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ADDIS ABABA UNIVERSITY
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**DEMOGRAPHIC RESPONSES TO HOUSEHOLD
FOOD INSECURITY IN NORTH WOLLO**

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*DEMOGRAPHIC RESPONSES TO HOUSEHOLD FOOD INSECURITY IN NORTH
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Demographic Responses to Household Food Insecurity In North Wollo

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ABSTRACT

Household food insecurity is a key development problem in Ethiopia. Very few studies have been conducted on the relationship between household food security and demographic responses to food insecurity. A study was conducted on 1200 rural households in North Wollo zone. These households were selected from all eight rural Weredas of the zone. Food insecurity situations of households were analysed in terms of households' access to resources (land, livestock and cash income).

Results of the study showed that 9 percent of the respondents were landless households during the survey. It was also found that mean number of cattle per household is about 2 heads per household. Mean annual cash income of households is not more than 500 Birr. Alternative Sources of cash income for households were found to be minimal. Migration is found to be the most important demographic response of household food insecurity. Cyclical and seasonal migration is used as coping mechanism of households before their food security position starts to decline. Permanent out-migration during normal times is common to households with better economic status. Whole family out-migration is a response to acute food insecurity. The probability of occurrence of famine induced mortality is higher in food insecure households than food secure ones. Mortality experience of households during famine and normal years showed marked difference. Mean number of children ever born to food insecure households is lower compared to food secure households. Nuptiality is found to be weakly associated with the food security position of households. Demographic events such as unusual migration , abnormal rate of deaths, delay in marriage in marriage activities, are to be continuously supervised and should be used for early warning and intervention purposes.

CHAPTER ONE

1.1 INTRODUCTION

Food is one of the basic needs of human being. As it is the most essential part of human life, there are a lot of institutions and organisations dealing with the study of different issues related to food. One of the areas concerned about the accessibility, availability and sufficiency of food is the study of food security situation of a region, a country a community and households in particular areas. Food security as the subject of study got momentum after the 1974 Bucharest World Food Summit. From that time onwards, the concept of food security has widened its horizon.

Food insecurity is the situation at which a community, a household or an individual face shortage of food at any time to eat. Food insecurity is the key development problem for developing countries in general and for Africa in particular. Ethiopia as being part of the continent, experienced famine related calamities as a result of food shortages due to drought. The country entertained dreadful famine times and is still a fertile ground for food shortage related hazards. Famine has left a painful scar in the country. It caused a huge loss of human life. Famine is the worst form of food insecurity (both chronic and transitory).

Scholars have studied food security at the national, community, household or individual level. Nowadays, the field of food security is becoming the focus of governmental and non-governmental organisations. The subject becomes one on the development agendas of African Governments. But, most African countries are not able to feed their rapidly growing population. In Africa, population is growing at annual rate of more than three percent while economic growth is in a declining situation. The mismatch between population and national economic growth undoubtedly leads the population to food insecurity situation. So what are the solutions for such an unstoppable major development obstacle?

Causes and consequences of food insecurity problem should first be thoroughly studied. Most of the literature available on the subject spell out two major categories that are responsible for food insecurity. They are natural (like drought, flood, earth quake) and man-made (such as deforestation, conflict etc.). Both cases can be taken as causes of food insecurity in Ethiopia. This paper tries to show the interrelationships that exist between household food insecurity and

some of the major demographic variables based on the data collected in North Wollo zone from which a sample of 1200 households are taken for the study. Demographic variables like fertility, mortality, migration and nuptiality characteristics are the subject of the study to be analysed in relation to household food insecurity, particularly chronic food insecurity. Some of the demographic variables can be regarded as both a cause and a consequence of household food insecurity. The paper is organised under seven chapters: **Chapter one** presents the general introduction of the subject, general background to the study area, objectives of the research paper, methodology employed in the study and the questionnaire developed to collect data.

Chapter two provides the literature review part of the study. The literature review includes definitions, key concepts, causes and consequences of food insecurity as to different views of scholars, indicators of household food insecurity and coping mechanisms of households.

Chapter three reveals the practical analysis of the problem based on data from the survey. Under this chapter, information on key variables for household food insecurity is presented. Data on ownership of productive assets such as land, livestock, different sources of income and market availability in the area is presented. **Chapter four and five** deal with some of the demographic responses to household food insecurity as evidenced from the results of the survey. Chapter Four treats migration (both in and out-migration) and Chapter Five examines nuptiality and mortality as compared between normal and famine times.

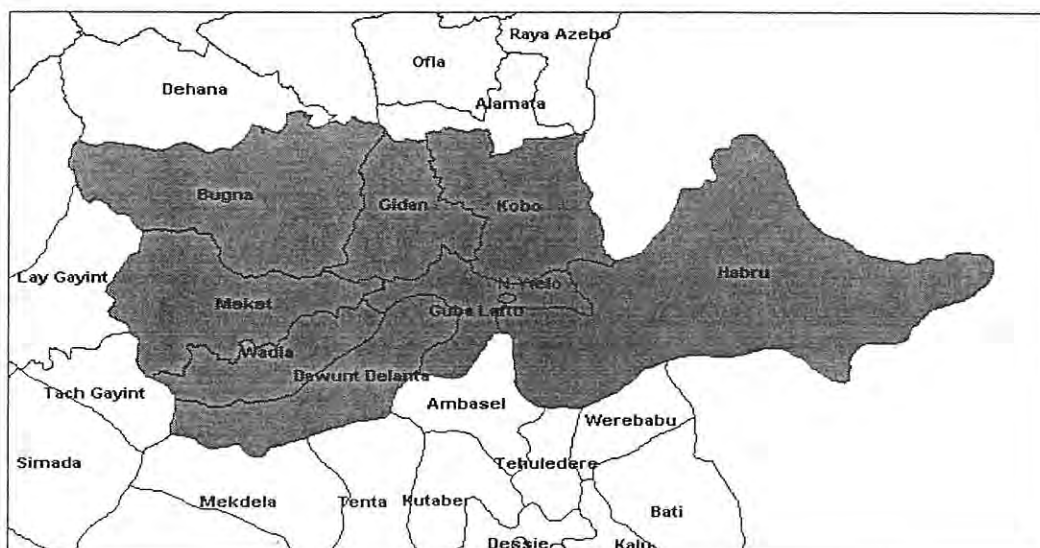
Chapter Six contains the discussion part of the paper based on the findings from the analysis made in the previous chapters. **Chapter Seven** presents the conclusion, recommendations and policy implications.

1.2 BACKGROUND TO THE STUDY AREA

1.2.1 TOPOGRAPHY AND CLIMATIC CHARACTERISTICS

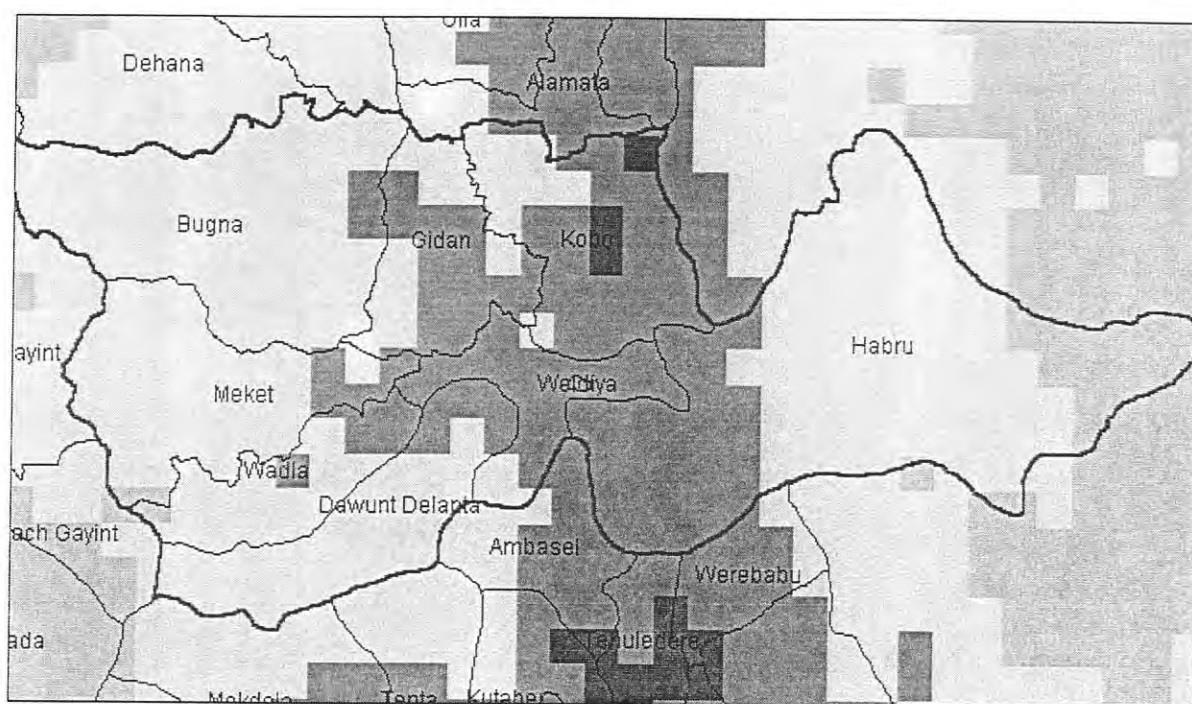
North Wollo is one of the zones in Amhara region. It is situated in the northeastern part of the country. The zone is divided into eight rural Weredas and one special town-Woldya (see Figure 1.1). The physical feature of North Wollo is rugged and mountainous. Most of the area is inaccessible since there are very few all-weather roads. The Addis Ababa-Asmara main road crosses some of the Weredas such as Habru, Gubalafto and Kobo. The China Road (Woldya-

There are two main growing seasons (Meher and Belg) in the area corresponding to the two rainfall seasons namely: Kiremt rainfall (June-September) and Belg (February-April). During Kiremt, the rains cover almost all the area. While the Belg rains cover some of the highland areas of the zone as well as the low lands of Kobo and Habru. Over all in the zone Meher production is more important than Belg production.



A long term mean of Normalised Difference Vegetation Index (NDVI) for the area during the first 10 days of May is shown in figure 1.2. The green area in the map shows where vegetation cover is significant. The yellow area shows very sparse vegetation during the peak of the Belg season. Gubalfto, Kobo, Gidan and western parts of Habru show considerable greenness.

Figure 1.2 Mean NDVI image for May 1-10



In terms of agro-ecological zone, Wadla and Delanta are mainly Dega areas. Gubalfto experiences mixed type of agro-ecological zone with slight domination of Dega . Kobo and Habru are predominantly Kolla areas mainly producing sorghum. Gidan is dominated by Dega and followed by Woina Dega. Meket is dominated by mixed type of agro-ecological zone.

1.2.2 MAJOR DEMOGRAPHIC CHARACTERISTICS

Population size variation among Weredas is so large that the highest population in Meket Wereda is 188,922 while the lowest number of population is living in Wadla Wereda, that is, 105,175. North Wollo has a total population of 1,260,317 out of which 93 percent lived in rural areas while 7 percent or 89,055 live in urban areas according to the 1994 population and housing census of Ethiopia (CSA 1994).

Average household size is 4.6 for the zone in general and 4.7 for rural area while for the urban area it is 3.7. In terms of economic activity status, total population aged ten and above is 889,734 of which the active population is 733,792 and 154,722 are inactive. Activity rate is 82.59 percent.

The demographic characteristics of the zone as explained by migration, fertility, mortality according to the 1994 census are as follows: In the area, about 8.5 percent of the population over 10 years of age are in-migrants. 91.5 percent of the population is non-migrant. About 36.4 percent of the urban population in the zone are migrants. Only 6.33 percent of the rural population are migrants. This shows that the direction of permanent migration in the zone is from rural to urban areas. In terms of sex-specific migration, the zone is characterised by higher female migration than male migration particularly to urban areas. Unadjusted CBR, GFR, and TFR for the zone are 27.3, 119.5 and 4.1 respectively. Life expectancy (e^0) in the zone is 51.5 for both urban and rural areas. The socio- economic data of the zone reveals that 87 percent of the zone population never attended school and about 63 percent of the population is economically active, out of which only 0.41 percent is unemployed. The dominant economic activity in the zone is subsistence and traditional agriculture. The single dominant religion in the zone is Orthodox Christian (about 99 percent) followed by Muslim religion. The major language in the area is Amharic followed by Tigrigna. The largest ethnic group in the area is Amhara followed by Tigraway.

TABLE 1.1 % DISTRIBUTION OF SAMPLE HHs BASED ON
AZ BY WEREDA

Wereda Name	Agro-ecological Zone			
	Kolla	W.Dega	Dega	Total
Bugna	33.3	56.5	10.2	100
Delanta	30.0	8.0	62.0	100
Gidan	9.5	60.1	30.4	100
Gubalafto	22.7	37.3	40.0	100
Habru	32.7	67.3	-	100
Kobo	34.7	55.8	9.5	100
Meket	48.7	22.7	28.6	100
Wadla	9.0	22.5	68.5	100

Source: Pilot Survey Data, 1997.

TABLE 1.2 NUMBER OF HOUSEHOLDS AND POPULATION
SIZE BY WEREDA

Wereda Name	No of HHs	Population Size
Bugna	41146	171333
Delanta	33527	145401
Gidan	33380	135805
Gubalafto	34716	139151
Habru	37741	168172
Kobo	37031	175558
Meket	44142	193683
Wadla	24473	106681
TOTAL	286156	1235784

Source: CSA, 1994

1.3 OBJECTIVES OF THE RESEARCH PAPER

North Wollo is well known for its drought related chronic food insecurity and famine problems. Most governmental and non-governmental organisations are concentrating their efforts both in intervention programs and research activities related to food security and famine situations. The effort of research institutions, line ministries and non-governmental organisations should be put together to further investigate the root causes of food insecurity problems at community, household and individual levels.

The purpose of the pilot study conducted in the zone is to identify the most vulnerable rural households to food insecurity. This pilot study is the first of its kind for it is under taken under close co-operation of interested institutions (like DPPC, USAID, SCF/UK and Addis Ababa University). One of the major objectives of the study is to contribute to the development of a national or sub- national policy in the area of food shortage related intervention programs by Early Warning Department of Disaster Prevention and Preparedness Commission. The other objective of the pilot study is to analyse the demographic characteristics of households and to be able to write an MSc thesis on the topic *demographic responses to household food insecurity*.

It is believed that there is still a lot of work to be done in order to meet the need to have accurate information in the area of household food insecurity and related demographic consequences. In fact, many researchers have paid much attention to the causes and consequences of food insecurity at different levels ranging from national level to household level. But, very few of them tried to extend the scope of their work so as to incorporate the demographic aspects of household food insecurity, both as cause and as consequence.

✓ This paper, based on a limited number of research works and primary data collected from the study area, tries to reveal the interrelationships that exist between demographic variables and household food insecurity (chronic or acute or transitory/cyclical). The paper could have paramount importance for its contribution to fill the research gap and can be considered as a step forward in launching further research activities in areas of this type. ✓

Baseline information from the community is an essential tool for policy formulators, decision-makers and researchers. Therefore, the major objective of this paper is to collect data from the

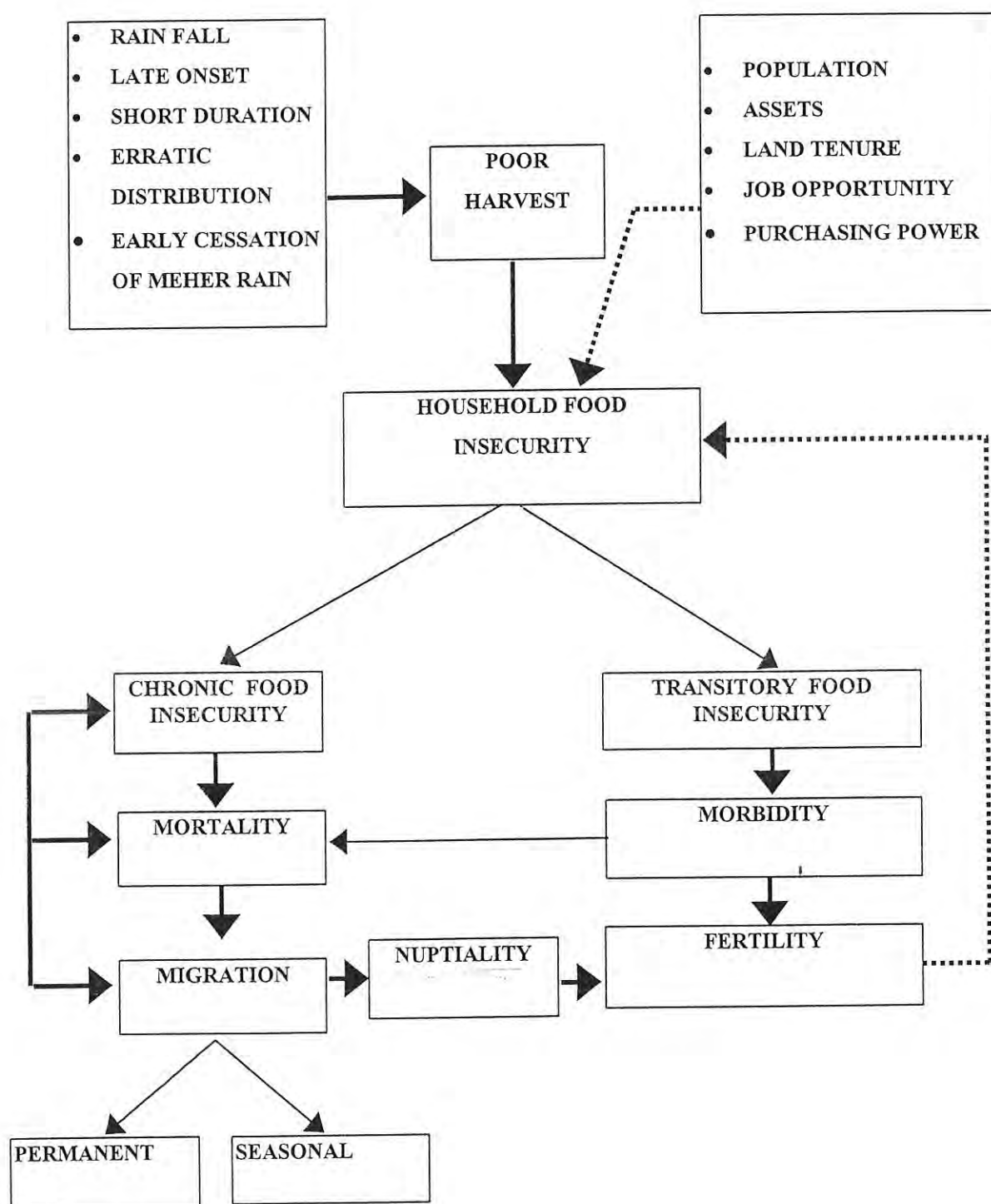
community and to review some of the demographic characteristics of food insecure households and their implications for population and development intervention programs..

1.4 HYPOTHESIS

1. Food insecure households experience a higher rate of migration than food secure households.
2. The direction of seasonal migratory movements occurring as a result of transitory household food insecurity is generally from Dega areas to Kolla areas.
3. Marriage dissolution and family disintegration are higher in food insecure areas than which are not food secure.
4. Women in food insecure households face reduced fertility both as a result of malnutrition and marital separation.
5. Mortality experience of food insecure households is higher than that of relatively food secure once households.

1.5 CONCEPTUAL FRAMEWORK

DEMOGRAPHIC RESPONSES TO HOUSEHOLD FOOD INSECURITY



1.6 THE INSTRUMENTS

The design of the data collection instrument, the questionnaire, is in such a way that it enables the collection of both qualitative and quantitative data. To attain this goal, two different types of instruments have been developed:

1. Household level questionnaire and
2. Key-informant questionnaire

The household level questionnaire contains household economic and demographic characteristics. Information obtained from this survey serves to analyse the vulnerability of households to food insecurity and thereby its demographic consequences.

The first part of the questionnaire focuses on the household food economy. Questions concerning household food stocks, annual food consumption, wild food consumption, seasonal patterns of food purchases, cash income by source, land ownership and utilisation, changes in size of land, farm input such as hiring labour for farm work, use or non use of farm credits, land preparation, crop and livestock production, wage labour, petty commodity production, petty trading, food aid, coping mechanisms and household possessions. The second part of the questionnaire includes data on demographic variables such as fertility, nuptiality, mortality migration and household structure.

The key- informant instrument was structured for Wereda officials, known community leaders, elderly persons, religious personalities and the like. The instrument by content was purely related to the food security situations of households in the area. It called for a sample of 30 respondents from each of eight Weredas, questions to be answered in estimated percentages, opinion on future food security situation as perceived by the respondents (key informants).

Before the actual data collection took place, pre-test of the instruments was carried out in the study area in the middle of January 1997. Adjustment of the instruments was made up to February 1997 based on information from the field pre-test. Other activities carried before actual data collection were human and material resource procurement, discussions with different levels of government officials, training of actual data collectors.

The data collection team was constituted from central Disaster Prevention and Preparedness Commission-Early Warning Department, Zonal Planning Bureau, Zonal Ministry of Agriculture Bureau, Zonal Administration Bureau and Wereda Ministry of Agriculture experts

and Zonal Disaster Prevention and Preparedness Commission workers. The author took an active part in questionnaire designing, preparing training material, organising activities such as training, dispatching, co-ordinating and data quality control and assisting the team leader in all aspects of management of the pilot study program.

A two-days training and one-day field trial program was carried out on February 15 and 16, 1997 before the commencement of the actual data collection. Field data collectors of SCF (UK) shared their field experiences in the rural community. Their approaches (such as coffee and tea ceremonies before and after each and every interview, brief and short questions designing) during interviewer-respondent communication and during staying times of a team in villages were the most important inputs during the training sessions. After the field practice, a session for general discussion was held. Valuable information was obtained from the general discussion. Some of the issues addressed during the discussion were: about some concepts in the data collection instruments; the geographic inaccessibility of some of the randomly selected PA and households, absence of simple first aid facilities for the field workers, insufficient daily subsistence allowance (DSA), and long bureaucratic processes and insufficient vehicles) are some of the points raised during the discussions.

Every possible means was tried to solve some of the problems. Central DPPC workers and a data collection process was supervised by a team, here, the role of the author has to act as assistant supervisor and to fill the gaps during the actual data collection in the field. The author took part in four kebeles in actual data collection and visited five Weredas during the actual data collection and consulted data collectors while they were in the field

The most important part of the pilot study approach is that it incorporated Wereda Ministry of Agriculture experts as a result there were not problems of reaching each farmer association and each selected household. Otherwise, communication could have been hampered to a greater extent. Peasant association (PA) levels Development Agents were also very important resources of the data collection process. Communication between Wereda teams and supervisors was a very crucial point through which solutions to problems in the field were to be solved. Another important means of communication within groups was possible through radio.

It has been realised that primary data collection using simple random selection of rural households requires due attention and emphasis before and during its implementation. Among the steps that are required before the commencement of the program can be summarised as:

1. Make sure that primary data collectors have the minimum necessary field skills and experience such as physical fitness, mule/horse riding, and communication ability with the community, as well as determination to attain the desired goal of the project.
2. Ensure that data collectors are fully satisfied by the daily subsistence allowance (DSA) so that they do not boycott the data quality.
3. Make sure that all the necessary logistics are available before the actual data collection underway. These include mattresses, sleeping bags, first aid materials, stationary, rations and cooking utensils.
4. Determine the type of relationships that should exist among the actors in the data collection and respective local and government officials and other interested institutions (if any). In general, the supply side of the project should be fully satisfied before the main program comes to reality.

1.7 METHODOLOGY

The main task in determining sample size is to find optimal distribution of samples across the total population under study. Proportional sample size was predetermined on questions of availability of trained man power, cost, time and feasibility as well as the need for statistically representative estimates at the Wereda and agro-ecological zone level. After taking all these facts into account, a sample size of 1200 out of 286149 households in the zone were deemed to be sufficient to represent the total population of rural households. All rural Weredas in the zone were taken as a frame for the sample selection of 30 households' cluster. Stratification by Wereda and by altitude zone of peasant association (PA) was made based on the information provided by SCF(UK) and local Wereda officials.

Two-stage cluster sampling were applied: The first, involving estimation of the sample size per Wereda and the second, was estimation of sample size within the Wereda. All PAs in North Wollo zone were listed by Wereda and predominant agro-ecological zone. The lists were randomised by a random number operator using computer. From the random lists, sample peasant associations were selected using the sampling interval formula Cij/Fij , where Cij is the

size of the peasant association to be selected in the Wereda and Fij is the total number of peasant associations in each Wereda per agro ecological strata. After peasant associations were selected based on the above steps, sample households were selected as follows:

- 1) Total population in each peasant association were estimated from data provided by SCF (UK) and corroborated by CSA 1994 census data on household numbers in each PA.
- 2) For practical reasons and from man power and logistical point of view, it was decided to have a standard 30 households sample size per PA.
- 3) The sample interval of households was computed as $POP_{fa} / 30$ where POP_{fa} is the total population in each peasant association.
- 4) All households in the sample PAs were numbered from 1...n, where n is the total number of households in each PA.
- 5) Using a random number operator on the computer, 30 households were randomly selected.
- 6) When the randomly selected households were not available due to uncontrollable reasons, the next household to the n^{th} household was taken as a substitute, that is $n^{th}+1$.

1.8 LIMITATIONS

Limitations of the pilot study includes: coverage problem, mis reporting of data, small sample size which could lack complete representation of the population under study. In relation to coverage problem, the most serious problem encountered during the data collection process was the geographic inaccessibility of some households. Most of the rural households are scattered. Household 1 and household 2, which are randomly selected in the sample, could be far apart with a distance of two to four hours on foot travel within the same PA. There were possibilities in which the same enumerator went to the three main agro-ecological zones in one PA.

Mis reporting of data is an other shortcoming of the survey. Some of the questions were related to households' possessions such as land, cattle, household assets and income. Information on the size of land was not free from bias that emanated from the suspicion of respondents. Land redistribution was to take place in April 1997 just after a month after the survey. Although the data on the size of land a household owned was ascertained by key informants and sometimes by direct observation, the data were jeopardised by fear of respondents, that is, the fear of

respondents to further redistribution of land. Information on income were so difficult to obtain accurate data. Respondents declined to estimate their annual income in terms of cash. Reports were not free from downward bias regarding the households' annual income.

Some of the demographic data such as age of the respondent and her/his family were not accurately reported. Respondents preferred age figures terminating with digits such as 0, 5 and 8. The rest of the terminal digits were disfavoured. Data on mortality were unfavourable to the interests of respondents. Mortality of young family members were totally denied by respondents. This was deliberate act of the respondents since they did not want to remember their dead relatives.

Number of living children was some times over reported and mostly under reported. Over reported for aid purpose and under reported for cultural and spiritual reasons.

Determination of sample size is governed by different factors. Among other things, financial constraints, lack of fund and time limitations lead to use fairly small sample size. Sample size determination in the study area was dominated by the above factors. 1200 households (about 2 per cent of the total households in the zone) might not reflect the true characteristics of the population. In spite of these limitations, carefully designed data collection activities were implemented.

CHAPTER TWO

2 LITERATURE REVIEW

2.1 DEFINITIONS

There are number of definitions of food security and food insecurity. Selected definitions for food security and food insecurity are taken from World Bank defines food security as access by all people at all times to enough food for an active, healthy life (World Bank, 1986). This definition includes key concepts such as access, time, sufficiency of food for an active and healthy life. Definitions are arranged according to their chronological orders. There are some modifications and improvements in definitions as time goes on.

On the other hand, Getachew defines food insecurity as a temporary complete lack and /or decline in access to productive resources, deterioration of the household asset position overtime, declining resource productivity as a result of environment degradation and lack of alternative technologies to meet rapidly growing food needs and associated with lack of employment opportunities (Getachew 1995).

2.2 KEY CONCEPTS

Acute or transitory food insecurity refers to temporary falls in food consumption below a desirable level.

Chronic food insecurity a static state (one which does not change over time). Chronic food insecurity refers to populations, households or individuals that habitually consume less than desirable level.

As demography is the science of statistics on populations characteristics related to fertility, mortality, morbidity, nuptiality sex and age etc., **demographic responses to food insecurity** refers to changes in these variables due to the food security situation of the population in question.

Food entitlement involves how much food households actually have access to from their own production, income, gathering of wild foods, community support or claims, assistance and migration.

Households' response to food insecurity: households are divided into three categories according to their response to food insecurity.

- 1) Enduring households are those who can maintain food security on continuous basis.
- 2) Resilient households are those who suffer shocks but recover quickly.
- 3) Fragile households are those who are increasingly insecure in response to shocks.

Security means the balance between vulnerability, risk and insurance.

Time refers to whether food insecurity is chronic, transitory or cyclical.

Vulnerability signifies defencelessness, insecurity, exposure to risk, shocks and stress, and difficulty in coping with them.

2.3 MAJOR CAUSES OF FOOD INSECURITY

Scholarly analysis of food security point to several out factors responsible for populations, households or individuals experiencing food insecurity. For the sake of convenience, these factors are divided here into three categories.

- 1) Economic factors: under this are scarcity of land, poor distribution of resources, declining access to productive resources, low level of savings and limited non farm employment opportunities.
- 2) Socio-demographic factors such as rapid population growth rate (population explosion), poor health and sanitation, high level of illiteracy and school non attendance, and
- 3) Hazards like climatic hardship, high rates of natural resources degradation and proneness to production fluctuations. (Getachew 1995; Webb and Von Braun 1994; Maxwell and Frankenberger 1992; Mulat et al 1995; Markos 1997).

Some authors give priority attention to economic factors as causes of food insecurity. Others consider natural calamities to be the leading causes of food insecurity. Few scholars like Markos and Dag pay attention to demographic factors. For these writers, uncontrolled population growth is the sole agent of natural resource degradation and hence leading to food insecurity. They show also that the consequences of food insecurity are more of demographic nature. The effects of food insecurity on fertility, mortality, nuptiality and migration have been well addressed by these writers. The demographic consequences of food insecurity as discussed in the works of Dag and Markos will be presented in the later sections of this chapter.

It should be understood that many of the writers on food security at any level of the population do not treat demographic variables in their direct sense. For these and other related reasons, the sources of information in the form of literature were found to be very limited.

2.4 INDICATORS OF FOOD INSECURITY

Many indicators of food insecurity at the household level are more or less economic indicators, and they are closely related to the economic conditions of households. Maxwell and Frankenberger put indicators as process indicators and out come indicators. By process indicators they mean that an estimation of food supply and food access. Out come indicators refer to process for food consumption (Maxwell and Frankenberger 1992).

Economic indicators include changes in employment opportunities, changes in community or social factors (self support mechanisms), ownership of productive assets, decline in purchasing power, deficiencies in internal marketing and distribution system, stagnant and/ or lack of technology and decreasing yields and limited food availability usually characterised by stagnating or even decreasing food production (Nana-Sinkam in :ECA 1992).

2.5 HOUSEHOLD COPING MECHANISMS

Households apply different coping mechanisms when they face food insecurity situations. The pre-crisis characteristics of households determine the type of method employed. In general there are three stages of coping mechanisms. The first one is risk minimisation under which households make adjustment to production and resources base before and during production season. The second stage is risk absorption. During this stage, households start to minimise the amount of food and the number of meals. The last stage is that of risk taking stage. This stage is characterised by the collapse and migration of households. Normal systems start to collapse and abnormal ones start to operate. The diet of households is dominated by unusual famine foods such as roots wild leaf and wild fruits. Households start to sell their last assets, including their fields, homes and clothes. Households start to break up and leave to search for assistance from their distant relatives or relief camps (Webb and Von Braun 1995, Maxwell and Framkenberger 1992,).

There are five major peasant survival strategies during food crisis. These are: Austerity and change in consumption in which households start to reduce the amount of food, prepare simple

crisis food, start to consume famine foods such as wild leafy and fruity plants and roots; 2) co-operation in the local communities like borrowing, bartering, mortgaging credit arrangements among the community, oxen-sharing , oxen rental, labour exchange and charity. 3) Temporary individual migration for searching off-farm employment. 4) Divestment, under which peasants start selling out their cattle, and small animals starting from sheep and goats , calves, cows, and then working oxen. 5) Crisis migration in which mass movement , starvation, and mass deaths are common features (Dag 1988, Markos 1997, Maxwell 1995).

2.6 CONSEQUENCES OF HOUSEHOLD FOOD INSECURITY

The consequences of household food insecurity are more of demographic in nature. These include : 1) increase in population movement (migration); 2) increase in the death rate; 3) temporary decrease in birth rate; 4) decrease in marriage activities. Dag argues that mass migration and mass death are the most common phenomena during chronic food insecurity (famine). He further explains that mass migration increases mass death as a result of hardship and epidemics. Markos spells out demographic responses to environmental degradation and food insecurity as reduction in fertility, increase in mortality, increase in migration and collapse of households as a result of divorces (Dag 1991, Markos 1997, Getachew 1995, Webb and Von Braun 1994, FAO 1995, Mulat et al 1995). Demographic responses to different stages of food insecurity are extracted from different sources and tabulated as follows:

TABLE 2.1 DEMOGRAPHIC RESPONSES TO DIFFERENT STAGES OF FOOD INSECURITY

STAGES	FERTILITY, MORTALITY AND MARRIAGE	MIGRATION
1. SCARCITY	-postponed marriage -decreased fertility -no significant increase in death	-individual migration for work, market and -deals with acquaintances
2. DEARTH	-serious decrease in marriages and fertility -moderate increase in death rates	-beginning family migration increased and unaccustomed moving for relief and begging
3. FAMINE	-reduction of fertility, marriages and birth rates -sudden ,substantial increase in death rate	-mass migration in communities -sudden, chaotic, involuntary and tragic movements

Source: Adapted from Dag 1991.

From the above table, it can be seen that after some time of economic adjustments to food crisis in communities, purely demographic changes of households start to operate. Although there is no much information on the interrelationships between household food insecurity and demographic responses to household food insecurity, available works clearly indicate the relation.

CHAPTER THREE

3. ANALYSIS OF VARIABLES IN HOUSEHOLD FOOD SECURITY

3.1 LAND RESOURCE

Needless to say, land and animals are the critical elements of livelihood for rural households. Both quantity and quality of land owned by a household determine the amount of production to be obtained from farming. As it was indicated in the preceding literature review section, increase in population size results in further division of land and over-cultivation of the land in order to meet the food requirement of growing population. Continuous degradation in the quality and the quantity of land lead to chronic food insecurity.

North Wollo is a well known area for the recurrent drought and for the poor condition of land available for cultivation. Data on land availability and productivity were collected for the purpose of analysis of the food security situation in the area. The next section deals with information on the size and the distribution of land.

Households were asked whether they own land or not and the size of land they owned in 1996. Land redistribution scheme was designed by authorities in 1997. This affected the attitude of respondents on the actual land holding status. Efforts were made to convince respondents that the survey had nothing to do with the redistribution of land in 1997. The reliability of the data were checked against the reports from key informants and some direct observation activities were undertaken.

Information on the trend in the land size and the reasons for the increase or decrease in the land size were also collected. Results of the survey indicate that about 9 percent of the households did not have their own land during the survey. Among the group of respondents who declared that they own land, 76 percent possess land one hectare and below. Only 15 percent of the sample households are in the groups who own greater than one hectare of land. Landless households, as mentioned by some key informants, are mostly newly formed ones. There are also households formed by returnees and ex-soldiers. These households are not entitled to have

land since there is no extra land to be distributed. Responses on the trend in the average holdings indicate it is getting smaller and smaller as result of distribution of land to the newly formed households (distribution to their children).

TABLE 3.1 LAND HOLDING SIZE, 1996(REPORTED).

LAND SIZE GROUP	No of respondents	Percent
Land less households	103	9
Less than or equal to one hectare	909	76
Greater than one hectare	188	15
Total	1200	100

Source: Pilot Survey Data, 1997.

Maximum land size owned by very small number of households reaches up to 3 hectares. Average land holding size for the zone as a whole is about 0.70 hectare per household. Under the best production time scenario, average production for each household is about four quintals (calculated based on the estimation of key informants and local people in the study area, production per hectare is about five quintals of cereals and less than one quintal of pulses).

Generally accepted estimate of the annual food requirement for an average household is about 12 quintals of cereals and 6 quintals of pulses per year (Dessaegn, 1991). This means that a minimum of 12 quintals deficit per household is common even under the assumption of the best production year. So what does this tell about the food security situation of households in the study area? The gap between food requirement and food production implies that unless there exist a means to fill, households with this amount of land holding and productivity are vulnerable to both transitory and chronic food insecurity.

Distribution of land on Wereda basis show some variation from the mean. Meket Wereda has a relatively better position than others. Average land holding size in this Wereda is found to be about 0.80 hectare per household. The lowest average land holding size is observed in Gubalafto and Habru. Informants said that these two Weredas are known for their land fertility. The following table shows land size per household on Wereda basis. The general expectation about the size of land holding is that Kolla areas would have a relatively bigger land holding size per household. But, Kobo and Habru as they are dominated by Kolla agro-ecological zone do not confirm the expectation. Instead, Wadla Meket and Delanta have bigger average land

holding size per household.

TABLE 3.2 AVERAGE LAND HOLDING SIZE BY WEREDA(REPORTED).

WEREDA	LAND HOLDING (ha. reported)
Bugna	0.71
Delanta	0.85
Gidan	0.72
Gubalafto	0.52
Habru	0.58
Kobo	0.78
Meket	0.85
Wadla	1.03
AZ:	
Kolla	0.88
Woina Dega	0.62
Dega	0.78

Source: Pilot Survey Data, 1997.

The variation in land holding size among Wereda can be attributed to different factors. Population size per Wereda can affect the size of land distributed to each household. The other reason can be the favourable conditions of each Wereda for agriculture might attract large number of people through different means. One important point to be made here is that Weredas with a relatively small land holding size, such as Gubalafto and Habru are known for having economic activities other than agriculture. These include petty trading and wage labour. Data on these sectors will be presented later under different sections.

Average land holding based on agro-ecological zone is the highest in Kolla (0.88 ha.) followed by Dega (0.78 ha.). This difference can be accounted for different reasons; the first one being favourable climatic conditions of Woina Dega might enhance population settlement. Another reason can be the impact of soil fertility on land holding size. That is, the more fertile the land, the higher the population density in that area and hence effect on average land holding size per

household.

Land resources play a decisive role in household food security. Availability or scarcity of this resource has direct or indirect impact on the demographic characteristics of households. The magnitude of variations in the demographic characteristics of households as a result of land holding size will be examined in the next chapters.

3.2 LIVESTOCK RESOURCES

The livestock sector is the second most important source of livelihoods in rural communities. Cattle are sources of food, energy and cash income. Small animals such as sheep and goats are as important as land to the food economy of rural households. Information on livestock holdings of households in the study area were collected using different approaches in the questionnaire. Data on this part covers two successive years that is 1996 and 1997. According to the result of the survey and in the opinion of key informants, the trend in this sector is declining at an alarming situation. The investigator was able to have a direct observation on the general profile of this sector in the study area. Groups of elderly people were consulted for the general situation of livestock holding in the community. Almost all of them agreed that each and every household in the area will be out of stock within very short period of time from the time of the survey (probably in the month of June, 1997).

For the sake of convenience information is analysed by dividing livestock holding into shoats, cattle and equines holdings. This is because each group contributes differently to the food security of households.

3.2.1 SHOATS HOLDING

Shoats are important sources of cash and food to households. They require relatively lower production cost and time. They are easily convertible to cash. They are the best insurance mechanisms of households against shocks. Shoats are not expensive to acquire. They are easily marketable almost throughout the year. For the above reasons shoats are crucial components of rural household food economy. Reported data (confirmed by key informants) on shoats holdings of 1996 and 1997 indicate that there is a declining situation in general. In 1996, average shoats holding per household was about 3 heads. In 1997 average holding of shoats

reduced by one head (on average two shoats per household). Households without shoats in 1996 were about 50 per cent of the sample population. In 1997, this percentage rose to 62 percent. Reasons for the deterioration in the average number of shoats held are two: sales and increased mortality as a result of shortages in grazing land and lack of water. The quality and quantity of shoats were reported to be well below normal. The tables below indicate mean holding of shoats on Wereda basis in 1996 and 1997.

TABLE 3.3 MEAN SHOTS HOLDING PER HH BY WEREDA IN 1996 AND 1997
(Reported).

WEREDA	MEAN NUMBER OF SHOATS	
	1996	1997
Bugna	3	2
Delanta	3	2
Gidan	4	2
Gubalafto	3	1
Habru	3	2
Kobo	1	1
Meket	5	1
Wadla	8	6
North Wollo	4	2

Source: Pilot Survey Data, 1997.

From the data it has also been observed that about 51 percent of the respondents are in the group of people who own 1-10 shoats and 40 per cent are in the group having 11 to 20 shoats. Only 9 percent of the respondents own more than 21 shoats per household in 1996.

On the basis of agro-ecological zones, mean number of shoats holding is a bit higher in Dega areas (5 shoats per household) . Kolla and Woina Dega have 3 and 2 shoats respectively.

From the above discussion of the position of shoats holding, what is the importance of this sector to household food security? What is the implication of shoats holding for household demographic behaviour? To answer these questions, one can see the importance of this sector to food security. If a household possesses reasonable number of shoats, it can sell at least 3 to 5

shoats per year. When the situation in the market is normal, the average price per head is estimated to be 50 Birr. A household selling five shoats earns about 250 Birr per year. Ignoring all other forms of expenditures in the household and assuming that the whole income goes to food crop purchase, it is possible to acquire about 2 quintals of food crop from the sale of 5 shoats.

Therefore, the household in the example can compensate for the annual food deficit encountered due to different reasons such as land shortage and crop failure. It can also be inferred that the contribution of this sector reduces the probability of migration to find cash income. If the cash position of households is strengthened through such means, it is more likely that households will engage in marriage ceremonies. It can be concluded that shoats holding of households has significant impact on the food security situation of households. Its relationship with the demographic behaviour of households will be examined in the empirical analysis of the paper using different statistical models like logistic regression analysis.

3.2.2 CATTLE HOLDING

Cattle holding is the other most important source of livelihood in rural households. Cattle holding of households determine their food security position. Cattle are useful in different ways. First, cattle are the best sources of food as oxen are essential for ploughing. On the other hand, milk and milk products are directly consumed by households or they are sold for cash to cover some other household expenses. Above all cattle are reliable sources of insurance against food crisis. If a household does not own at least an ox, then it is highly vulnerable to food insecurity. Cattle are the largest sources of households' cash income. S the sale of cattle is not possible to happen annually. When it occurs, the amount of income drawn from this sector is sufficient to cover food purchases, clothing and other household expenses. If one cow is sold in a year, average income could be about 550 Birr. Keeping other variables constant, a household with this income in a year can procure about 5 quintals of grain from the market. If a household sells an ox with reasonable price, it is possible for the household to have enough cash to cover expenses even after substitution of the ox with a small bull. The remaining cash could be expended on the purchase of food grain. This is not the usual habit of households unless they are compelled by declining food security.

Data on cattle holding were obtained by considering the cattle holdings of households for the

two consecutive years, 1996 and 1997. Cattle holding and the quality of cattle during the survey as compared to last year before the survey are some of the variables addressed in the study. Information on cattle holding across the sample population is presented in the following table.

TABLE 3.4 MEAN NUMBER OF CATTLE HOLDING OF HOUSEHOLDS IN 1996 AND 1997(REPORTED).

NUMBER OF CATTLE	NUMBER OF RESPONDENTS		PERCENT	
	1996	1997	1996	1997
No cattle holding	313	373	26	31
One to five cattle	784	770	65	64
Six cattle and above	103	57	9	5
TOTAL	1200	100	100	100

Source: Pilot Survey Data, 1997.

The number and per cent distribution of households without cattle holding show an increasing trend (figures in bracket represent 1997 data). Percentage of households with cattle holding is decreased from 1996 to 1997. Respondents complained that both the number and quality of cattle are deteriorating. Reasons given for the declining situation in cattle holding included: drought or lack of water, sales of cattle as result of stress and lack of grazing land. Average number of cattle owned by households in 1996 and 1997 show no significant variation as it was in the case of shoats holding. The reason can be attributed to the slow depletion of cattle resources than any other livestock holding. Households resorting to selling of their cattle are those whose food security position is getting worse and worse. According to information on the mean number of cattle owned by households, there is significant variation either on Wereda basis or between the two years. Mean number on cattle holding in the zone in general was found to be two heads of cattle per household. The figure on Wereda basis shows no significant difference from the grand mean. Habru, Kobo and Meket have higher mean number of cattle, that is, three heads of cattle per household while the rest of the Wereda have two heads of cattle per household.

As it has been indicated above the implication of cattle holding to household food security is multidimensional. Absolute lack of this resource by rural households unless accompanied by

special circumstance, immediately lead to vulnerability. Demographic characteristics of households with no cattle holding compared to those who own cattle will be examined in conjunction with other elements of household food security.

3.2.3 EQUINES HOLDING

The contribution of pack animals to household food economy is unquestionable. Access to equines by rural households simplifies petty trading and transportation. The contribution of holding of pack animals to food security can be explained in different ways. The first of these is income diversification of household through petty trading using pack animals as means of transporting farm products from rural areas to towns and consumer goods to rural areas. The other important contribution of pack animals is cash earned as result of renting them out.

Data on possession of pack animals indicate that very small percentage of households in the sample population own one or more pack animals that is, 374 households (31 percent). Results of the analysis indicate that 69 per cent of the respondents do not own a single equine during the survey. Mean number of equines per household is well below one head per household. Significant variation is observed in pack animals holding between agro-ecological zone. Dega has the highest mean number of equines (about one head per household) as compared to Woina Dega and Kolla.

3.3 INCOME SOURCES

3.3.1 PETTY COMMODITY (HANDICRAFTS) PRODUCTION

Petty commodity production is one of the components of household food economy. Rural households engage in petty commodity production to supplement production of food. Petty commodity production in the study area include clay making, weaving, charcoal production, fire wood gathering and production of traditional household items. Most of the time this type of activity is carried out in connection with the usual farming activities. This activity was observed on Wereda basis. Among the eight Weredas, Meket was found to be the area where petty commodity production is the most important. The least income from petty commodity production is found in Gidan Wereda. Mean income from this sector was found to be about 50

Birr per household.

Annual income from petty commodity production is highest in Kolla which is 115 Birr. The least income from this activity is observed in Woina Dega which is far below the mean income. It is not common in Dega areas too. Comparison of income on Wereda basis indicated that Meket Wereda drew the highest income (156 Birr) from this sector. The least is Wadla Wereda (11 Birr).

In conclusion, the contribution of petty commodity production to household income is not crucial. Nearly 90 percent of the respondents reported that they did not engage in petty commodity production on continuous basis. What type of implication does petty commodity production have on household food security? Its contribution to household food security is a positive one since it strengthens the purchasing power of households. It has an indirect impact on migration of households. Temporary migration is common among weavers and clay makers either to sell their products or to work in some distant places away from their localities.

3.3.2 PETTY TRADING

Petty trading is very much underreported by respondents. The percentage of respondents who practised petty trading before the survey is only 8 per cent. Key informants reported that there are substantial number of farmers who undertake petty trading. This activity is commonly practised during slack time of peasants. The most commonly traded items include shoats, domestic products such as handicrafts, grain and livestock, Manufactured goods such as clothes, soap, salt and gasoline are also traded.

Survey results indicated that mean income from petty trading was not significant. However, the data on this variable are not free from suspect. Respondents were not at ease to tell even about their engagement in the activity itself let alone the income they obtained. In fact there are Weredas and peasant associations which are far from market places. In such areas trade is not imaginable. Mean income was found to be 50 Birr and the highest income is observed in Habru Wereda followed by Wadla and Meket. Some of these Weredas have the advantage of easy access to market places since most areas of these Weredas are lying along main roads. Addis Ababa- Asmara main road crosses most part of Habru while Woldya-Woreta road passes through larger area of Meket. The research team had the chance to observe some major markets in the areas and people trading different items. Therefore, data on petty trading could

be believed to be unsatisfactory at least for the above mentioned Weredas.

What is the contribution of petty trading to reducing the food insecurity problems of households and what implications does it have to the demographic characteristics of households? The contribution of petty trading for household food security is explained in terms of cash income as a form of profit. When households get cash income out of this activity, their purchasing power is strengthened. Petty trading involves the activities of selling expensive crops and purchasing those with relatively cheaper prices for the household consumption.

As to the demographic implication of petty trading, traders move to distant places from their usual residence. This type of movement can be seen as seasonal migration. Cattle traders of the area move as far as Addis Ababa. When such people are unlucky and they face crisis in their business, they prefer to remain in towns and cities. Petty trading might as a result cause migration, family disintegration and long term separation.

3.3.3 REMITTANCES

Data on remittances in the study area is not free from bias. Respondents did not tell the source and the amount of remittances they obtained during last year before the survey. Key informants told that there are some peasant associations characterised by high number of out-migrants to Jedha and Yemen (it is believed that key informants report is more reliable than the respondent). Households who send one or more members receive remittances at least once a year. The research team in Hara peasant association had the chance to observe electronic materials such as tape recorders and radio cassettes in many of the rural households. The living condition in these households indicates that they have a better source of income than their counterparts.

Remittance received as a form of cash has been found to be insignificant. Only 5 percent of the respondents reported that they received remittance during the last year before the survey. Information on Wereda basis indicate that Habru Wereda received higher remittance than the other Weredas. Therefore, the contribution of remittance to household food security can not easily be measured. However, it can be concluded that remittance makes positive contribution towards household food security in the study area. The relationship between remittance and demography can be explained as out-migration is a precondition for remittance to occur at least in the study area.

3.3.4 LIVESTOCK SALES

Among the different income sources of rural households, income from livestock sales is the largest one. It contributes about 59 per cent out of the total cash income of households. Livestock sales is not common to all rural households. Survey data indicated that livestock sales is higher in Dega areas than in Kolla areas. Respondents explained that livestock sales is increasing as a result of shortage of grazing land and drought or lack of water.

3.3.5 CASH CROP SALES

Some of the Weredas in the zone gain income from cash crop sales. Gubalafto and Gidan have some cash crops such as garlic, coffee, onion, sugarcane and chat. The contribution of cash crops sale is about 6 percent of the total sources of cash income of households. Woina Dega areas have favourable climatic condition to grow cash crops. Therefore, income from cash crop sales is the highest in Woina Dega followed by Kolla agro-ecological zones. Cash crop production is an important contributor to household food security.

3.3.6 WAGE LABOUR (FARM AND NON-FARM)

Households with extra family labour gain income from the sale of their labour to households who have not enough labour to work on their farm. Wage farm labour involves seasonal and temporary migration. People with surplus labour in resource poor areas migrate to resource rich areas. Survey data indicated that farmers from Dega Weredas like Bugna and Gubalafto seasonally move to Woina Dega and Kolla Weredas such as Kobo and Habru.

Non-farm wage labour is an other source of income. Farmers migrate to towns and other areas where casual work is available. Such migration occurs when there is slack time in farming activities in sending areas. Income wage labour is an important source of cash required to cover household's expenditure for clothing and food purchases. It is a supporting mechanism of household food security. Since it involves migration, it has direct demographic implication.

3.3.7 LOANS

Loans as the source of income through which households obtain cash from rich merchants, rich farmers, money lenders and relatives in distant places. Loans are found to be among the lowest sources of income. The table below summarises the mean income and share of each source in

household's cash income. The data represent income from different sources in 1996.

TABLE 3.5 INCOME SOURCES, MEAN INCOME AND SHARE OF EACH SOURCE

SOURCE	MEAN INCOME (in Birr)	SHARE OF SOURCE
Livestock sales	293	0.59
Petty commodity production	46	0.09
Cash crop sales	29	0.06
Food crop sales	28	0.06
Loan	28	0.05
Non-farm wage labour	27	0.05
Petty trading	18	0.04
Remittance	14	0.03
Wage farm labour	13	0.03
Rent from animals	2	0.00
Total	498	1.00

Source: Pilot Survey Data, 1997.

3.4 FOOD SOURCES

3.4.1 OWN CROP PRODUCTION

Needless to say, own crop production is the main source of food for communities mainly engaged in agriculture. In the study area, own crop production meets the largest share of food requirement by households. Own farm crop production as a share of total food requirement is 57 per cent. Food crop production in the area is undertaken during two main production seasons-Meher and Belg. Mean annual crop production of households from their own farm in 1996 was about 5 quintals per household. The major production is obtained during Meher season.

Data on the distribution of respondents by the amount of production indicated that about 28 per cent of the respondents did not have crop yields in 1996. These households largely depended on purchased food from market. 50 per cent of the respondents reported that they produced between 1 and 4 quintals of grain in 1996. 32 percent of the respondents produced more than 4

quintals. (Key informants indicated that 1996 was considered as good harvest year).

When comparison of production on Wereda basis is made, Kobo and Wadla produced the highest in 1996, 11 and 7 quintals of grain respectively. The lowest production is observed in Habru which is about 2.5 quintals per household. Based on agro-ecological zone own crop production is higher in Kolla areas than Dega and Woina Dega areas. Mean production in Kolla was 6 quintals while it was 4.5 quintals in Dega and Woina Dega areas.

3.4.2 FOOD CROP PURCHASES

Data on seasonal food purchases were collected to show the seasons during which major purchasing activities take place, major types of commodities purchased, markets and reasons for not purchasing if there were households who did not purchase during 1996. From the results of the survey, it has been seen that 34 percent of households' annual food requirement is met by purchases from markets. Seasons in which major food crop purchasing take place are Kiremt-main rain season and Tseday- autumn, 71 and 56 per cent respectively. Least purchases occur during Bega- dry season (35 per cent of respondents purchased food crop during Bega-dry season season). Sorghum is purchased by most of the families. 22 per cent of the respondents purchased sorghum during Kiremt (main rain season). Barley is the second important crop purchased by households. Wheat is least purchased commodity. This implies that households purchase crops with lower prices. They maintain their food security position by changing their purchasing strategies.

Information on market places indicated that Wereda town markets are the most important places of purchasing. Markets in farmers associations also play important role in food purchasing and selling. Households who did not purchase food commodities in 1996 can be divided into two: the first group contains those households which did not purchase food since it was not needed and the second group consists of households which did not have money to buy food. Average time required to reach a distant market is about 3 hours on the average. To conclude this section, what is the implication of food purchasing to household food security? By simple analogy households' purchasing power of households is a very important factor to reduce food insecurity problems of households.

3.4.3 FOOD AID

Food aid is the third important source of livelihood in the study area. Food aid distribution is common in the zone. In 1996, food aid distribution was minimal since it was more- or- less a good harvest year. Bugna and Delanta received more food aid than the rest of the Weredas. Food aid distribution was almost non existent in Kobo and Habru.

3.4.4 FOOD LOAN AND GIFTS FROM COMMUNITY

Data on these sources of food indicated that the sources were not very important to the household food economy. In all the Weredas, the share of food loan and gifts from the community were not well above one per cent.

3.4.5 WILD FOOD

Wild foods contribute to the household food economy. Households resort to wild food consumption mostly during food crises. Wild foods are used to fill the gap between two successive harvest seasons. Food crop shortages are compensated by wild food consumption up to the next harvest season.. Wild food consumption in the study area varies from Wereda to Wereda. Bugna is the only Wereda in which significant amount of wild food consumption per household occurs. Average wild food consumption per household was found to be 52 kilograms per household (wild food consumption of households is estimated by converting the reported local unit of measurement into kilograms). The magnitude of wild food consumption depends on the availability of wild food and the severity food crisis.

Wild food consumption is common during Kiremt season followed by Bega. 68 percent of the respondents replied that they consumed wild cabbages, wild roots, fruits and vegetables during Kiremt. Therefore, wild food consumption in the area is season specific. There are some wild foods consumed by the community throughout the year. Samma (wild cabbage) is common in the zone. Whether there is food shortage or not, samma is consumed by the community in combination with other food items.

3.4.6 FOOD CONSUMPTION

In the above discussion, different sources of food have been observed. The contribution of each source has been pointed out. The total amount of food available to each household in 1996 was

converted into kilograms. Per capita food consumption in households was calculated (calculation was made on the basis of the amount of food consumed from each source in 1996 by each household) and it was found that the highest per capita annual food consumption was 191 kilograms of food. The lowest per capita food consumption was 173 kilograms of food

3.5 COPING STRATEGIES DURING FOOD CRISIS

Households apply different coping strategies at different circumstances. Increase in wild food consumption, borrowing, reduction in the quantity and number of meals are some of the strategies. Information on these strategies indicated that households never borrow food unless it is famine year. Increase in consumption of wild foods is also common during famine years. Reduction in the number and quantity of meals is applied in each year though there is no food shortage. Migration to find work is practised when households face serious food shortage.

TABLE 3.6 COPING STRATEGIES AND RESPONSES TO EACH STRATEGY

STRATEGY	PERCENT DISTRIBUTION				
	never	some years	every year	only famine year	TOTAL
Borrow food	21	23	10	46	100
Inform local authorities	15	19	15	51	100
Increase wild food consumption	34	11	19	36	100
Migrate to find labour	28	13	5	54	100
Reduce number of meals	5	39	21	35	100
Reduce quantity of meals	22	19	24	35	100
Sell essential animals	10	13	4	73	100
Sell household assets	14	4	1	81	100
Eat toxic foods	66	5	2	27	100
Withdraw kids from school	6	3	3	88	100

Source: Pilot Survey Data, 1997.

Table 3.6 above shows that coping strategies vary depending on the severity of food shortage (percentages are calculated on the basis of the 1200 households). Most of the strategies applied during only famine years. Some of them are applied every year irrespective of famine occurrences. Reduction in the number and quantity of meals is practised every year. Migration to find labour, sale of essential animals and household assets are indicators of famine.

CHAPTER FOUR

4 MIGRATION

4.1 OUT- MIGRATION

People in rural areas resort to migration due to different reasons most likely economic one such as food shortages, lack of job, pressure on land and income differentials. The analysis of migration in the paper concentrates on the above factors which determine the migration characteristics of households in North Wollo.

The designs of questions on migration are very important factors than any other technique to tackle the problem in this aspect. The questionnaire treated migration in different ways:

At the beginning of the questionnaire residential status of individual household members was identified.

Migration in search of work was also treated in the other part of the questionnaire.

Migration as a coping strategy during times of food crises was included.

The last part of the questionnaire on migration was incorporated in famine recollections of respondents.

Therefore, the major questions on migration were carefully designed considering various variables related to it

. The two major forms of the questionnaire were focusing on in-migration and out-migration. From the total sample population of households 14 percent of the respondents replied that one or more individuals from the household have permanently out-migrated during the last six years before the survey. But as the report from interviewers and indirect cross-check on the seasonal and permanent out-migration reveals, that figure could be higher. The proportion of out-migrants from the total sample population constitutes about 5 percent (about 261 individuals permanently out-migrated).

The discussion about migration should start from the hypothesis that the direction of migration is from areas of high altitudes to areas of low altitudes (down-slope migration).

The table below shows the relationship between the out-migration and agro-ecological zone

TABLE 4.1 DISTRIBUTION OF OUT-MIGRANTS BY AGRO-ECOLOGICAL ZONE

Agro-ecological zone	No of out-migrants	percent
Dega	89	34
Woina Dega	104	40
Kolla	68	26
Total	261	100

Source: Pilot Survey Data, 1997.

Low land areas such as Kobo (Raya) and Gubalafto (Yeju) are comparatively resource rich areas. The direction of seasonal and permanent out-migration is from highland resource poor areas to lowlands. In case of seasonal out-migration, single male adults commonly migrate in search of wage labour. When it is compared on Wereda basis, Gidan sends the highest number of out-migrants and Kobo sends the least number of out-migrants. This confirms that the direction of out-migration is from high altitude to low altitude. Gidan is typically Dega area while Kobo is predominantly Kolla.

The distribution of out-migrants on the basis of age and sex can be seen from the table below. From the data it has been observed that out-migration is age specific. Age groups 15-19 and 20-24 have the highest number of out-migrants. In general terms, male out-migration is higher than female out-migration, particularly age group 20-29. This fact is ascertained by sex ratio of out-migrants. The following table presents distribution of out-migrants by age group and sex.

TABLE 4.2 DISTRIBUTION OF OUT-MIGRANTS BY AGE GROUP AND SEX

Age Group	Out-migrants		
	Male	Female	SR
10-14	30	29	103
15-19	42	43	98
20-24	48	16	300
25-29	24	12	200
30+	6	11	55
Total	150	111	135

Source: Pilot Survey Data, 1997.

Number of out-migrants as stated above is underreported for different reasons. Female out-migration is typical characteristic of the area. Young females are migrating to urban areas and

even to Arab countries crossing the national boundary. Such type of migration is not reported by respondents

. However, the data were not very reliable, particularly on the out-migration part, in the study area, it was observed that there was high internal movement of people, that is, from rural to urban and from rural to rural areas. The data collectors and the investigator realised that in just 2 highland farmer associations, 32 household heads were not available for interview. Since the individuals were among the randomly selected household heads, peasant association leaders and key informants were asked to tell the reasons for the absence of the household heads at the time of the survey. Information obtained from the leaders and key informants indicated that most of the people in question migrated to Raya and Yeju, eastern lowland plains of Wollo in search of work. Their absence was also reported to be for longer period of time (at least 2 months before the survey and probably they could stay for about 5 or 6 months after the survey). The pilot survey team also realised that quite a large number of rural people, particularly adult males, were hovering near and around Woldya, Kobo, Mersa and other small towns. Informants from the urban areas complained that exodus of rural people toward urban areas was getting to be an abnormal situation.

Key informants (elderly people) said that for household heads to report that his or her household member out-migrated is a sort of contemptuous and social stigma especially when it is related to economic problems, i.e., food shortage. It was also disclosed that out-migration of young girls to urban areas for the search of jobs (most likely prostitution) is socially unacceptable in the area. And data on this type of out-migration is systematically under reported

.Another important factor that underestimates data on out-migration was found to be fear of cut in land size as a result of reduction in family size due to out-migration. This type of attitude developed after land distribution was based on the number of individuals or family size of a household

.Among the major reasons for mis reporting are religious and social factors. Orthodox Christianity is dominant in the zone. Females from Christian families are not expected to migrate to Arab countries. If it happens, it is not reported. Key informants told that it is becoming more and more common to migrate to urban areas and Arab countries irrespective of

religion. Female from Christian families change their Christian names to Muslim names in order to be accepted by receiving countries. But, such type of migration is hardly reported for the above mentioned reasons.

Migration can be further analysed by comparing the socio-economic characteristics of households. The economic effect of out-migration is estimated using some basic indicators such as total annual cash income, total annual crop production, livestock and land holding of households. From the survey data, households with one or more members who have out-migrated are more advantageous than households who did not send out any household member in the last six years before the survey

. Among the distinct objectives of out-migration are (1) supplementing of household resources through remittances (typically earned as wage); (2) the release of the migrant's share of joint household resources for the benefits of those who stay behind; and (3) the abandonment of other family members (Dreze and Sen, 1989). This is confirmed by the results in the survey data. Households with one or more out-migrants are in a better position in annual cash income. The reason for this can be the income that come through remittance from those household members who out-migrated and are living in distant places. Size of land owned by households with out-migrants is a little bigger than those with no migrants. This is because the land share of the out-migrant is left for the remaining household members. But, when compared in terms of total crop production, households with one or more out migrants produce less than those with no out-migrants. This is in contradiction with the size of land they owned. In general, the higher the land size, the more the production of crops from that land. But this does not hold true in the analysis of land size and out-migration.

TABLE 4.3 COMPARISON OF HOUSEHOLDS WITH MIGRANTS AND NO MIGRANTS BASED ON WEALTH

Type of wealth	Households with one or more out-migrants	Households with no out-migrants
Land size in ha. (average)	0.78	0.73
Livestock holding (number)	0.79	0.84
Shoats holding (number)	0.75	0.60
Total crop production 1996(Qt.)	0.86	0.94
Mean annual cash income (Birr)	634	477

Source: Pilot Survey Data, 1997.

4.1.1 LABOUR MIGRATION

Migration to find work as a coping mechanism is one of the ways in which the level of internal movements was considered. Labour migration can be associated with “hard times” or famine years. In this case the frequency of migration can be used as an indicator of famine (chronic food insecurity). Care should be taken that there are households who do not migrate even if they face food crisis or lean seasons. There are also households who move from one area to another to find labour in spite of non-food shortage times in their locality. That is, the absence of migration is not proof of non-existence of famine. Equally, if everybody migrates for different reasons on a regular basis, we cannot talk much about the frequency of migration.

Respondents were asked a question: “In the lean season, how often do members of the household migrate to find work?”. The responses systematically vary with agro-ecological zones. Respondents in Dega and Woina Dega areas(43 and 28 percent respectively) gave affirmative answers that they migrate to find labour even during normal times. The responses rate in zones is also high to the question related to migration as a demographic response to famine years. About 10 and 13 percent of Dega and Woina Dega dwellers replied that they faced whole family migration during major famine years they encountered.

Out-migration as a response to famine has a stronger effect in Kolla than any other form of migration of Kolla dwellers. About 13 percent of respondents from the total sample population replied that they faced whole or partial family migration during major famine years they

recollect.

TABLE 4.4 MIGRATION AS AN INDICATOR OF FAMINE

Type of response	Distribution	
	No of respondents	Percent
no answer	46	3.8
never	291	24.3
some years	158	13.2
every year	58	4.8
only famine years	647	53.9
Total	1200	100

Source: Pilot Survey Data, 1997.

The results from the above table suggest that a major increase in the frequency of migration to find labour may be indicator of famine. But may not be relied on since the existence of migration is no a sure indicator of the existence of famine.

Another method of information gathering on migration of households in relation to food security (famine) is inquiry about famine recollections. The most important demographic indicators were included in the questionnaire including whole family migration. The results on migration are summarised in the following table.

TABLE 4.5 MIGRATION AS A COPING STRATEGY DURING FAMINE YEARS

	Entire \partial family migration	
Delanta	61	41
Meket	47	31
Bugna	62	30
Gubalafto	38	25
Gidan	32	21
Wadla	32	21
Habru	24	16
Kobo	9	6
Total	305	25

Source: Pilot Survey Data

From the above table it can safely be concluded that migration is a single major method of food shortage problem alleviation during famine years. Table 4.5 above does not indicate the relationship between out-migration and agricultural zones during famine years. However, it has been found that out-migration during famine is the highest in Kolla areas than Dega and

Woina Dega areas. About 36 percent of respondents who experienced partial or entire family out-migration during famine years which they remember were from Kolla areas. Respondents from Dega and Woina Dega areas were about 27 and 18 percent respectively. Therefore, out-migration is the common coping mechanisms of households in Kolla areas during famine years. But during normal times, the magnitude of out-migration is reversed. Households from Dega and Woina Dega areas experience frequent out-migration.

4.1.2 Reasons for Out-Migration

The major reasons for internal movements of household members were included in the questionnaire. Causes included are intention to live with ones family; search of work; marriage, schooling; drought \ famine; lose of previous job; shortage of land; and other reasons specified by respondents. From the data it was observed that the two most important reasons for internal movement were found to be schooling and search of work (mostly for males). Such movements are considered to be permanent. Marriage (mostly female) and family related movements were also found to be important reasons for internal movements in the zone.

On the other hand, migration question in the questionnaire was entertained as a form of famine recollection of respondents. Entire or partial family migration was found to be the highest in famine year. This is in agreement with the theory that migration is the immediate demographic response to stress (Markos, 1997).

As to the direction of migration, rural-rural and rural-urban migrations are the dominant ones. No evidence was found for urban- rural migration. Migration status of an individual is determined by asking place of origin (place of birth) and duration of continuous residence at the time of enumeration. Data on out-migration represents individuals who out-migrated since the last six years before the survey. Results of famine years as remembered by respondents also supplement data on out-migration in relation to household food insecurity.

4.2 IN-MIGRATION

Questions on in-migration refer to the time period of six years before the survey. The questions address place of birth and place of current residence. Responses were given by the household head and the second member of the household, that is, the wife or the husband of the household head.

The question in the analysis of in-migration is that “are long-term in-migrant households likely to be more vulnerable than permanent residents?” This question is raised with the assumption or hypothesis that even long-term migrant households are likely to be more vulnerable than local permanent residents because of the following factors: lack of local knowledge of farming system and other social norms and economic ties ,possible exclusion from general community information, possible unfair distribution of land and other common resources, possible discriminating practices as a result of origin or birth place.

In-migration can be used as a smoothing mechanism of resources. Distribution of wealth and income among Wredas can be affected by internal movements. People move from resource poor areas (where push factors are stronger) to resource rich areas (where pull factors are relatively attractive). Sending areas to the zone include South Wollo, Tigray, North and South Gondar, and Wag Hmra. In-migration in the zone is dominated by internal movement within the zone itself. The data presented below shows the in-migration pattern in the zone.

TABLE 4.6 PLACE OF BIRTH AND CURRENT RESIDENCE, ADULT RESPONDENTS

Place of Birth	Woreda of current residence								
	Bugna	Delant	Gida	G.lafto	Habr	Kobo	Meket	Wadl	Tota
Bugna	410	0	1	0	1	2	5	0	419
Delanta	0	300	0	10	1	0	0	1	312
Gidan	0	0	299	2	0	0	0	1	302
Gubalafto	10	0	0	285	5	0	0	0	300
Habru	0	0	0	0	268	2	0	0	270
Kobo	0	0	0	1	25	296	0	0	322
Meket	0	0	0	1	0	0	295	0	296
Wadla	0	0	0	1	0	0	0	178	179
C. Tigray	0	2	0	0	0	3	0	0	5
N. Gondar	0	0	0	2	0	2	0	0	4
S. Gondar	2	0	0	0	1	0	1	0	4
South Wollo	0	0	0	0	5	2	1	0	8
Wag Hmra	9	0	0	0	0	0	0	0	9
A. Ababa	0	0	1	1	0	0	0	0	2

Source: Pilot Study Data, 1997.

As to the reasons for in-migration of individuals to the zone, the single important reason is marriage. Other factors such as to live with ones family, search for work, schooling, loss of job, drought /famine and lack of land are not important factors to move in to the area.

Data on in-migration is affected by the will of respondents for they do not want to be treated as 'metie' meaning the one who is not indigenous resident of the area.

In most of the cases, the second member of a household is the wife of the household head. Data on reasons to in-migration shows that female in-migrants as a result of marriage are higher than male in-migrants due to this reason.

The total number of in migrants to the zone is 168 persons or about 13 percent of the total sample population. Out of these in-migrants, 143 are males and 25 are females. Since the zone is one of the most drought prone areas in the country, it is evident that centres of attraction to the zone are very minimal. Generally speaking, there is no positive relationship between economic reasons and in-migration patterns in the zone. Therefore in-migration can not be a good predictor variable for the food security situation in the zone.

However, the result could suggest a different picture if data on in-migration entertained internal movements too. Within Wereda movements were not considered in the questionnaire. Table 4. 8 above represents only individuals who moved in to the zone from different zones outside North Wollo.

TABLE 4 .7 IN-MIGRATION TO THE ZONE

Residence status	Sex of HH head		
	male	female	Sex Ratio
Local residents	858	174	493
In-migrants	143	25	572
Total	1001	199	503

Source: Pilot Survey Data, 1997.

Some variables can be used to compare in-migrants and non-migrants. As it has been used in the out-migration section, mean annual cash income is the most important distinguishing factor. Mean annual cash income for non-migrants is about 515 while it is 431 for in-migrants. There is no variation in the land holding size between the two groups. Mean annual total production in quintals is nearly equal with a slightly higher in case of in-migrants. No

differences have been observed in livestock and shoats holdings. Average family size is essentially the same for both groups.

CHAPTER FIVE

5. FERTILITY, MORTALITY AND NUPTIALITY

Demographic responses to food insecurity have been observed by means of data from famine years recollections of respondents. These demographic responses include fertility, mortality and nuptiality. These three events are universally practised by communities in different forms. The rate of marriages and the level of mortality could show variation on the basis of food availability and food shortage. At the time of food crisis, marriage ceremonies and wedding activities are reduced or postponed at least up to the next normal time or harvest. Divorce and separation are higher during famine times as result of adult male migration for search of food to the remaining family. Mortality is higher during famine years than normal times.

5.1 FERTILITY

Fertility experience of eligible women in the sample population is estimated using data on children ever born. All women whose age is between 15 and 49 in the sample households were asked fertility related questions. The questions asked on children ever born were Brass type questions. The questions asked include whether the respondent have given birth, the number of children born to the respondent, number of male children, female children, male and female children living with the household, male and female children living elsewhere. After asking the above questions, total number of children born to the respondent is calculated by the interviewer and if there is a discrepancy between the total reported number of children and the number of surviving ones, the number of dead children was to be confirmed by probing the respondent. Results of the survey on CEB are presented in the following table.

TABLE 5.1 CHILDREN EVER BORN CLASSIFIED BY 5-YEAR AGE GROUP OF MOTHER

Age Group	NUMBER OF CHILDREN EVER BORN											Total	Mean
	0	1	2	3	4	5	6	7	8	9	10+		
15-49	66.7	20.0	13.3	-	-	-	-	-	-	-	-	75	0.47
20-24	19.1	22.2	35.7	16.7	6.3	-	-	-	-	-	-	126	1.69
25-29	11.2	15.6	26.8	24.1	12.9	9.4	-	-	-	-	-	224	2.40
30-34	8.1	5.9	10.8	16.1	14.5	21.5	10.8	12.4	-	-	-	186	3.93
35-39	5.3	3.6	8.9	10.7	16.0	16.6	16.0	7.1	7.7	4.1	4.1	169	4.63
40-44	4.4	4.4	9.7	6.2	17.7	15.0	11.5	16.8	7.1	3.5	3.5	113	5.21
45-49	2.1	7.4	3.2	17.0	11.7	11.7	14.9	17.0	2.1	9.6	3.2	94	5.38
TOT	13.2	10.8	16.6	14.8	12.4	11.9	7.5	7.1	2.3	2.0	1.4	987	3.44

Source: Pilot Survey Data, 1997.

Out of the total 987 eligible women, 13 per cent reported that they do not have children. The highest percentage of eligible women 17 percent reported that they born children. Very small percentage (1 percent have children 10 and above).

Parameters of fertility in the study area are presented in the following table

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TABLE 5.2 FERTILITY ESTIMATION BASED ON CEB.

Age at the survey	No. of women	CEB	Average Parity
15-19	75	35	0.468
20-24	126	213	1.690
25-29	224	538	2.402
30-34	186	730	3.925
35-39	163	755	4.632
40-44	114	594	5.211
45-49	99	533	5.384
Total	987	3398	3.44

Source: Pilot Survey Data, 1997.

Key informants reported that households are not interested in large number of children. They further explained that if a household increases the size of his family by one child, either the child could die or the parents should give one child to other households.

“There is no resource to grow more children. There is serious shortage of food to feed the already existing children. Therefore, there is no need to add one more child to the family” said a middle woman and her husband with three grown children when asked about their plan on the number of children they could have. Therefore, in conclusion it can be said that food insecurity has a reducing effect on fertility. North Wollo as indicated before is a chronically food insecure area. TFR in the area is lower than TFR in Amhara region as Whole (2.7 for urban and 4.5 for rural).

5.2 MORTALITY

Data on mortality were obtained in two approaches. The first approach was by interviewing respondents if there was any death in the household during last six years before the survey. The second method refers to the retrospective event of death during famine years. Severe famine year recalled by all respondents is 1985.

Responses to questions on mortality during the last six years are analysed on Zonal and Wereda levels. In North Wollo, out of the total sample households, about 23.4 per cent reported that there were one or more deaths. Based on agro-ecological zone, distribution of

reported deaths shows that the highest percentage is observed in Woina Dega (40.2 percent may be due to sample size) followed by Kolla (33.7 percent). Dega agro-ecological zone has the least percentage (26.1 percent). Data on mortality during the last six years before the survey is presented in table 5.3 below.

TABLE 5.3 REPORTS ON MORTALITY IN THE LAST SIX YEARS BEFORE THE SURVEY BY WEREDA

Wereda	HHS. with one or more members dead	Percent	Nò. of Deaths	Percent
Habru	59	5.0	75	19.6
Gidan	45	3.8	64	16.7
Bugna	42	3.5	54	14.1
Kobo	36	3.0	54	14.1
Meket	25	2.1	43	11.2
Gubalafto	30	2.5	35	9.1
Delanta	25	2.1	30	7.8
Wadla	19	1.6	28	7.3
Total	281	23.4	383	100

Source: Pilot Survey Data, 1997.

From table 5.3 it can be observed that out of the total sample population, 23.4 percent reported that they have had one or more deaths in the last six years before the survey. Percent of respondents who reported that there was one or more deaths in their household is the highest in Habru(5.0 percent). Gidan and Bugna have relatively also high percentage of mortality. Mortality experience of households was estimated by using retrospective questions. The results show that death of one or more family members was one of the major demographic events that took place during famine year.

Based on agro-ecological zone, in 1985(the major famine year), 31.6 percent of the respondents replied that they experienced one or more family member deaths. During the same year, proportion of respondents who faced one or more family member death in Woina Dega is about 46.9 percent. Where as in Dega the proportion falls to 21.5 percent.

As Kolla areas are not easily accessible, depleted resources due to drought are not easily substituted, existence of epidemic disease and hostile environment aggravated by drought contribute for high mortality, death reports in Kolla areas should be higher than Woina Dega and Dega.. However, the figure for Kolla and Woina Dega is not as expected as there are more deaths in Woina Dega than in Kolla. This might be attributed to the fact that the figure for Kolla is underreported because of lack of clear demarcation between Kolla and Woina Dega. Table 5.4 below shows respondents who reported that one or more deaths in 1985 as a result of famine.

TABLE 5.4 NUMBER OF HOUSEHOLDS REPORTED ONE OR MORE DEATHS DURING FAMINE YEAR (1985).

Woreda	HHs with one or more death	percent
Kobo	94	24.5
Habru	70	18.3
Bugna	51	13.3
Gubalafto	40	10.4
Gidan	39	10.2
Delanta	39	10.2
Wadla	32	8.4
Meket	18	4.7
Total	383	100

Source : Pilot Survey Data, 1997.

Results in tables 5.5 and 5.4 support that mortality is closely associated with food insecurity. The comparison is that the percentage of households who had experienced mortality in the last six years (table 5.3) is much lower than reports on mortality of a single famine year (table 5.4). In conclusion it can be said that mortality is one of the major demographic events which can show significant variations as a result of famine (acute and chronic food insecurity).

5.3 NUPTIALITY

5.2.1 MARRIAGE

Variables considered in the data collection on nuptiality include marital status, number of divorces in a household (if any), age at first marriage, reasons for choosing the time of the first marriage, reasons for divorces and arrangement during marriage. Data on nuptiality shows that marriage is universal in the study area. From the total sample population, 96.6 percent (1159) of the respondents (for males over age 25 and for female respondents over age 17) gave affirmative response to question whether they were ever married or not. Only 3.4 (41) respondents replied that they were single during the survey. As to the reasons for choosing a time for first marriage, it has been observed that about 78 percent of respondents married at the time they mentioned since it was their right age to marry.

The “right age” differs according to the perception of individual respondents. For households with a relatively better economic conditions, right age to marry may mean as early as 9 to 10 years for girls and 15 to 18 for sons. In any case, 78 percent of the respondents declared that they choose the time of their first marriage because it was their right age. About 16 percent of the respondents replied that they married at the time arranged by their families and they said that they were forced to marry.

Average age at first marriage for males was found to be 19 years while for females 11 years. The low mean age at first marriage for females might be due to the effect of small sample size since female respondents are not equivalent to male respondents (199 female household heads were interviewed).

5.2.2 DIVORCE

Data on divorce reveals that 55.7 percent or 668 individuals replied that they had practised at least one divorce before the survey. Reasons for divorce were listed as economic, age, ethnic differences, infertility and incompatibility. Among these factors economic problem as a reason for divorce takes the highest score, that is about 27 percent of the ever divorced respondents attested that they divorced due to economic problems. About 40 percent of the respondents said that they faced divorce due to incompatibility in their behaviour, 6.6 and 4.3 percent due to age differences and infertility respectively. Ethnic difference is found to be the weakest

reason (only 0.1 percent) for divorce.

According to data on major demographic events during famine years, the association between food insecurity and nuptiality is not strong enough to explain some systematic links. Combined proportion of marriage dissolution and postponement of marriage ceremonies as a result of chronic food shortage is not beyond 6 percent. Death of one or more family members and partial or entire family migration as a result of famine are the two most important demographic events related to famine times. Nuptiality as a major demographic consequence during food crisis is not clearly supported by data from the survey. Postponement of marriage ceremonies and dissolution of marriages as a result of economic problems emanated from food shortages are the two events focused by the survey. In both cases, only 5 percent of respondents stated that they faced either delay in marriage ceremonies or dissolution of marriages during the major famine year (1985).

CHAPTER SIX

6 MULTIVARIATE ANALYSIS

6.1 HOUSEHOLDS ACCESS TO RESOURCES

6.1.1 Land Resources

Land is the single most important source of livelihoods of the society in rural areas such as North Wollo. Paradoxically, land is getting more and more scarce. Household food security without available land for cultivation is inconceivable. Data on land resources of households indicated that about 9 percent of the sample population do not own land in 1996. Major reason for landlessness is shortage of land. Change in the size of land available to households in the last ten years was evaluated by the perception of respondents. Responses were categorised as land size increased, did not show change and land size decreased. About 66 percent of respondents said that land size has decreased during the last ten years as a result of distribution of land among their children (newly formed households) and local authority distribution before the survey. Just after the survey, there was a universal land redistribution scheme and it was expected the land size per household would be smaller than the size during the survey. Average size of land cultivated by households in 1996 is found to be 0.5 hectare (two timad) and the proportion of households under this category constitute about 52 percent. 35 percent of the respondents cultivated land between 0.5 and 1 hectare. Only 13 percent of households cultivated between 1 and 3 hectares of land.

The reliability of the above data was tested against the results from the survey carried out by SCF/UK in which the investigator had the chance to revisit the study area for the second time. Five to ten key informants per PA (five PA per Wereda) were interviewed about the size of the land available for each household. Responses show that in each PA, there is not any member who own more than 0.5 hectares of land through formal distribution. Since the size of the land is so small, land preparation is mostly done by hoe (by hand). Middle and rich farmers rented in some plot of land from the poor families either by giving them some money or by means of crop sharing. Some people give their labour for two days and get a pair of oxen for one day.

Others give their land for those who own oxen through the arrangement of crop sharing.

Given the small size of land holding and lack of access to draft animals and other small animals such as sheep and goats, poor households are nearly under chronic food insecurity throughout the year.

The quality as well as the quantity of land in the area is under a declining situation. This is confirmed by some of the opinions of key informants with whom the investigator discussed on the issue in both of the surveys. Most of the discussants agree on the complete reduction of land both in quality and quantity. One of them said that "Only land and farming are surviving while production died ten to fifteen years ago." Another key informant complained on the smallness of the size of the land by equating his plot of land with the forehead of an ox. For these interviewees, there are no "good" and "bad" years in terms of on farm crop production since all the harvesting times are characterised by poor harvest due to infertility of the soil and small size of land.

Landless households in rural community are mostly food insecure ones and are the most vulnerable for famine-related catastrophe. Their demographic characteristics are usually expressed by higher seasonal and permanent migration, higher mortality experience than moderate households in the same community, lower number of children ever born, more frequent dissolution of marriage and lower marriage rate.

6.1.2 Livestock Resources

Livestock resource is the second important source of survival for rural households in the study area. Any negative impact on this resources highly affects the food security situation of households. Cattle are insurance of households against times of crisis in the their food position. Cattle are both sources of food and energy for cultivation of land and fuel. The position of households in terms of ownership of livestock in the study area has been measured by means of some questions related to this resource.

Poor households do not have access to livestock as land resource. Information from both surveys indicate that poor households do not own cattle and most likely they possess two to three sheep or goats.

Moderate households own one ox and one cow and these households constitute not less than 60 percent of the population in the study area. When the food security situation is worse, the

supply of livestock in the market increases at an alarming rate. The price of an ox approaches to be equal to the price of 50 kilogram of grain. Respondents declared that the price of their livestock decreasing these days as a result of the drought symptoms in 1996 and 1997.

Shortage of pasture land is the major problem for households unable to keep larger number of animals. According to respondents opinion on the quality of livestock in 1996 and 1997, they rated as well below normal. The reasons given for deterioration both in quality and in quantity are similar in all the areas. Drought and lack of pasture land are the two most important reasons given.

6.2 HOUSEHOLDS DEMOGRAPHIC CHARACTERISTICS

6.2.1 MIGRATION

As stated earlier, data on migration is not simple to collect . The survey methodology tried to tackle the problem by cross-checking mechanisms. Almost all interviewers faced household heads unavailable for interview. But, non were able to provide information on the whereabouts of individuals. This shows that people are not interested to tell about the migration of a household member.

As to the key informants and the knowledge of the investigator about the study area, both seasonal and permanent out-migration are common features of the community. Adult male migration in search of work both to urban and to resource rich rural areas is common. During the survey with SCF/UK, almost all of the respondents said that migration to Raya and Yeju lowlands is the major source of their livelihoods. Some people permanently move to these areas when it is favourable for them to do so. Older people said that in early times some low land areas were uninhabited due to fear of malaria and lack of transportation disfavoured lowland economic activities. But these days, they are occupied by migrants from highland areas.

Out-migration seems sex specific in the study area. Characteristically, female migrants are different from male migrants. When respondents volunteer to tell about an out-migrant, they give economic reasons for his out-migration if the individual is adult male migrant. If the migrant is a young female, they give reason as to see her relatives in urban areas. Most of female migrants especially in the age groups 15-19, 20-24 and migrate to urban areas for

search of work. Those who are successful in securing a job and consequently better income, send money to their families as a form of remittance. Information is widely disseminated throughout the localities about the good side of urban life and the one who send money to her family is cited as a good example. This type of attitude induces more female out-migration to urban areas. Most of the female migrants are employed as house maids and bar tenders.

Adult male migrants sometimes permanently settle in the receiving areas by forming new households. This is true when there are more female headed households in the receiving communities as a result of widowhood or separation. Such migrants are characterised by two distinct families and they constantly move between the two places. Such people are usually men with occupation. Seasonal out-migration is one of the most important demographic characteristics of highlanders in North Wollo. The seasonal demand for labour in the low land areas induces seasonal migration from highland areas.

Chronic food insecurity in the area is favouring both seasonal and permanent out-migration. Those household heads who moved to Gojam and Gondar are not coming back to their home for the last one or two years before the survey. This information was given by different people interviewed as key informants. Some of the respondents replied that they are intending to leave their place of residence since their plot of land denied production as a result of insufficient rainfall and poor quality of the soil.

Therefore, out-migration is closely associated with the food security situation of households. When household heads (bread winners of the family) permanently out-migrated and when the worst comes, the whole family moves as a result of food crisis.

Findings of these survey indicated that permanent and seasonal out migration are closely linked with household access to productive assets such as land, livestock and cash income resources. The better the position of the household in terms of access to these resources the higher the probability of one or more permanent out-migrant from the household.

Results of statistical models applied to test the hypothesis and the above discussion on household food insecurity and demographic responses are given in the following section of the discussion. The models applied to the analysis are LOGISTIC REGRESSION AND MULTIPLE CLASSIFICATION ANALYSIS (MCA). Before the models are used in the analysis it is important to see the correlation of variable involved in the analysis. Bivariate

correlation analysis between the dependent and the independent variables is done and presented in the table below.

TABLE 6.1 RESULTS OF BIVARIATE CORRELATION ON OUT-MIGRATION AND FERTILITY

VARIABLES	CORR.	SIG. (2-TAILED)	SIG. LEVEL (2-TAILED.)
1. Out-migrants and cattle holding in 1996	0.064	0.026	0.005
2. Out-migrants and gender of household heads	-0.081	0.005	0.01
3. Out-migrants and total estimated cash income	0.062	0.031	0.005
4. Out-migrants and land ownership	-0.083	0.004	0.01
5. Out-migrants and pack animals holding	0.092	0.001	0.01
6. Out-migrants and shoats holding	0.131	0.000	0.01
CEB and cattle holding	0.198	0.000	0.01
CEB and total estimated income	0.206	0.000	0.01
CEB and land ownership	0.179	0.000	0.01
CEB and equines holding	0.194	0.000	0.01
CEB and shoats holding	0.180	0.000	0.01

Source: Pilot Survey Data, 1997.

THE LOGISTIC REGRESSION MODEL

1. DETERMINING THE PROBABILITY OF OUT-MIGRATION

In logistic regression analysis, the probability of an event occurring is determined using the formula

$$P(\text{event occurring}) = \frac{1}{1 + e^{-z}}$$

Where:

e is the base of natural logarithms, approximately 2.718

$$Z = \alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_p X_p$$

α is a constant.

$\beta_1, \beta_2, \dots, \beta_p$ are coefficients estimated from data, $X_1, X_2, \dots, X_p$ are the independent variables or co-variates

Testing the hypotheses

Hypothesis: Food insecure households experience higher out-migration than food secure ones.

The value of the independent variables that correspond to

$X_1, X_2, \dots, X_p$ is shown below

X_1 = Cattle holding of households in 1996

X_2 = Total estimated cash income

X_3 = Land ownership

X_4 = Equine holding

X_5 = Shoats holding of households in 1996

The estimated coefficients of the $\alpha, \beta_1, \beta_2, \dots, \beta_p$ values are obtained from the data.

TABLE 6.2 PARAMETER ESTIMATES FOR THE LOGISTIC REGRESSION MODEL

VARIABLE	B	S.E.	WALD	df	Sig.	R	Exp(B)
CATTLE HOLDING	0.4353	0.1670	6.7977	1	0.009	0.0706	1.5454
LAND OWNERSHIP	1.7175	1.0195	2.8378	1	0.0921	0.0295	5.5705
SHOATS HOLDING	0.2959	0.1363	4.7113	1	0.300	0.0530	1.3444
Constant	-3.0536	1.0419	8.5895	1.	0.0034		

Given the coefficients, the logistic regression for the probability of one or more out-migrants from a household is given by

Prob(out-migration) =

$$\frac{1}{1 + e^{-Z}}$$

where

$$Z = -3.0536 + 0.4353(X_1) + 1.7175(X_2) + 0.2959(X_3)$$

$Z = -3.0536 + 0.4353(\text{CATTLE HOLDING}) + 1.7175(\text{LAND HOLDING}) + 0.2959(\text{SHOATS HOLDING})$

Applying this to a household with average cattle holding, average land holding and mean number of shoats, the result is as follows:

$$Z = -3.0536 + (0.4353)(2) + (1.7175)(0.5) + (0.2959)(5) = 0.15525$$

Substituting the value of Z in the above equation,

$$\text{Prob(out-migration)} = \frac{1}{1 + e^{-0.15525}} = 0.54$$

Based on the above estimate, it is more likely that one or more household members will out-migrate. The calculation shows if the values of the predictor variables is decreased from average, the probability of out migration decreases. This might be attributed to the fact that during normal times households with less access to productive resources (food insecure households) are not able to afford the cost of out-migration.

The log odds of the above result can be computed as,

$$\begin{aligned} \text{log odds} &= \frac{\log(\text{Prob (event occurring)})}{\text{Prob (no event occurring)}} \\ \frac{\log(0.54)}{1-0.54} &= 0.16 \end{aligned}$$

To see the effect of the individual predictor variables, such as the number of cattle, on out-migration,

log odds can be computed after changing the value of cattle by one.

Probability of out-migration for households with 3 cattle and other predictor variables remain constant is calculated to be 0.37 and the log odds therefore is 0.58

The result shows that by increasing the number of cattle by one unit, the odds ratio is changed by about 0.42.

In conclusion it can be said that the number of out-migrants during normal times depends on the economic status of the household. This means that food insecure households are not characterised by permanent out-migration during normal times.

6.2.2 MEAN NUMBER OF CHILDREN BORN TO HOUSEHOLDS

Since data on the number of children ever born to the household have been collected, it is possible to see the relationship between households' access to resources and the mean number of children born to the household.

TABLE 6.3 RELATIONSHIP BETWEEN MEAN NUMBER OF CHILDREN BORN TO THE HOUSEHOLD AND HOUSEHOLDS' ACCESS TO RESOURCES (MCA)

VARIABLES	NO OF CASES	MEAN NUMBER OF CHILDREN BORN	
		Unadjusted	Adjusted
Land Size ($\eta^2=0.03$; $\beta^2=0.01$)			
Landless HHs.	103	3.36	3.60
0.25-1.00 ha.	907	3.95	4.00
1.25-2.00 ha.	176	5.13	4.83
Total Number of cases	1010		
Grand Mean	4.10		
Cash Income ($\eta^2=0.03$; $\beta^2=0.02$)			
1-1000 Birr	1040	3.92	3.98
1001-2000 Birr	128	4.87	4.56
2001-3000	20	6.95	6.24
Total Number of cases	1188		
Grand Mean	4.10		
Cattle holding ($\eta^2=0.04$; $\beta^2=0.02$)			
No cattle	309	3.5	3.6
1-5	780	4.09	4.09
6-10	93	5.54	5.17
Total number of cases	1182		
Grand Mean	4.10		
Shoats holding ($\eta^2=0.04$; $\beta^2=0.02$)			
No shoats	601	3.75	3.85
1-10	477	4.16	4.11
11-20	91	5.11	4.83
Total number of cases	1169		
Grand mean	4.10		

Source: Pilot Survey Data, 1997.

From results of MCA in the above table, it can be concluded that the mean number of children born to a household is strongly associated with the household access to resources. The better the access to resources such as land and livestock resources, the higher the number of children born to a household.

CHAPTER SEVEN

7 CONCLUSION AND POLICY IMPLICATIONS

1. CONCLUSION

- 1) The most important parts of demographic dynamics related to household food insecurity in areas of North Wollo are migration and mortality. Household food insecurity triggers these events either as before event or after event. Seasonal \ temporary out-migration is the practice of food insecure households to supplement their food shortfall. No matter how data is jeopardised by respondents reporting about out-migration, key informants confirmed that seasonal out-migration is the common feature of the community in the study area.
- 2) Sex and age specific out-migration is an important part of demographic characteristics of the community. Younger females and relatively older males are the usual out-migrants. Out-migrants come from families which are better-off in their economic position.
- 3) In-migration to the study area is not a common experience. Internal movement within the zone is higher than incomers from outside the zone. The main reasons for internal movements are: marriage, schooling and search for work. This shows that “push factors” from the zone are stronger than “pull factors” to the zone, that is, there are no major centres of attraction to the zone.
- 4) Mortality differential is higher among households even during ‘normal’ years. Households with limited access to productive resources such as land and livestock are characterised by higher mortality than households with moderate access to resources.
- 5) Nuptiality is not closely associated with household food insecurity. Marriage is universal in the zone. There is no clear indication of the data that marriage activities are affected food security position of households. But, it was reported that the timing of marriage ceremonies are highly dependent on the harvest performance of households during the year at which marriage is going to take place. So, food insecurity has a postponement effect on the marriage ceremonies.
- 6) Divorce is high. Divorce timing are not strongly associated with food insecurity. About 56

percent of the adult respondents had at least one divorce before the survey. As to the reasons given to divorce, economic reasons are not the leading factors for divorce and nor is food insecurity but it cannot be ignored as factor affecting nuptiality.

- 7) Household size and number of children born to the household are closely linked with the level of access to resources. Generally, the better the access to resources, the higher the number of individuals in a household and the better-off the household in its economic position as there are more hands to work instead of more mouths to feed. However, there are also households with large family size and with less entitlement of resources.
- 8) Gender of household head is an other important factor that determines the access to productive resources. It has been observed that female-headed households have less assets than male-headed households. The demographic characteristics of female-headed households is different than their counterparts in that they have small family size, small number of children and less out-migration experience.
- 9) All households in the area are not equally affected by food insecurity. Landless, female-headed, old-aged and disabled people are highly vulnerable to food insecurity.

II. POLICY IMPLICATIONS

A) BEFORE EVENT MEASURES

- i) The decline in entitlement of productive resources leads to either out-migration or increase in the number of deaths or both at a time. **Access to land is the crucial element of food security in rural societies.** However, entitlement to land alone does not guarantee food security of households. Size, quality and quantity of land available for cultivation are very important factors to be considered. Therefore, land policy should incorporate the threshold of land size below which own crop production could not be sufficient to feed them without food deficit throughout the year for the family. Quality of land should be maintained through traditional and scientific ways. Fallow method, manure application and application of natural fertilisers of soil should be encouraged rather pure dependence on imported chemical fertilisers at least for economic sustainability reasons. Further land redistribution can not lead to food security of households. It would rather aggravates land degradation thereby reducing labour and

land productivity. Therefore, seek alternative solutions for newly formed households instead of giving them small plot of land.

- ii) **Access to livestock resources** is the second largest source of livelihoods at least in the study area. Cattle are sources of food, energy and cash income. Pastoral activities are practically impossible with existing level of grazing fields which are almost non-existent in the zone. Land policy should address the problem and importance of the sector. Scientific researches and traditional mechanisms should find solution to increase the quality and quantity of pasture lands.
- iii) Food security is a function of ownership of productive resources. Lack of access to these resources induces some demographic changes in the affected population. Over utilisation of land and other productive assets brings about depletion and quality deterioration. Productivity drastically falls below the minimum acceptable level. The root causes of over-utilisation and unbalanced consumption should be analysed in terms of population-environment and resources nexus. Among the basic indicators of household food insecurity, **changes in the demographic characteristics of households** are crucial. Seasonal and permanent out-migration accompanied by general failure in rainfall and hence in crop production, sheds light on the food crisis of households. Therefore the movement of people towards food should be thoroughly monitored so that food could move to people instead. Food security-related policies should emphasise the importance of longitudinal studies on migration starting from community bases. In general migration should be one of the components of food security policies.
- (v) Integrated economic development plans on sustainable basis are the forefront solutions to the food insecurity and related demographic problems for the nation in general and for the study area in particular. Land tenure and other agricultural policies need revision updating according to the demographic changes in the population.
- (vi) Early warning activities at the grass root level supported by scientific research should the crucial components of food insecurity problems alleviation.

B) AFTER EVENT MEASURES

- 1) Unusual movement of people (out-migration) is a response to chronic food insecurity (famine). Such movements should be closely monitored at a grass root level. The movement of people towards food should be reversed to food towards people since this strategy reduces family disintegration and famine induced mortality.
- 2) Increased mortality is an indicator of abnormal situation. Although mortality is an after event demographic phenomena, it needs close monitoring, research and evaluation at the community level for intervention purpose.
- 3) Vulnerable groups are the first victims of food insecurity. Identifying such segments of the community reduces bad consequences of food insecurity.

III. RECOMMENDATIONS

The following measures are crucial for ensuring household food security at least in the study area:

- ◆ Maintain households' access to productive resources such as land (with better land reform) and livestock resources.
- ◆ Develop an integrated agricultural system that minimises pure dependence on subsistence rain fed agriculture.
- ◆ Establish and strengthen ways and means of income diversification through employment generating schemes of rural households so that their position against shocks could be strengthened.
- ◆ Ensure access of communities to local and adjacent markets so that they can easily fill the gap between food production and their demand for food.
- ◆ Reduce aid dependency and motivate and direct people to wards self sufficiency at least in food requirements
- ◆ Consider the incentives for population redistribution or migration by providing information for the purpose of tackling food insecurity problems.

EARLY WARNING SYSTEM

- ◇ Develop and strengthen early warning systems so that effective intervention programmes can be implemented without delay due to information gap.
- ◇ Separate easily vulnerable members of the community to food insecurity and make sure that any aid programme properly addresses these target population.
- ◇ Train people in food insecure areas on how to evaluate and report about changes in rain fall during major planting seasons.

RESEARCH ACTIVITIES

- * Establish community-based institutions that conduct longitudinal surveys related to population and resources relations, including multi-level migration research activities
- * Study the resiliency of the community during food crisis and intervene before failure in their coping mechanisms.
- * Organise and co-ordinate community-based research activities on vulnerability to drought and food insecurity to be carried out by research institutions and to be used for policy formulation related to food insecurity.
- * Encourage primary data collection related to demographic characteristics of rural households during both normal and stress times.

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DECLARATION

I, the undersigned, declare that this thesis is my work and that all sources of the materials used for this thesis have been duly acknowledged.

Name Ambachew Legesse

Signature

A handwritten signature in black ink, appearing to read 'Ambachew Legesse', is written over a horizontal line.

Place: Addis Ababa University

Date: June 19, 1998