	0%	2	1.4%
Shortage of grazing land & vet post	0	0%	14	31.8%	14	9.7%
Shortage of grazing land, attack by wild animals	0	0%	1	2.3%	1	.7%
Total	100	100.0%	44	100.0%	144	100%

Source: household survey results 2006

Annex 10 spending for food and non food items

Spending for food & non-food items (in ETB)	Agro-ecological zone							
	Dega				Weina dega			
	Respondents who spend for food items		Respondents who spend for non-food items		Respondents who spend for food items		Respondents who spend for non-food items	
	Count	%	Count	%	Count	%	Count	%
0	0	0%	1	1.0%	0	0%	0	0%
28	0	0%	3	2.9%	0	0%	0	0%
29	0	0%	1	1.0%	0	0%	0	0%
30	0	0%	3	2.9%	0	0%	0	0%
33	0	0%	1	1.0%	0	0%	0	0%
35	0	0%	2	1.9%	1	2.3%	0	0%
38	0	0%	8	7.6%	0	0%	0	0%
39	0	0%	1	1.0%	0	0%	0	0%
40	0	0%	2	1.9%	4	9.3%	0	0%
42	0	0%	1	1.0%	0	0%	0	0%
43	0	0%	2	1.9%	0	0%	0	0%
45	0	0%	3	2.9%	0	0%	0	0%
48	0	0%	2	1.9%	0	0%	0	0%
50	0	0%	3	2.9%	2	4.7%	0	0%
51	0	0%	1	1.0%	0	0%	0	0%
52	0	0%	1	1.0%	0	0%	0	0%
53	0	0%	5	4.8%	0	0%	0	0%
56	1	1.6%	0	0%	0	0%	0	0%
57	0	0%	0	0%	1	2.3%	0	0%
62	0	0%	0	0%	1	2.3%	1	2.3%
64	0	0%	0	0%	2	4.7%	0	0%
70	0	0%	0	0%	2	4.7%	1	2.3%
73	0	0%	0	0%	1	2.3%	0	0%
76	0	0%	0	0%	1	2.3%	0	0%
80	0	0%	0	0%	7	16.3%	0	0%
82	0	0%	0	0%	0	0%	2	4.5%
85	0	0%	1	1.0%	0	0%	2	4.5%
87	0	0%	3	2.9%	0	0%	0	0%
90	0	0%	1	1.0%	0	0%	0	0%
91	0	0%	0	0%	0	0%	1	2.3%
92	0	0%	1	1.0%	0	0%	4	9.1%
100	0	0%	0	0%	1	2.3%	0	0%
101	0	0%	1	1.0%	0	0%	0	0%
102	0	0%	3	2.9%	0	0%	1	2.3%
104	0	0%	1	1.0%	0	0%	0	0%
105	0	0%	2	1.9%	0	0%	0	0%
109	0	0%	2	1.9%	0	0%	0	0%
110	0	0%	1	1.0%	0	0%	0	0%

112	0	0%	2	1.9%	0	0%	0	0%
114	0	0%	1	1.0%	0	0%	0	0%
117	0	0%	2	1.9%	0	0%	1	2.3%
119	0	0%	1	1.0%	0	0%	0	0%
120	0	0%	0	0%	1	2.3%	0	0%
124	0	0%	1	1.0%	0	0%	0	0%
126	0	0%	1	1.0%	0	0%	0	0%
129	0	0%	1	1.0%	0	0%	0	0%
130	0	0%	1	1.0%	0	0%	0	0%
137	0	0%	1	1.0%	0	0%	0	0%
142	0	0%	0	0%	0	0%	4	9.1%
144	1	1.6%	5	4.8%	0	0%	0	0%
145	0	0%	1	1.0%	0	0%	0	0%
146	0	0%	0	0%	0	0%	1	2.3%
147	0	0%	0	0%	0	0%	4	9.1%
148	0	0%	1	1.0%	0	0%	0	0%
149	0	0%	1	1.0%	0	0%	0	0%
150	0	0%	1	1.0%	0	0%	0	0%
168	0	0%	0	0%	0	0%	1	2.3%
169	0	0%	2	1.9%	0	0%	0	0%
172	0	0%	0	0%	0	0%	1	2.3%
175	0	0%	1	1.0%	0	0%	1	2.3%
176	0	0%	1	1.0%	0	0%	0	0%
177	0	0%	0	0%	0	0%	2	4.5%
182	0	0%	0	0%	0	0%	3	6.8%
192	0	0%	0	0%	0	0%	1	2.3%
194	0	0%	1	1.0%	0	0%	0	0%
200	0	0%	1	1.0%	0	0%	0	0%
201	0	0%	1	1.0%	0	0%	0	0%
203	0	0%	0	0%	0	0%	1	2.3%
206	0	0%	0	0%	1	2.3%	0	0%
209	0	0%	1	1.0%	0	0%	0	0%
230	0	0%	0	0%	1	2.3%	0	0%
242	0	0%	0	0%	0	0%	1	2.3%
260	0	0%	0	0%	0	0%	1	2.3%
268	1	1.6%	0	0%	0	0%	0	0%
272	0	0%	0	0%	0	0%	1	2.3%
285	0	0%	0	0%	0	0%	1	2.3%
288	0	0%	1	1.0%	0	0%	0	0%
300	0	0%	0	0%	2	4.7%	0	0%
307	0	0%	0	0%	0	0%	1	2.3%
310	1	1.6%	0	0%	0	0%	0	0%
312	2	3.1%	0	0%	0	0%	0	0%
320	0	0%	0	0%	1	2.3%	0	0%
324	0	0%	0	0%	1	2.3%	0	0%

337	0	0%	1	1.0%	0	0%	0	0%
345	0	0%	1	1.0%	0	0%	0	0%
350	0	0%	0	0%	1	2.3%	0	0%
360	1	1.6%	0	0%	0	0%	0	0%
370	1	1.6%	0	0%	0	0%	0	0%
400	2	3.1%	0	0%	0	0%	0	0%
418	0	0%	0	0%	2	4.7%	0	0%
420	0	0%	2	1.9%	0	0%	0	0%
430	0	0%	0	0%	1	2.3%	0	0%
435	1	1.6%	0	0%	0	0%	0	0%
437	0	0%	1	1.0%	0	0%	0	0%
442	0	0%	0	0%	0	0%	2	4.5%
445	1	1.6%	0	0%	0	0%	0	0%
460	1	1.6%	0	0%	0	0%	0	0%
484	0	0%	0	0%	1	2.3%	0	0%
492	0	0%	0	0%	0	0%	1	2.3%
500	0	0%	1	1.0%	2	4.7%	0	0%
510	0	0%	0	0%	1	2.3%	0	0%
520	1	1.6%	0	0%	0	0%	0	0%
528	1	1.6%	0	0%	0	0%	0	0%
530	0	0%	1	1.0%	0	0%	0	0%
540	0	0%	0	0%	1	2.3%	0	0%
576	0	0%	0	0%	1	2.3%	0	0%
585	1	1.6%	0	0%	0	0%	0	0%
590	0	0%	0	0%	1	2.3%	0	0%
595	1	1.6%	0	0%	0	0%	0	0%
600	1	1.6%	1	1.0%	0	0%	0	0%
605	0	0%	0	0%	0	0%	1	2.3%
650	1	1.6%	0	0%	0	0%	0	0%
660	0	0%	1	1.0%	0	0%	0	0%
675	1	1.6%	0	0%	0	0%	0	0%
680	1	1.6%	0	0%	0	0%	0	0%
700	2	3.1%	0	0%	0	0%	0	0%
702	1	1.6%	0	0%	0	0%	0	0%
725	1	1.6%	0	0%	0	0%	0	0%
735	1	1.6%	0	0%	0	0%	0	0%
740	0	0%	1	1.0%	0	0%	0	0%
756	1	1.6%	0	0%	0	0%	0	0%
780	1	1.6%	0	0%	0	0%	0	0%
810	1	1.6%	0	0%	0	0%	0	0%
815	2	3.1%	0	0%	0	0%	0	0%
830	1	1.6%	0	0%	0	0%	0	0%
840	1	1.6%	0	0%	0	0%	0	0%
879	0	0%	1	1.0%	0	0%	0	0%
910	0	0%	1	1.0%	0	0%	0	0%

916	1	1.6%	0	0%	0	0%	0	0%
918	1	1.6%	0	0%	0	0%	0	0%
940	1	1.6%	0	0%	0	0%	0	0%
948	1	1.6%	0	0%	0	0%	0	0%
955	0	0%	1	1.0%	0	0%	0	0%
970	1	1.6%	0	0%	0	0%	0	0%
990	0	0%	1	1.0%	0	0%	0	0%
995	1	1.6%	0	0%	0	0%	0	0%
1037	0	0%	1	1.0%	0	0%	0	0%
1080	1	1.6%	0	0%	0	0%	0	0%
1085	1	1.6%	0	0%	0	0%	0	0%
1100	1	1.6%	0	0%	0	0%	0	0%
1110	1	1.6%	0	0%	0	0%	0	0%
1120	1	1.6%	0	0%	0	0%	0	0%
1130	1	1.6%	0	0%	0	0%	0	0%
1150	1	1.6%	0	0%	0	0%	0	0%
1160	1	1.6%	0	0%	0	0%	0	0%
1200	1	1.6%	0	0%	0	0%	0	0%
1231	0	0%	1	1.0%	0	0%	0	0%
1240	1	1.6%	0	0%	0	0%	0	0%
1275	1	1.6%	0	0%	0	0%	0	0%
1290	1	1.6%	0	0%	0	0%	0	0%
1305	1	1.6%	0	0%	0	0%	0	0%
1310	1	1.6%	0	0%	0	0%	0	0%
1320	0	0%	0	0%	1	2.3%	0	0%
1330	1	1.6%	0	0%	0	0%	0	0%
1340	1	1.6%	0	0%	0	0%	0	0%
1375	1	1.6%	0	0%	0	0%	0	0%
1390	1	1.6%	0	0%	0	0%	0	0%
1425	1	1.6%	0	0%	0	0%	1	2.3%
1510	1	1.6%	0	0%	0	0%	0	0%
1533	1	1.6%	0	0%	0	0%	0	0%
1642	0	0%	0	0%	0	0%	1	2.3%
1672	0	0%	1	1.0%	0	0%	0	0%
1700	1	1.6%	0	0%	0	0%	0	0%
1740	1	1.6%	0	0%	0	0%	0	0%
1768	0	0%	1	1.0%	0	0%	0	0%
1800	0	0%	1	1.0%	0	0%	0	0%
1808	0	0%	1	1.0%	0	0%	0	0%
2100	1	1.6%	0	0%	0	0%	0	0%
2220	0	0%	0	0%	1	2.3%	0	0%
2300	1	1.6%	0	0%	0	0%	0	0%
2642	0	0%	0	0%	0	0%	1	2.3%
Total	64	100.0%	105	100.0%	43	100.0%	44	100.0%

Source: household survey results 2006

Annex 11. Coping strategies employed by respondents in the survey area.

Coping strategies	Agro-ecological zone				Total	
	Dega		*Weina dega*			
	Number	%	Number	%	Number	%
Ate less food	1	1.0%	0	0%	1	.7%
Rented out land	0	0%	1	2.3%	1	.7%
Sale of livestock	5	5.1%	0	0%	5	3.5%
Ate less food, borrowing, sale of livestock	24	24.2%	0	0%	24	16.8%
Ate less food and borrow	12	12.1%	0	0%	12	8.4%
Ate less food, borrow, migration to towns(self or child)	26	26.3%	0	0%	26	18.2%
Ate less food & sell of livestock	10	10.1%	0	0%	10	7.0%
Migration to near by town and sale of livestock	2	2.0%	0	0%	2	1.4%
Ate less food, migration, sale of livestock	7	7.1%	1	2.3%	8	5.6%
Borrow & sale livestock	1	1.0%	0	0%	1	.7%
Sale livestock, other asset & relief	1	1.0%	0	0%	1	.7%
Reduced freq meals, migrating to towns, sale wood, rent land,	8	8.1%	36	81.8%	44	30.8%

	Agro-ecological zone				Total	
	Dega		*Weina dega*			
sale farm oxen						
Ate less, migrate to towns & rural places	1	1.0%	3	6.8%	4	2.8%
Migration to near by tow and sell fuel wood	1	1.0%	3	6.8%	4	2.8%
Total	99	100.0%	44	100.0%	143	100.0%

Source: household survey results 2006

Annex 12 Questionnaire for Household Survey

Section 1. Identification of Sample KAs

KA: _____ Name of Village: _____ Name of Enumerator: _____
Date: _____

Section 2. Household Characterstics

1. Would you please fill in the form below about your household characterstics?

	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.11	1.12	1.13
S/N	List of HH members	Relation to head	Sex 1=Male 2=Female	Age in complete years	Birth place: 1= Angolela 2=other than Angolela	Educational status	Marital status	Was engaged in productive work during the last 12 months? 1= yes 2= No	If no, reason for not working	If yes, type of work	What was the main occupation during the last 12 months?	How much earned from the work (estimated birr)
1												
2												
3												
4												
5												
6												

Code Relation to head: 0=head 1=spouse/husband 2=son/doughter 3=mother/father 4=brother/sister
5=niece/nephew 6=uncle/aunt 7=grand parent 8=other relative 9=non-relative 10=serevant
Code: Educational status: 0=can't read & write 1= able to read & write 2= grade 1-6 3= grade 7-8 4=grade 9-12 5= >grade 12
Code: Marital status: 0=never married 1 =married 2=widowed 3=divorced 4=separated 5= other (specify)
Code If no, reason for not working: 1=student 2= no land 3= too old 4=disabled 5= other (specify)
Code If yes, type of work: 1=own farm 2= petty trade 3= sale of fuel wood 4=contractual farming 5=domestic work 6= sale of local beverages 7=other (specify)

Section 3. Household Asset and Socio-economic Profiles

2. What is the socio-political status of the HH within the community 1=leadership member of the KPA 2=farmers' cadre 3=community elder 4=other(specify) ☐
3. What are your key economic assets in the HH?
4. Who controls/possesses major assets in your family?
5. What agricultural inputs/tools do you have? 1= a pair of farm oxen 2= only one farm ox 3= pick axe 4= > a pair of oxen 5= other (specify) ☐
6. Do you own any land? 1=Yes 2= No ☐

7. If yes, what are the total sizes of the following land types that you use?

Land type	Hectare
Cultivated land	
Fallow land	
Grazing land	
Forest land	
Settlement land	
Other (specify)	

8. Did you farm in the last farming season? 1=Yes 2= No ☐
9. If yes, please tell as about the land you used for farming and land you rented or sharecropped to others

Acess to land	Yes=1 No=2	If yes, how much land? (ha)	Land given to others	Yes=1 No=2	If yes, how much land? (ha)
Farmed own land					
Sharecropped in land			Sharecropped out land		
Rented in land			Rented out land		
Free access to someone's land			Gave land to someone for free		

10. How do you rate your plot of land in terms of quality? 1=v.good 2=good 3= poor 4=v.poor ☐
11. if you sell, rent out or sharecrop out any land in the last farming season, why?
1= we needed cash to buy food 2=we needed cash for family health expenses 3=we needed cash for schooling expenses 4= we needed cash for social obligations
5= we have more land than we need 6= we don't have enough labour 7= we don't have access to a plough and oxen 8=the land is poor quality 9=Other (specify) ☐
12. Is there land that you use communally with other people in your kebele? 1= Yes 2= No ☐
13. If yes, what are the benefit that your household accrue from it? 1=pasture/grazing 2= firewood 3=water 4=source of construction material 5= Others(specify) ☐

Section 4. Crop Production, Livestock Raising and Environmental Issues

14. Would you tell us the size of farm lands cultivated, and amount of crops harvested during the previous belg and meher seasons?

S/N	Crop type	Meher		Belg		How many KGs were		
		farm size	Total amount harvested	Farm size	Total amount harvested	Eaten at home	Sold	Prices per KG
1								
2								
3								
4								
5								

Codes of crop type: 1= barley 2= beans 3= wheat 4= chick pea 5= lentil 6= peas 7= teff 8= maize 9= sorghum 10= other (specify)

15. Tell us about your perrenial crops and the income you earn from them.

S/N	Crop type	Number/stand	Monthly income	Annual income

Codes for crop type: 1= gesho 2= onion 3= garlic 4= green pepper 5= potato 6= other (specify)

16. Which modern farm inputs do you apply in order to augment/ boost your crop production?
1=chemical fertilizers 2=improved seeds 3=herbicides 4= insecticides
5= irrigation 6=manure and mulch 7= other (specify) ☐

17. What have been the main constraints to expanding your crop production? 1=drought 2=frost 3=water logging 4=pests and diseases 5=erratic rainfall distribution 6=weeds 7= shortage of farm oxen 8= poor storage 9=insufficient landholding 10=poor soil fertility 11=lack of access to appropriate technology 12=high sandy 13= shortage of cash 14=inadedquate extension services 15=erosion 16= susceptibility to wild attack 17= other (specify) ☐

18. Which measures do you practice to minimize soil erosion on your own farm?
1= terracing 2= tree planting 3= soil/ stone bunds 4= contour ploughing 5= furrowing 6= strip cultivation 7= others (specify) ☐

19. Which of the following land management practices do you carry out in order to maintain and replenish the soil fertility of your farm lands? 1=fallowing/field rotation 2=crop rotation 3= manuring 4=use of chemical fertilizers 5=inter-cropping 6=other (specify) ☐

20. Would you tell us the number of livestock you own?

S/N	Type	Number	Variety		Equivalent in cash
			Local	Imporved	
1					
2					
3					
4					

Codes of livestock type: 1= cow 2= ox 3= bull 4= hiefer 5= calf 6= sheep 7= goat 8= mule 9= horse 10= donkey 11= chicken 12= other (specify)

21. Do you have beehives? 1= Yes 2= No ☐

22. If yes, how many beehives do you manage?_____

23. What are the constraints to rearing livestock? 1= shortage of grazing land 2= lack of additional fodder 3= disease prevalence 4= lack of sufficient veterinary services 5= shortage of water 6= attack by wildlife 7= others (specify)

24. Do you sell fuel wood? 1= Yes 2= No ☐
25. If yes, what is the source? _____
26. What type of trees would you prefer to grow and cut? Why?

Types of trees preferred to grow		Types of trees preferred to cut		Number of trees planted in the last 12 months	Number of trees cut in the last 12 months
Type	reason	Type	reason		

Section 5. Non-farm Employeement Opportunities: Finanical Capital

27. Do any of your household members work in activities apart from crop production and livestock rearing? 1=Yes 2=No ☐
28. If yes, would you tell us about the types of activities? 1=daily laboring 2= government employment 3=FFW 4=military 5= petty trading 6=other (specify) ☐
29. If the HH is engaged in petty-trade, mention the type of trade.
1= Food grain 2= Consumer products 3= local alcoholic beverages 4=Others (Specify) ☐
30. What are constraints in expanding your household non-farm ventures?
1=lack of access to non-farm job opportunities 2=shortage of start up capital
3=lack of knowledge and working skills 4=cast/lack of respect for some activities
5=unable to work/disability 6=lack of raw materials 7=lack of market 8=poor infrastructure to supprot activities 9=absence of rural credit 10=other (specify) ☐
31. Do you have access to rural credits? 1=Yes 2= No ☐
32. If no, what are the reasons? _____
33. What problems do you encountered in getting credit services?

Section 6. Income and Expenditure

34. What are the main income sources of the HH in the last 12 months?
And how much income does the household generate from the following sources?

S.N	Income source	how much income did the household receive during the last 12 months	How has each income sources changed during the last 12 months	Amount of annual income in Birr
1				
2				
3				
4				
5				
6				
7				

Code for income source: 1=sale of grain 2= sale of fuel wood
3= sale of vegetables 4= sale of livestock 5= from petty trade 6=sale of assets
7= wage from labor work 8= remittances 9=credits 10= other (specify)

Codes for how has each income sources changed during the last 12 months:
1=increased 2=decreased 3=same

35. Who is the main breadwinner of the household? _____

36. How much does the household spend for the following food and non-food items?

S.N	Expense category	Expenditure source 1= own produce 2=purchase 3=other (specify)	Amount	Unit of measurments	Amount of annual expense in birr
1					
2					
3					
4					
5					
6					
7					

Codes for food and non food items: 1= teff 2= wheat 3= maize 4= barley 5=sorghum 6= lentil 7= bean
8=pea 9=chick pea 10= vegetables 11= milk 12= oil/salt/sugar 13= tella/tej/areqi 14=utensils
15= clothing 16= school fee 17= medical care 18= transportation 19= tax 20= kerosene 21= others (specify)

Section 7. Food Security

37. Which food stuffs are consumed at your home?

Food staff consumed	How many times per day was it consumed at your home	Is there a time of a year when you encounter shortage of specific foods 1=Yes 2=No	Which months of a year are the shortage periods

Codes for food staff: 1=injera 2= bread 3= wot 4= oil 5= milk 6= potato 7= vegetables 8= supplimentary food 9= porridge 10= breast feeding 11= other (specify)

38. Would you tell us the amount of grains and other food staffs that cover the annual consumption food requirements of your household members?

Grain type	Amount in quintal	Equivalent in cash
Cereals		
Pulses		
Oil seeds		
vegetables		
Others (specify)		
Others (specify)		

39. During the worest months, how many times a day did the adults and children in your household eat?

	Number of meals /day
Adults	0 1 2 3 4
Children	0 1 2 3 4

40.Do you meet the all year round food requirements of your HH members from own production? 1=yes 2=No ☐

41. If no, how do you cope with the problem of food shortage?

S/N	Copping strategies	Yes=1 No=2	Use a strategy when food shortage is 1=less 2=moderae 3=severe	How often 1= everyday 2= 1-2times/week 3= 4-5times/week 4= never

Codes for copping strategies: 1= ate less food 2= reduced the number of meals/day 3=consuming less preferred foods 4=borrow grains/cash 5=remitances from relatives 6= migration to nearby towns for wage labors 7= migration to other rural areas for wage labors 8= sent children to stay with relatives 9= withdrew children from school 10=sent children to work 11= firewood/ charcoal selling 12= rented out land 13= sale off livestock 14=sale off farm oxen 15=sale off other assets 16=rely on relief 17=off-farm activities 18=petty trading 19=other (specify) ☐

42. Have your HH received any food or cash from PSNP? 1= yes, public work beneficiary 2= yes, direct beneficiary 3= no ☐
43. If this HH is a direct beneficiary, what are the reasons? 1= HH members are too old to work 2= HH members are too sick to work 3= HH members are disabled 4= other (specify) ☐
44. What did you do with the money/food you received? 1= bought staple foods 2= bought clothes 3= paid taxes 4= credit repayment 5= paid for health expenses 6= bought livestock 7= ate the food 8= other (specify) ☐
45. If the HH is not included in PSNP, what do you think is the reason? 1= we are not poor 2= we received remittances 3= we have more land/livestock 4= other (specify) ☐

Section 8. Utilization

46. What is the source of water for your household consumption and for various agricultural purposes?

S/N	Uses	Sources during dry season	Sources during wet/ rainy season	Distance in hour
1	Household consumption			
2	Livestock consumption			
3	Garden crops			
4	Irrigation			

Codes: 1= river 2= pond 3= hand-dug well 4= tap/pipe water 5= others (specify)

47. Do you have pit latrine? 1= Yes 2= No ☐
48. Problems responsible for the failure to properly use food and other resources?
1=prevalence of human diseases 2=lack of access to clean and potable water 3=sanitary problems 4=lack of nutritional knowledge 5=mismanagement of products in the post-harvest seasons 6=lack of saving tradition 7=other (specify) ☐
49. Do you use contraceptives? 1= yes 2= no ☐
50. If no, why? 1= we need more children 2= we do not know much about contraceptives 3= we have no access to health institutions 4= fear of side effects 5= other (specify) ☐
51. If any member of the HH (children) had died in the last 12 months, what was the reason?
1= diahrea 2= measles 3= shortage of food 4=pnumonia 5= other (specify) ☐
52. If any member of the HH (adult) had died in the last 12 months, what was the reason?
1= diahrea 2=shortage of food 3= pneumonia 4= other (specify) ☐

DECLARATION

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

Declared by Fassil Setargie Emiru

Signature: _____

Date: 17 Aug 2007

Place and date of submission: Addis Ababa University, July 2007.