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DETERMINANTS AND COPING STRATEGIES OF HOUSEHOLD FOOD INSECURITY: THE CASE OF RURAL SETTING IN LEMO *WOREDA*, HADIYA ZONE

BY
ADINEW LONSEKO CHINKISO

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BY: ADINEW LONSEKO CHINKISO

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DECLARATION

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

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October 2007

Addis Ababa University

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

Woldeamlak Bewket (Ph.D)

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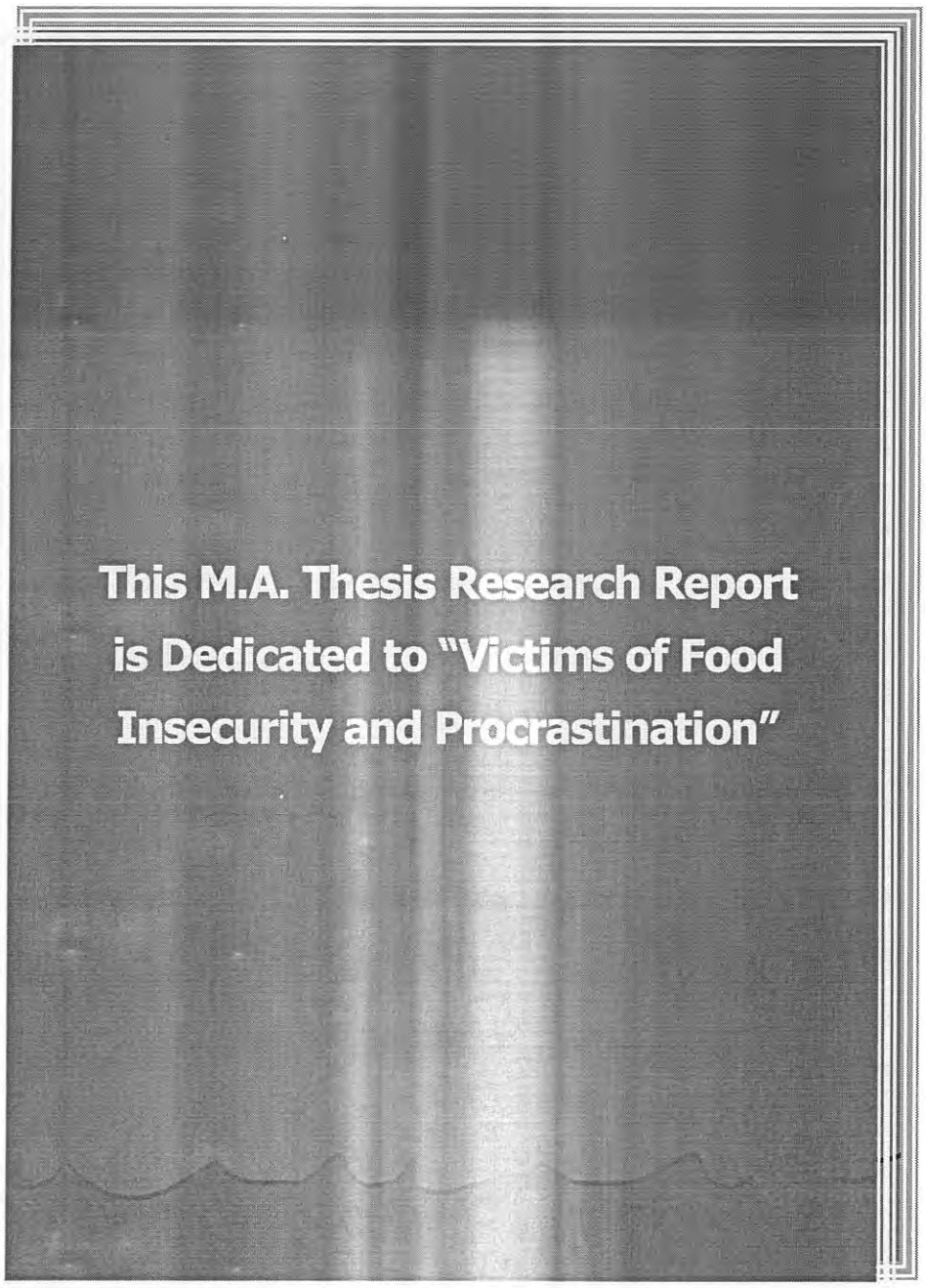
This M.A. Thesis Research Report
is Dedicated to "Victims of Food
Insecurity and Procrastination"

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TABLE OF CONTENTS

LIST OF TABLES

List of Figures

PAGE

List of Appendices

Abbreviations and Acronyms

AAU:	Addis Ababa University
ACP:	Africa-Caribbean-Pacific
ADLI:	Agricultural Development Led Industry
AHFSI:	Aggregate Household Food Security Index
AIDS:	Acquired Immune Deficiency Syndrome
Amt:	Amount
ARI:	Agricultural Research Institute
asl	above sea level
BoFED:	Bureau of Finance and Economic Development
CAD:	Crude Agricultural Density
CSA:	Central Statistical Authority (Agency)
DA:	Development Agent
DES:	Dietary Energy Supply
DoARD:	Department of Agriculture and Rural Development
DoFED:	Department of Finance and Economic Development
DoFSDPP:	Desk of Food Security and Disaster Prevention and Preparedness
DPPC:	Disaster Prevention and Preparedness Commission
E.C:	Ethiopian Calendar
EU:	European Union
EUFIC:	European Food Information Council
F:	Female
FAO:	Food and Agriculture Organization (of the United Nations)
FAQS:	Frequently Asked Questions
FBS:	Food Balance Sheet

FDRE:	Federal Democratic Republic of Ethiopia
FGDs:	Focus Group Discussions
FH:	Female-headed
FIVIMS:	Food Insecurity and Vulnerability Information Mapping Systems
FSS:	Forum for Social Studies
FTC:	Farmers Training Center
GIS:	Geographic Information Systems
GSR:	Graduate Studies and Research
HEA:	Health Extension Agent
HFS:	Household Food Security
HSS:	Household Sample Survey
HZDoARD:	Hadiya Zone Department of Agriculture and Rural Development
HZDoFED:	Hadiya Zone Department of Finance and Economic Development
HZDoTIUD:	Hadiya Zone Department of Trade, Industry, and Urban Development
IDS:	Institute of Development Studies
IFAD:	International Fund for Agricultural Development
IFPRI:	International Food Policy Research Institute
Kcal:	Kilocalories
KIIs:	Key Informants Interviews
LWOoARD:	Lemo *Woreda* Office of Agriculture and Rural Development
M:	Male
MFI:	Micro Finance Institution
MH:	Male-headed
MoA:	Ministry of Agriculture
MoARD:	Ministry of Agriculture and Rural Development

MoFED:	Ministry of Finance and Economic Development
NA:	Non-Applicable
NGO:	Non-Governmental Organization
OoARD:	Office of Agriculture and Rural Development
OoCA:	Office of the Chief Administrator
OoTA:	Office of the Tax Administration
PA:	Peasant Association
PET:	Potential Evapo-Transpiration
PST:	Population and Statistics Team
Qt:	Quintal
Qty:	Quantity
RLDS:	Regional and Local Development Studies
SERA:	Strengthening Emergency Response Abilities
SNNPR(G):	Southern Nations, Nationalities, and Peoples' Regional (Government)
SPSS:	Statistical Package for Social Scientists
SS:	Systematic Sampling
SRS:	Simple Random Sampling
SSA:	Sub-Saharan Africa
UDHR:	The Universal Declaration of Human Rights
UN:	United Nations
USAID:	United States Agency for International Development
WFS:	World Food Submit

ABSTRACT

Food insecurity is one of the top-standing scourges that all countries of the world have been suffering. However, its scale varies in time and place. This study therefore, attempts to identify level and key determinants of as well as coping mechanisms adopted at local level (by the householders of Lemo Woreda) against it.

Household sample survey, which was further triangulated by key informant interviews and focus group discussions as well as reinforced by researcher's direct observation, was the principal means of generating data from primary sources. Secondary data sources were published and unpublished as well as hard and soft copies of different organizations. Data from all sources were analyzed using both qualitative and quantitative methods.

Overall, the study finds out that the sample households in particular and the study woreda at large were in a low level of food security. Moreover, out of eighteen independent variables that were regressed on per capita food availability for consumption (a dependent variable), the statistically significant ones (the major determinants of household food insecurity) in the study area were eight. Total crops production was found the strongest positively influencing determinant while household size was the strongest negatively influencing one, with the stamina of the latter excelling the former. The sample households were practicing various measures to cope up against the occurrence of food insecurity.

Finally, the study recommends short-, medium-, and long-term solutions like improvement of the agricultural productivity, access to farm credit as well as off-farm and non-farm employment, participatory resettlement programs, natural resource management, effective implementation of population policy, etc.

Key words: *rural; household; food insecurity; level; determinants; coping strategies*

CHAPTER ONE

INTRODUCTION

1.1. Background

Humankind has been struggling, through control mechanisms, against the effects of manmade and natural risks that may halt his/her existence on earth. Whenever possible, preventive measures have been envisioned against them. For food[1] is one and probably the first of the basic human needs, it might not be surprising if myriads of "commitments" have been made against food insecurity[2]. In November 1996[3], for

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[1] *Food* is any substance or product (whether processed, partially processed, or unprocessed) intended to be, or reasonably expected to be ingested by humans. Food also includes drink and any substance, including water, intentionally incorporated into the food during its manufacture, preparation, or treatment. Food shall not include feed, live animals unless they are prepared for placing on the market for human consumption, plants prior to harvesting, medicinal products, cosmetics, tobacco and tobacco products, narcotic or psychotropic substances, as well as residues and contaminants (EUFIC, 2002).

[2] *Food insecurity* is the lack of food security. *Food security* exists when all people, at all times, have physical, social and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO, 2006). *Food insecurity*, by contrast, exists when all or a portion of people are undernourished as a result of the physical unavailability of food, their lack of social or economic access to adequate food, and/or inadequate food utilization. An alternative view would define the concept of *food insecurity* as referring only to the consequence of inadequate consumption of nutritious food, considering the physiological utilization of food by the body as being within the domain of nutrition and health. Thus, the *food insecure* are those individuals whose food intake falls below their minimum calorie (energy) requirements, as well as those who exhibit physical symptoms caused by energy and nutrient deficiencies resulting from an inadequate or unbalanced diet or from the body's inability to use food effectively because of infection or disease (FIVIMS, 2006). *Household food (in)security* is the application of these concepts at household level, with individuals within the household as the focus of concern for the aggregation to household level.

[3] Unless specified, in this paper, this and all other figures indicating ***years*** are in Gregorian calendar.

e world turned its attention to Rome, where heads of states and of more than 180 nations attending the World Food Summit (WFS) radicate hunger, one of the worst scourges in all countries of the world. ne immediate target of halving by the year 2015 the number of ied people from the 1996 level, which was about 840 million. , they committed to make a race against hunger by reducing their nber by at least 20 million people per year (FAO,2003[a]).

er (in 2006), though some achievements have been observed with respect e figures (percentages), the world has confronted with the sad reality in nbers that virtually no progress has been made towards the "race against ner it remained stubbornly high (FAO, 2006). WFS target cannot be 2015, for the current average annual decrease of the undernourished has lion, which is far below the level required to achieve the target (FAO, chieve the target, the same source indicated that the progress should have rated at the reduction of 24 million undernourished per annum, which is mes of the current pace (2.5 million).

3, there were still 854 million undernourished people worldwide, of million (about 96%), 25 million, and 9 million were in the developing, nd industrialized countries respectively (FAO, 2006). Today, one in people do not get enough food to be healthy and lead an active life, ger and malnutrition the number one risk to health worldwide: greater

In Ethiopia, the number of undernourished people declined by 6 million (17 percent), from 38 to 32 million, between 1993–95 and 2001–03, with the prevalence falling from 61 to 46 percent (FAO, 2006). Though the progress in Ethiopia's struggle against food insecurity has been improving, this figure implies that if Ethiopia had accelerated the race against hunger in line with the WFS target, she could have made the number of undernourished decline by at least 10 million[4] by 2001-03.

Elements of both chronic and transitory food insecurity are prevalent and severe in Ethiopia (FDRE, 1996; Tilaye, 2004). As stated in these sources, chronic food insecurity is mostly caused by high magnitude of persistent unemployment in urban areas and limitations of landholdings in rural settings, where more than one-third of the households hold less than half a hectare, which under rain-fed agriculture is inadequate for subsistence production. Lack of draft animals intensifies the vulnerability to food insecurity associated with excessively small landholdings. On the other hand, there is transitory food insecurity arising from drought, displacement of people, and refugee inflows. Moreover, in many areas of the country, there is an overlap (blurredness) of both types of food insecurity, chronic and transitory, which expands the size of the vulnerable population (FDRE, 1996; Devereux, 2000). For example, a subgroup of virtually assetless rural Ethiopians is emerging who cannot meet their food needs even under ideal weather conditions, but is suffering from hunger and malnutrition. Moreover, the members of the subgroup are acutely vulnerable to famine in years of low or erratic rainfall (Devereux, 2000).

Obviously, there are many degrees of food insecurity in Ethiopia, depending on the access to food by households. Considered at the broadest level of average calorie needs, the Government of Ethiopia adopted the minimal acceptable *weighted average* requirement per person per day at 2,100 kilocalories (FDRE, 1996). In connection to this source, in the 1980s, it was estimated that Ethiopia's domestic food production

[4] This is the inference made by the researcher from the facts aforementioned.

provided about 1,620 kilocalories, while the total food availability, including imports, was about 1,770 kilocalories per person per day. It grew to 1,845 kilocalories in 1990s (Sisay, 2003 cited in Tilaye, 2004). It stayed 1,860 kilocalories in 2003 (FAO, 2006). All these figures are lower than the world's minimum standard (2,100 kilocalories) accepted by the Government for survival and much less than the standard (2,400 kilocalories) for an adequate diet.

Food aid received in Ethiopia as a share of dietary energy supply (DES) was 7% in 2003 and did not show any decline from the 1993's (FAO, 2006). This clearly indicates that the absolute amount of food aid has grown with the parallel absolute increase of the food insecure. According to ACP-EU (2003), for the last fifteen years until 2003, Ethiopia on average had received per annum 600,000 to 800,000 metric tones food aid from the West. In rural Ethiopia, 49% of the population are food insecure (Diao and Eleni, 2005).

In light of all the above facts, one may look for measures that have been taken to reverse the prevailing food insecurity situation in Ethiopia. The Government of the Federal Democratic Republic of Ethiopia (FDRE) has had an economic development strategy, which is built on four pillars (building blocks). The Government believes such a four-pronged approach to be effective in a fight against poverty and ensuring sustainable development. These are agricultural development led industrialization (ADLI), justice system and civil service reform, decentralization and empowerment, and public and private sectors capacity building. ADLI has been seen as a long-term strategy to achieve faster and broad-based economic growth and development by making use of technologies, which are labor-intensive but land augmenting, such as chemical fertilizer, improved seeds, and other agricultural practices. Hence, agriculture has been regarded as an engine of overall growth and development in general and of ensuring food security in particular (MoFED, 2002).

The Government of Ethiopia has recently embarked upon a new initiative called

productive safety net. Under this program, two approaches are used to meet the problem of food insecurity. The first approach, which provides access to food mainly through employment, supports chronically food insecure households. There are an estimated 4 to 5 million people in the rural areas defined as chronically food insecure. These are expected to benefit from a food transfer scheme under the program on a relatively permanent basis. The second group consists of those who fall into transitory food insecurity caused by temporary environmental and other disasters. These only require emergency assistance, which will be terminated as soon as conditions return to normal (FSS, 2007).

1.2. Statement of the Problem and Research Justification

The causes of food insecurity can be manmade and natural (Kifle and Yoseph, 1999; Dagnew, 2001). With the same token, the prevalence of pervasive and chronic food insecurity in Ethiopia can be attributed to a series of mutually reinforcing and interlinked environmental, demographic, socio-economic, etc. factors. These include population growth unparallel to food acquisition, overdependence on subsistence farming, lack of assets, antiquated technology, weak markets, poor infrastructure, lack of opportunity outside the sphere of agriculture, erratic weather conditions, environmental degradation, etc (FDRE, 1996; Degefa, 2002; FAO, 2006).

While these are the causal reality at the macro (country) level, situations of food insecurity seem to be varied and even worse at the micro (*woreda*, kebele, and household) level. There are significant variations among regions as well as zones and *woredas* of a single region with regard to the level (extent) of, causes for, and coping strategies against food insecurity. The same is true among households within a single *woreda* or kebele. The variations at the sub-national levels can be ascribed, for example, to the variations in climatic and natural resource endowments, landholding

size and fertility as well as demographic and socio-economic conditions. Moreover, in their daily struggle to subsist, behavior of especially rural dwellers may have often seemed irrational to many observers who, until recently, had little comprehension of the precarious nature of subsistence living and the importance of mitigating causal factors via local-borne remedies. Understanding the fact that prescribing from above has been proscribing the demanded further progress; driven-from-inward participation of the grassroots' beneficiaries in Ethiopia is the most recent exercise and probably at an infantile stage. Since the macro-level analysis of the problem of food insecurity cannot fully reveal disparities at the micro-level, which will result in blurred recommendations to the widely varying local situations, it, therefore, deserves analysis of food insecurity state at the household level to come up with viable mechanism(s) of coping against and/or combating it.

In addition to the micro-level (household) consideration, this research has also been conceived to be carried at rural setting owing to the existence of the paradoxical interplay: availability of both the necessary inputs to food production and a serious food shortage. This can be illustrated by taking the case of Ethiopia. The total projected population of the country for July 2006 was estimated to be 75,067,000 persons, of whom 83.8% were rural and 16.2% were urban[5] (CSA, 2006). Out of the total area of Ethiopia (1,127,127 square kilometers), about 99.34% is covered by land, of which the majority is located in rural areas (CIA, 2006). It is believed that most food items in Ethiopia as elsewhere in the world are derived from land. Moreover, one of the resources that rural dwellers possess is their agricultural land. It is, therefore, the surprising paradox that rural dwellers are facing such a chronic food insecurity state. This in turn triggers in one's mind as to why rural people face food

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[5] *Urban areas* refer to all capitals of regions, zones, and woredas; it also includes localities with urban kebeles whose inhabitants are primarily engaged in nonagricultural activities (CSA, 2006).

insecurity (regardless of their living at plethora of the land portion), leading to pick the research issue in rural environment.

1.3. Objectives of the Study

1.3.1. General Objective

The research under consideration has both descriptive and explanatory purposes. Accordingly, the study generally sets out to describe and explain the level and determinants of and coping strategies against food insecurity state in Lemo *Woreda*.

1.3.2. Specific Objectives of the Study

Specifically, the study aims to:

- describe the physical and human environmental setups of the study area that have repercussions on rural household food insecurity,
- quantify the level (magnitude) of food insecurity that the rural households of the study *woreda* are facing,
- identify the major determining factors of rural households food insecurity,
- assess perceptions of rural dwellers with regards to causal factors to the problem of food crisis,
- identify coping mechanisms used by households during food insecurity, and
- suggest the policy and local-level program implications derived from the major findings.

1.4. Research Questions

The following research questions, which are answered in the course of the research, are set for this study:

i. How do the physical and human environmental setups of the study area influence rural households' food insecurity?
ii. How is the magnitude of food insecurity measured?
iii. Is there a statistically significant difference of the level of food insecurity among the rural households inhabiting the three sample *kebeles* of the study *woreda*?
iv. What is the top-standing determining factor of rural households' food insecurity?
v. What coping mechanism is regularly employed to curb food insecurity?

1.5. Significances of the Study

Woreda-level government planners engaged in the formulation of sectoral-oriented operational and strategic plans in the areas of environment, agriculture, population, and food security could utilize the findings of the research. Moreover, homegrown as well as international NGOs interested in advancing rural development in the study area by launching different response (intervention) packages would make an advantage as a take-off from the findings of the study. It can lay basis for further similar and extended research at the study *woreda*. Its final document can help as a reference for those writing academic papers like term papers, theses, etc. Ultimately, all these merits may help policy makers at macro-level consider micro-level variations in formulating national and sub-national policies and programs.

1.6. Research Methodology

The study area, Lemo *Woreda*, was *purposefully selected* by the researcher. The following criteria were taken into consideration while purposively selecting it. First, it is widely known that productive safety net program has been launched in 263 *woredas* of Ethiopia with the aim of "graduating" of those households suffering from chronic food insecurity (Fekadu, 2007). Since Lemo *Woreda* is one of them, it deserves undertaking a research on food insecurity issues. Second, to lessen the consequential negative impact on the collection of data as well as the analysis thereof, proximity of the *woreda*, in light of the time limitation and financial shortage faced during the study, was considered. Lastly, personal acquaintance with and work experience at the locality, which can help the researcher to get access to valuable data, were also seen.

In the following sub-sections, the key methods and processes employed in this study for data collection and analysis are briefly described.

1.6.1. Sampling Techniques, Methods of Data Collection, and Field Work

The issue under the research, *food insecurity*, necessitates the use of collection methods that can generate both qualitative and quantitative data. As a result, both primary and secondary sources of data were used.

1.6.1.1. Primary Data Generation

The major methods employed in the study to collect primary data include rural households sample survey, key informant interviews, and focus group discussions. The researcher also tried to have a *direct observation* at the sample *kebeles* to make out information that can help as a supplement of the three methods.

A. Household Sample Survey (HSS)

i. Survey Instrument: The Questionnaire

For the HSS, a semi-structured questionnaire (a combination of both open-ended and close-ended) had been designed and pre-tested by the researcher before the actual survey was conducted. Questions aimed at generating data on demographic characteristics, socio-economic status, physical resources like land and household assets, agricultural production, non-farm and off-farm income, agricultural extension and credit services, and household coping strategies against food insecurity were among the major ones included in the questionnaire (see appendix-A). Survey guideline was also prepared to keep the survey's execution consistent in all the sample *kebeles*. Three data collectors (one per kebele) and a field assistant were hired for the survey. All of them were diploma holders in agriculture and related fields. There was a training session for them on the details of the survey guideline and the questionnaire. The orientation was accompanied by a mock interview carried at Ambicho Gode kebele of the *woreda*: the kebele located besides Hossana town. This enabled the trainees acquaint with the details of questions in the questionnaire. It also warned the trainees about the ingenuity expected to forward the questions in a way that can keep the unity, continuity, and coherence of the responses given by the interviewees against the questions. The trained data collectors, with the follow-up and edition work of the researcher and a field assistant, carried out face-to-face interviews with the sample household heads at the sample *kebeles*. It took a fortnight. Totally, the field survey together with key informant interviews and focus group discussions lasted from 23 April 2007 to 27 May 2007.

ii. Observation Units, a Basic Unit of Analysis, and Survey Designs

Observation units (elements from which pieces of information were collected) were

household heads. The basic unit of analysis (the thing under study) for the survey research was a household. Some data of the research were gathered on an individual basis and aggregated to a household. Cross-sectional survey design was mostly used in constructing the research instruments: questionnaires and checklists. In few cases, like crop production, approximation of the longitudinal survey design with the cross-sectional one was also employed.

iii. **Sampling Procedure**

Total Population (The Rural Households): Lemo *Woreda* has thirty-three rural and two urban *kebeles*. By projecting[6] population size from the results of the 1994 Population and Housing Census (CSA, 1996) and assuming average household size of six members, the current total rural households in the *woreda* were projected 26,419.

Survey Population and Sampling Frame: List of the thirty-three rural kebeles was photocopied from the existing lists held by Lemo *Woreda* Office of Chief Administrator. Out of the total in the *woreda*, three *kebele;* namely, Ana Bellesa, Gora Tume, and Shurmo Wit-Bira, were drawn employing *simple random sampling (SRS)* by the help of a table of random numbers. Administrative offices of the sample *kebeles* had only the list of tax-paying households for land use. However, this study sets out to extend its scope to all rural households, including those landless ones. Hence, agricultural development agents (commonly called DAs) working in the respective sample *kebeles* were cooperated in making an actual list of all households[7]

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[6] The projection was done by the formula $p_2 = p_1 e^{r.n}$ where "P_2" is the projected current population size; "P_1" is population size "n" years back from the projection year; "e" is the given constant (2.718); and "r" is growth rates, with 4.11% and 2.33% for urban and rural settings respectively. The formula has been in use for years by HZDoFED (HZDoFED, 2007).

[7] *A household* is an individual or group of individuals who mostly are relatives and non-relative servants, live under a roof; prepare food in a hearth, and share a meal at least once a day. In the case of polygamous ones, when no commensality exists among the wives, the male partner is considered with the elder wife; and the younger wife has her own household considered separately (CSA, 1996; SERA, 2000; Encyclopedia of Food and Culture, 2003).

in the *kebeles*. Accordingly, households in Ana Bellesa, Gora Tume, and Shurmo Wit-Bira few days before the onset of enumeration of this survey were registered 329, 437, and 736 respectively. Hence, the sampling frame (that is, the actual list of all households comprising the survey population) was 1,502.

Sample Size: The total sample size required for the study was 150 (10%[8] of the sampling frame). The sample size of each sample *kebele* was determined through a *probability proportionate to size (PPS) sampling* method; that is, based on the proportion of the households in each *kebele* to the total households of the three *kebeles*. Accordingly, the sample household sizes for Ana Bellesa, Gora Tume, and Shurmo Wit-Bira were 34, 43, and 73 respectively. To know specific sample household in each sample kebele, *systematic sampling (SS)* method was used.

In general, in this survey, the *three-stages sampling* was used. First, purposive sampling was applied for selecting the study woreda. Second, SRS was applied for picking sample kebeles. Finally, SS was applied for picking the 150 specific sample households.

Table 1-1 shows the sample household heads (respondents) segregated by sex and kebele. Female-headed households make 16% of the total sample households surveyed. The lowest female household heads were surveyed in Shurmo Wit-Bira. Excluding contingencies, 150 survey questionnaires were prepared in Amharic and no questionnaire was sent back unfilled. If any analytical presentation in either tabular or chart form happens in the paper to include a missing case, it indicates a non-applicable (NA) question within a filled questionnaire.

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[8] At the outset, it was proposed to proceed with *total sample size* determined based on the formula developed by IFAD (1999) for nutrition-based studies. The formula is $n = \{t^2xp(1-p)\} \div m^2)$ where "n" is the required sample size; "t" is standard value of confidence level; "p" is estimated prevalence of food insecurity in the study area; and "m" is standard value of margin of error. Due to budget and time constraints, the *percentage-based determination*, however, was employed instead of the *formulized* one.

Table 1-1: Sample Household Heads (Respondents) by Sex and Kebele

Kebele	*Male*	*Female*	*Total (male + female)*	*% of Total*
Ana Bellesa	25	9	34	22.6
Gora Tume	32	11	43	28.7
Shurmo Wit-Bira	69	4	73	48.7
Total	126	24	150	100.0

Source: Author's Computation from the Field Survey (2007)

B. **Key Informant Interviews (KII)**

The KIIs were administered by the researcher to generate information on community profiles (like population dynamics) as well as causes of, coping mechanisms against, and preventive solutions sought towards food insecurity. Moreover, pieces of information on damages by causal factors as well as food inflows and outflows through agricultural produce, sales, loss, and transfers were also included. An unstructured questionnaire was also set for interviewees during the KIIs (see appendix-B). The informants included religious leaders, *edir* leaders, community elders, and kebele administration officials as well as agricultural development agents, health extension agents, school directors working at the study sites, and some personalities at government offices of the study woreda (see appendix-C).

C. **Focus Group Discussions (FGD)**

Totally, three FGDs, one at each sample kebele, were held through moderation by the researcher. The field assistant played the role of recording. Checklist of discussion issues was also set for discussants (see appendix-D). Chairmen of the three sample *kebeles* helped in screening specific discussants based on the hints set to do so. To

make discussions easy to manage, each group consisted of seven members (see appendix-E). The participants involved were representatives from different age groups, various villages of the *kebeles*, different economic strata, and both sexes. The participants were expected to express their own feelings (perceptions) and offer their experiences regarding the meaning of food insecurity, its causes, and the extent of damage thereof, as well as interventions in place against and solutions proposed towards it. Since the discussants were variant in composition and selected from non-interviewed households during the household sample survey, pieces of information obtained via this method were used to enrich those collected through household sample survey and key informant interviews.

1.6.1.2. Secondary Sources of Data

It was tried to collect secondary data (topically similar to most types of the abovementioned primary data) from government line departments and offices. Tabulation sheet was prepared prior to the onset of their collection (see appendix-F). However, since the study *woreda* is a newly formed one at the beginning of the 1998/99 E.C budget year of Ethiopian Government, the concerned bodies lack numerous compiled data. Thus, most secondary data were recomputed from reports of different personalities working in touch with the sample *kebeles*. Few data were estimated based on the data of the previous *woreda* from which it was descended. Soft[9] and hard copies were accessed from both published and unpublished secondary materials for this study.

Results of 1994's Population and Housing Census were used mainly for the projections of some of demographic characteristics of the *woreda* and its selected *kebeles*. Moreover, final report of SERA (2000), documentations of DoFED, DoFSDPP and DoARD of Hadiya Zone as well as OoTA, DoFSDPP, and OoARD of

[9] Soft copies stands for materials accessed from internet.

Lemo *Woreda* were referred in depth. Especially, unpublished compilations of annual performance reports of Hadiya Zone DoARD helped a great deal.

Supplementary data were gathered through discussions with governmental authorities that now are directly or indirectly dealing with food security. Specifically, the *woreda* administrator, head for the *woreda* OoARD, leaders of the DoFSDPP both at the *woreda* and zonal levels were consulted. Moreover, experts at the crop production and protection sections of Lemo *Woreda* OoARD did their best in estimation of some of the figures required in the preparation of food balance sheet (FBS).

1.6.2. Data Entry, Processing and Analysis

Values of most variables in the household survey questionnaire were exhaustively pre-coded. Responses to "other, specify" alternatives in a closed-ended questions and all open-ended ones were also thoroughly post-coded. All the details of SPSS data editor were strictly handled then for the definition of all variables. Finally, the survey data were entered into a computer for analysis by the guidance of the data entry clerk and using a computer software, SPSS 13.0 for Windows. In fact, the role of Microsoft Excel 2003 was not ignored in this regard.

Data generated through household sample survey were quantitatively analyzed. Pieces of information generated through key informant interviews and focus group discussions were qualitatively analyzed. Data gathered from secondary sources were incorporated in both qualitative and quantitative analyses.

To quantify the level of food insecurity, an aggregate household food security index, which was developed by FAO and stated in Thompson and Metz (1998) and Ramakrishna and Assefa, (2002), was used. Accordingly, AHFSI was computed from both primary and secondary data sources. To compute Gini coefficient that is framed in the formula of AHFSI, *Free Statistics Software* posted in the internet and developed by Wessa (2007) was used. Household food insecurity is known to be

influenced generally by the factors of availability (supply), demand, entitlement, and attitudes. Linear multivariate regression model was used to draw out specific determining factors of food insecurity at the rural household level in the study area. Since the model requires both the dependent and independent variables to be quantitative, categorical variables, such as literacy status, were post-recoded to binary (dummy) variables. The household responses regarding their coping strategies during periods of food insecurity (lean seasons) were recorded and their proportions was described in light of the four main stages of destitution: maintenance (insurance), resource depleting stages (non-productive and productive), and complete destitution.

1.7. Organization of the Thesis

The paper is generally organized guided by the revised thesis format of GSR Office of Addis Ababa University, posted at its official website. Accordingly, the paper has preliminaries like acknowledgment, list of tables, list of figures, list of appendices, abbreviations and acronyms, an abstract, and table of contents. References and appendices (annexes) are affixed at the end of the paper. The rest of the thesis paper situated amid the aforementioned ones is structured as follows. *Chapter 1* is an introduction. *Chapter 2* is a brief review of the related literatures and theoretical orientation. *Chapter 3* deals with the description of the salient features of the study area with regard mainly to physical environment setups. Empirical and analytical results are discussed in *Chapter 4*. The last section, *Chapter 5*, sees to conclusions along with some suggested solutions to the problems.

1.8. Constraints and Limitations of the Study

Accessibility and proximity of the *woreda* as well as personal acquaintance with and work experience at the locality greatly helped the researcher to obtain relatively qualified data. Even though much effort was geared to curtail their negative impacts,

it cannot be denied that few of the identified constraints could still have their own negative effect on the quality of this study. The following were some of the major limitations and constraints the study had endured from data collection to analysis and interpretation.

***Minimal coverage of secondary data and their probable less quality*:** Especially in almost all the *woreda* offices, secondary data were not well documented, mainly may be due to its new establishment. Data on some issues were at the hands of experts in a way inconvenient to access immediately through the established organizational structure. In some cases, even these experts were already transferred to somewhere else together with the data. This restricted the researcher from comparisons and the consequential choice to adopt among the secondary data. Besides, some of the available data were estimations with out field survey and/or field report, making the quality of data prone to decline.

***Lack of well-established local experience and related literatures*:** Preparation of profiles and production of papers regarding food insecurity at the *woreda* had not been experienced well and, as a result, this made most secondary data and literatures at hand not directly suited to the issue under consideration. Moreover, government offices lack documentation center for technical compilations and publications separate to that of archives of correspondences.

***Expectations from the respondents*:** Interviewers were trained to help them develop ingenuity in the presentation of questions and stimulation of responses that do expect nothing in return. Notwithstanding the continuous ingenious efforts made by the data collectors to explain about the objectives of the survey, some respondents were observed expecting some sort of aid/donation in return to their response. For example, some interviewees were repeatedly asking, "What will be brought in return after my response to these questions?"

Lack of facilities as well as shortage of budget and time: Amongst other requisites, conducting the fieldwork demands steadfast follow-up and immediate edition of questionnaires at the field level at the specific surveyed household. However, since the trips to the survey areas were mostly by mass transport and sometimes on foot, it was difficult to do the same as planned. Along with other consequences, the shortage of research budget had caused the sample survey limited on relatively few sample households. If sufficient budget had been allotted, the proposed sample size (302) calculated based on the formula developed by IFAD (1999) to sampling size determination for nutrition-based studies could have been used. Moreover, survey questionnaire, which consisted of consumption patterns and food stress coping mechanisms and prepared separate to all females in a household (who were at the age range capable to prepare a household meal), was left unfilled. This, in turn could have finetuned the results toward the level, determinants, and coping strategies of food insecurity. Finally, it was planned for the three data collectors to fill the 150 household questionnaires within 10 days (i.e. 5 per day). For the collectors were too slow during the first few days, the data collection was done under a very high time stress.

CHAPTER TWO

REVIEW OF RELATED LITERATURES AND THEORETICAL ORIENTATION

2.1. Food (In)Security[10]: Conceptual Evolution

Food security has been in the eye of the public for a long time. Maxwell (2001), for example, mentioned the biblical story of Joseph at the Pharaoh's court, predicting seven years of plenty of food followed by seven years of famine, as an early example of food security planning in practice. The time, when the more generic term "food security" began to make a serious impact on the development debate and in literatures, however, traces back to the 1970s. Hence, the roots of concern with "food security" can be traced back to the world food crisis of 1972-74; and beyond that at least to the 1948's Universal Declaration of Human Rights (UDHR). UDHR, in its article 25, recognized the "right to food" as a core element of a standard of living adequate for the health and well-being (UN, 1948; Maxwell and Frankenberger, 1992). Some literatures also trace back its conceptual evolution to the first session of the United Nations Conference on Food and Agriculture which was held in Hot Springs, Virginia, in 1945 (Synder, 2004). The Conference recognized that "freedom from want" means a secure, adequate, and suitable supply of food for every man.

According to Maxwell and Frankenberger (1992), "food security" in the 1970's was mostly concerned with national and global food supplies. In the 1980's, however, researchers and development practitioners realized that food insecurity occurred in situations where food was available but not accessible because of an erosion of

[10] Food insecurity is the reverse discussion on food security. Moreover, most literatures see them simultaneously. Hence, the researcher preferred to use the term "(in)security" to refer to security and/or insecurity accordingly.

people's entitlement to food. The focus, therefore, was accompanied by a paradigm shift to questions of access, vulnerability, and entitlement to food at household and individual levels. Almost all literatures, which state even once as concerns food security, worth mention the Amartya Kumar Sen's (1981) *theory on food entitlement* (cited in Thompson and Metz, 1998) that has had a considerable influence on this shift in thinking.

As the topic has grown, the concept has become more eclectic and wide-ranging. Hence, nowadays, food security can no longer be considered uni-dimensional, but must be treated as a multi-objective phenomenon. As different individuals and development agencies often perceive the concept and its operationalization in multi-dimensional view and different ways, many definitions and conceptual models have been presented (FAO, 2003[b]). For example, Hoddinott (1995) and FAO (2003[b]) mentioned the availability of approximately 200 definitions of food security from where Smith et al (1992) (cited in Maxwell and Frankenberg, 1992) have reviewed about 30 definitions of household food insecurity. In this study, the one used by UN organizations (like FAO) and World Bank and presented footnoted on *page-1* of this paper, is taken as an operational definition for the concept. As regards to Kifle and Yoseph (1999), many agencies involved in food security-related activities also adopt this definition.

2.2. Food (In)Security: Dimensions

In the definition of food insecurity, there always are indicated the phrase *"access by all people at all times to sufficient food, in terms of quality, quantity and diversity, for an active and healthy life without risk of loss of such access"*, which comprise at least the four key defining characteristics of household food security (HFS). They are *availability (sufficiency), accessibility, utilization (consumption or acceptability)*, and

time (sustainability or stability) (Maxwell and Frankenberg, 1992; Thompson and Metz, 1998; Kifle and Yoseph, 1999; Scanlan, 2001; FAO, 2003[b]; FAO, 2006).

The first dimension, *food availability,* refers to the sufficient supply of foodstuffs in a country from production or imports for all people. In this regard, there is a "basket" of food available for a population to consume, but this concept says nothing about how it is distributed. Thus, one should also consider a second dimension, *food accessibility,* or the ability (entitlement) to acquire food for consumption, be it through purchase, production, or public assistance (gift or inheritance). Food may be plenteously available but not necessarily accessible. Hunger and famine, for example, could occur in the absence of any change in food production, if the value of people's production and work activities declined relative to the cost of staple food. That is, food availability is not a necessary and sufficient condition for food entitlement. Thus, food security is about more than just growth in agricultural productivity; it also considers questions of distribution (Sen, 1981 cited in Thompson and Metz, 1998; Rena, 2005). There is *food utilization,* the third dimension, which concerns the physical use of food derived from different sources for human consumption. It may be true that food is available to individuals who have access, but nutrient deficiencies or health problems may result from the imbalanced diet of food that is consumed. Utilization means that food security encompasses questions that link availability and access to a country's ability to meet the basic health needs of its population. Finally, the *time* refers to the sustainability or security issues for how long the food (in)security persists (Maxwell and Frankenberger, 1992; Melaku, 1997; Scanlan, 2001).

2.3. Food Insecurity: Major Types

Depending on the time of persistence, the food insecurity can be chronic and acute (Maxwell and Frankenberger, 1992; Degefa, 2002). *Chronic (permanent) food*

insecurity means that a household runs at a continual high risk of inability to meet the food needs of household members for a relatively long time. In other words, it is a situation where on average food availability is below the required level for a long time (Nichola, 2006). Its root causes could be poverty, fragile natural resource base, weak institutions (notably markets and land tenure) and unhelpful or inconsistent government policies (Devereux, 2000). *Acute (transitory) food insecurity*, in contrast, occurs when a household faces a temporary decline in the security of its entitlement (access) to food and the risk of failure to meet the food needs is of short duration. Its causes could be drought, flood, migratory pests, fluctuations in income or prices, etc.

It has been argued that transitory food insecurity, in turn, can be further divided in to temporary and cyclical (seasonal) (Thomson and Metz, 1998). *Temporary food insecurity* occurs for a limited time because of a sudden and unforeseen or unpredictable circumstances (like drought or pest attack) affect household's entitlements. For urban households, sudden unemployment may also be the cause for temporary food insecurity. *Cyclical (seasonal) food insecurity* occurs when there is a regular pattern in the periodicity of inadequate access to food. It is possibly due to logistical difficulties or prohibitive costs in storing food or borrowing, particularly when it is difficult for households to borrow to even outflows of food overtime.

Depending on the characteristics of households' ability to withstand crisis to preserve household food security on a sustainable basis, households can be enduring, resilient, and fragile (Maxwell and Frankenberger, 1992). *Enduring households* are those households maintaining household food security (HFS) on a continuing basis. *Resilient households* are those households that experience transitory food insecurity but maintain HFS in the long-term perspective. *Fragile households* are those households that are unable to maintain HFS both in the short and long-term perspective.

2.4. Food Security vis-à-vis Food Self-sufficiency

It is sometimes argued that the best way to increase a country's food security level is to increase its level of self-sufficiency, and this idea has a certain perceptive level. It may seem that a country has more control over its food supply if it is independent on international markets. In addition, there is a perception that developing countries may be exploited in international markets (Thompson and Metz, 1998). According to these authors, the term *food self-sufficiency* generally does mean the extent to which a country can satisfy its food needs from its own domestic production. It differs from food security in two fundamental points. It looks only at national production as the sole source of food supply, while food security takes into account commercial imports and food aid as possible sources of food supply. On the other hand, it refers only to domestically produced food availability at the national level, where as food security brings in elements of stability of supply and access to food by the population. Alternatively, it is linked to an overall perspective on development, which emphasizes the need for self-reliance, an *auto-centric approach*, whereas food security is consistent with a view of development, which incorporates *international specialization and comparative advantage* (Thompson and Metz, 1998).

2.5. Food Insecurity vis-à-vis Hunger, Famine, Malnutrition, Poverty, and Vulnerability

Achievement of sustainable access to adequate food requires a common perception of the principal causes of the problems, the concepts involved, and how they can be translated into practical activities and measurable change. These changes must also be understood and designed within the context of economic development for the affected groups (i.e. the poorest and most vulnerable population groups). Hence, reduction of poverty is a key to achieving reduction of hunger and malnutrition. With the same token, to understand better the linkages between the processes and measures

that can alleviate poverty on the one hand; and specific food access, food intake and nutrition-relevant outcomes of such development efforts on the other hand, HFS is a key element (Rena, 2005).

Food security, on the one hand, and *famine* and *hunger* on the other, are inversely related concepts. Ensuring food security is equated to avoidance of famine and hunger. Famine and hunger result from the lack of food security; that is, famine and hunger are both consequentially rooted in *food insecurity*. Famine is an absolute lack of food affecting a large population for a long time. Famine can be avoided or prevented because it does not strike suddenly, but builds up slowly and provides a lead-time or prediction before it happens. Hunger is not famine. It is similar to undernourishment and is related to *poverty*. When hunger persists for a longer period, covering a large number of the population and resulting in mass migration and death, it then becomes famine (Melaku, 1997). Hunger can lead to malnutrition. *Undernourishment (malnourishment)* describes the status of people whose food intake does not include enough calories (energy) to meet minimum physiological needs (WFP, 2006). *Vulnerability* refers to the full range of factors that place people at risk of becoming food-insecure (FIVIMS, 2006). The degree of vulnerability of individuals, households, or groups of people is determined by their exposure to the risk factors and their ability to cope with or withstand stressful situations.

To summarize, putting a clear demarcation between the essence, causes, and consequences among these terms is too difficult and most literatures interchangeably use the figures of one as proxies for another. Thus, the notions of hunger, famine, under-nutrition (mal-nutrition), poverty, and vulnerability are closely intertwined in the definitions of food insecurity and hence they are in its another face of food insecurity. Therefore, it is at least difficult to review food insecurity separately without inculcating the issues of the above three (Maxwell and Frankenberger, 1992).

2.6. Food Insecurity: Causes and the Vulnerable

The causes of food insecurity can be manmade and natural (Kifle and Yoseph, 1999). They are intricate in nature and even the probable ones can differ for supply and demand side and for their chronic and transitory forms of food insecurity (Rena, 2005). Some of the major possible ones of food insecurity that are repeatedly mentioned in most literatures (Maxwell and Frankenbeger, 1992; FDRE, 1996; Kifle and Yoseph, 1999; Scanlan, 2001; Rena, 2005; FAO, 2006) are the following:

- Natural hazards (like inadequate and variable rainfall or drought, floods, locusts or contagious human and livestock diseases),
- Constraints of natural resources (like fragility of natural resource base),
- Low agricultural productivity (due to improper farming and rearing practices like absurd farm tools and limited veterinary services),
- Lack of access to productive resources (like rural credit),
- Poor economic policy environment (like land tenure and tree ownership),
- Corruption
- Poor development of human capital resources (especially low level of education and poor health status),
- Poor storage technology (pre- and post-harvest losses),
- Inaccessibility to transport and other infrastructure,
- Heavy work load on women (gender inequality),
- War and civil strife (like ethnic conflicts),
- Rapid population growth,
- Lack of purchasing power (i.e. poverty),
- Untargeted free distribution of food aid, which could be a disincentive for farmers to produce,
- Weak regional institutions and donor co-ordination,

– Cultural insensitivity, etc.

Globally, certain groups of people are more vulnerable to food insecurity than others. Vulnerable groups include victims of conflict (e.g., refugees and internally displaced people); migrant workers; marginal populations (e.g., school dropouts, unemployed people, homeless people, and orphans); dependent populations (e.g., elderly people, children under five, and disabled and ill people); women of reproductive age; ethnic minorities; and low literacy households (FAQS, 2007).

2.7. Food Insecurity: Coping Strategies

People who live in conditions, which put their main source of income and/or grain at recurrent risk, are not passive victims but they develop self-insurance and coping strategies to offset threats to the household's food and economic resources at times of hardship. In attempts to understand how households cope up against grain and cash shortages, researchers and development practitioners have been concerned with the ways in which they make decisions and choose among different options for meeting their food deficits. As stated in Yared (1999), one mode of conceptualizing this process has been the *"sequencing approach"* which attempts to chart the sequence of progressively economically attractive but less and less reversible steps that households take to deal with the increasingly severe food shortages.

As stated in Corbett (1988), embarking to study coping strategies is vital, for it is one of the most common methods for identifying food insecure households or regions by looking at frequency and types of the strategies (in conjunction with consumption, expenditure, food share, and nutritional status indicators). The overwhelming majority of the types of coping strategies are often listed in literatures, such as Corbett, 1988; Maxwell and Frankenbeger, 1992; SERA, 2000; Elias, 2001.

Based on the sequencing approach, the different types of coping strategies are markers of the severity of conditions, often categorized into four distinct stages of destitution (Corbett, 1988; Elias, 2001). These are stage-1 (*crisis' insurance or asset preservation mechanisms*), stage-2 (*disposal or depletion of non-productive assets*), stage-3 (*disposal or depletion of productive assets*), and stage-4 (*complete destitution*). The movement from one stage to the next depends on the context of food insecurity state. For example, people suffering due to poor agricultural production might slowly move from stage 1 to stage 2 or 3, whereas in complex emergencies, people might be 'shocked' directly into strategies of stage 3 or 4, due to sudden external forces such as a flood or armed conflict (Corbett, 1988). Coping strategies are employed in order to stave off destitution or great suffering with the hopes of reversing the situation and again attaining food and livelihood security. Thus, generally only when it is necessary for survival will individuals sell productive assets or migrate in order to feed the household. Figure 2-1 depicts the stages and coping strategies with food insecurity over time.

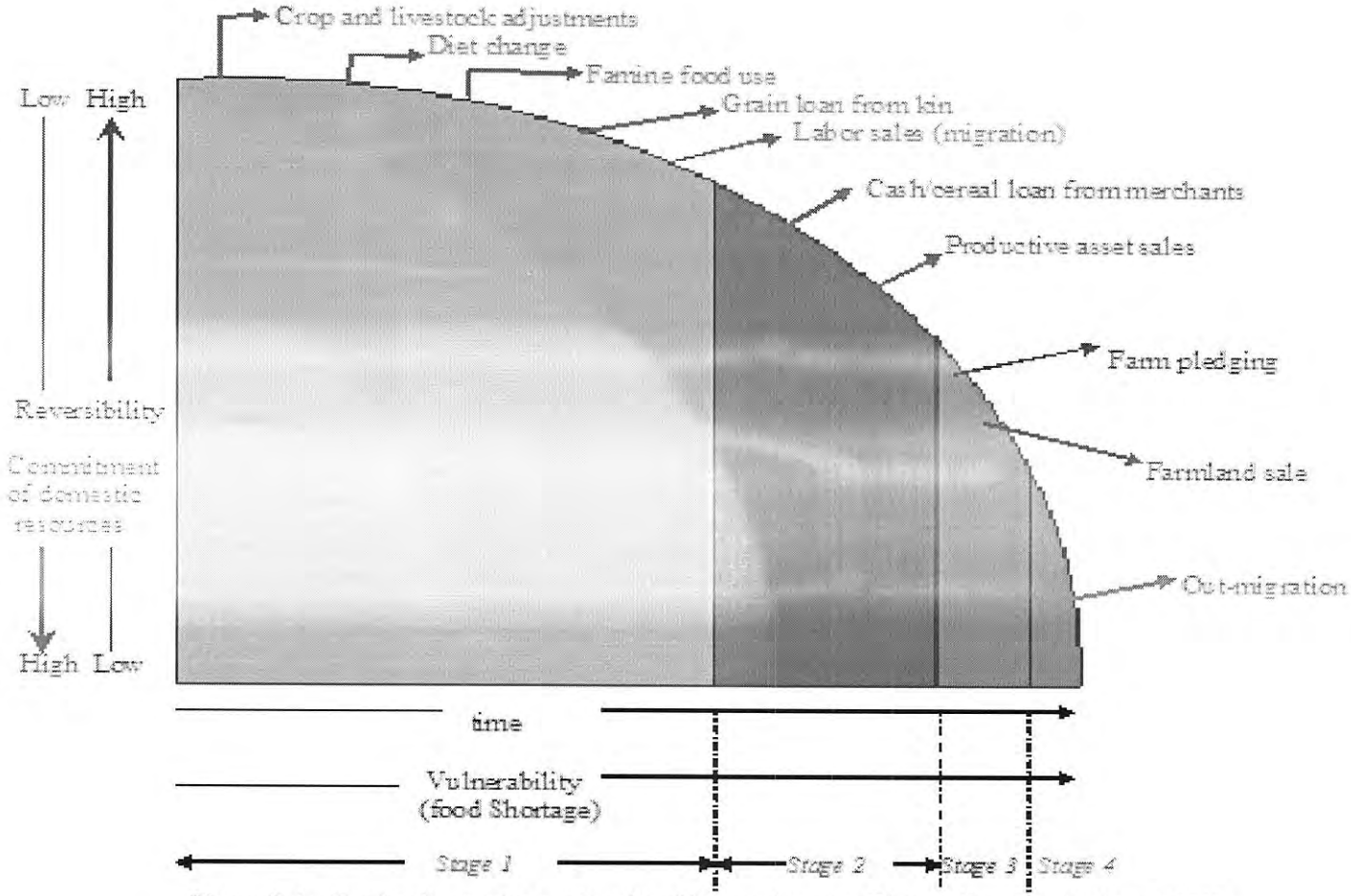

Figure 2-1: Coping Strategies against Food Insecurity over Time (*Source*: Corbett, 1988)

The *first stage* of household food insecurity is marked by the initial shortage of food, or inability to provide sufficient quantities of food to all members of the household. Many times, households used to get themselves ready for a food quantity shortfall, as in the case of seasonal production, by storing quantities of grain or owning livestock that can be quickly sold, traded, or used for food (in the case of agricultural societies). These stores are often referred to as *insurance,* and are not intended to be a main source of income or an integral part of income generation, but are simply crisis insurance (Corbett, 1988).

In general, the most common stage-1 indicators (adaptations employed) are:

- diet change to less preferred (for instance, wheat instead of *teff*);
- reducing meal frequency per day (rationing);
- gathering wild foods;
- inter-household (relatives) transfers and borrowing of food or cash;
- increasing petty commodity production (cattle grasses, firewood, charcoal, local drinks, etc.), and
- seeking menial (casual) wage labor within the residential vicinity (Corbett, 1988; Elias, 2001). Moreover, households at the initial stage of food insecurity apply dispersed grazing, changes in seeding and planting practices, lessening expenses, and sale of livestock products.

If the food shortage continues or worsens more than the first, the household would enter the *second stage*. The second stage of food insecurity is marked by the sale of assets, specifically non-productive ones, to cope against it. At this point in the line of food security crisis, food consumption *begins* to supersede asset preservation as the top priority, but still not entirely. The sale of valuable insurance assets (jewelry) would happen. Chickens, goats, other livestock, and any other non-productive assets that serve as crisis insurance would be liquidated. Generally, the assets that are preserved are those related to income generation, such as land, farming equipment,

oxen, cattle, etc. In addition to non-productive asset sales, the second stage also sees the onset of loans/credit from non-kinship network (i.e. from merchants and moneylenders), which also has serious implications for the future security of the household and recovery to their original socio-economic status (Corbett, 1988; Elias, 2001). At this stage, temporary migration for work or land (days/week or days/month), skipping meals for entire days (days/week), and withdrawing children from schooling are also exercised.

In the *third stage,* the situation of food shortage worsens even further than the second. The third stage is indicative of productive asset sales and the shift of the number one priority from asset preservation to food consumption (Corbett, 1988; Elias, 2001). At this point, all things else has either failed to provide sufficient food quantities or the crisis has prolonged itself into a dire situation. At this juncture, old productive assets are sold. Thus, all the remaining livestock and all personal items would be sold, possibly even the sale of housing material as well as productive furniture and equipment will happen. Moreover, pledging, renting and/or sale of land can happen. Return out-migration (years) and rarely redistribution of children may occur. This disposal of all assets may ensure current survival, but severely jeopardizes the future security of the household. In the case of natural disasters, such as drought, many assets will be lost involuntarily, specifically livestock succumbing to disease or starvation. When the crisis has reached this stage, famine conditions have essentially set in.

The fourth stage is the last on the line of food insecurity and represents *complete destitution* (Corbett, 1988; Elias, 2001). The household no longer exists as it once did. Thus, permanent migration (either whole or part of household) occurs in order to resettle on suitable land, find wage labor, or more likely for food aid. Individuals are generally too weak to work and simply need food and care to survive. Hence, permanent migration, begging for food/resources, complete dependence on external aid, and breakup of households are cases of indicators in *stage four*.

In general, households pursue coping strategies to ensure future income generating capacity and livelihood rather than simply maintaining current levels of food consumption. These strategies will vary by region, community, social class, ethnic group, household, gender, age, and season. Their use as indicators is location specific. The types of strategies employed by households also will vary depending upon the severity and duration of the potentially disruptive conditions.

2.8. Factors Promoting Food Entitlements

The use that households can make use of the resources available to them as well as the level of those resources depends to some extent on the nature of the environment within which they operate and the specific forms of the institutions, which regulate the relations between the various economic agents. An approach to analyzing the problem, which considers these different elements, is known as analysis of entitlements. Amartya Sen (Cited in Thompson and Metz, 1998) defined "entitlements" as the set of alternative commodity bundles that a person can command in a society using the totality of rights and opportunities that he or she has. In other words, entitlement is what a person can produce, buy, or borrow, given what he/she owns and what social and state regulations allow them to do with the produces, etc.

Sen (1981) identified four main categories of entitlement (cited in Thomson and Metz, 1998); namely, trade-based, production-based, own-labour, and inheritance and transfer entitlements. *Trade-based entitlement* describes what an individual can buy with the commodities and cash he/she own. *Production-based entitlement* describes the right to own what one produces with one's own resources. *Own-labour entitlement* describes the sale of one's own labour power, and the resulting trade-based entitlements. *Inheritance and transfer entitlement* refers to the right to own what is willingly given by others as remittances, gifts or bequests, as well as transfers from the state such as social security, pensions, and food distribution.

Beerlandt and Huysman (1999) and Alem (2005) mentioned at least four major factors that promote food entitlements. All these entitlements give an individual control over resources, which they can use, within the rules and regulations laid down by society, to satisfy their needs, including the very basic need of food. The first is *resource endowments* consisting of quantity, skill and knowledge of the labour force; size and fertility of land; other farm assets such as draught animals and farm tools; the quantity and quality of rainfall; and the prevalence or otherwise of the susceptibility to pest and other hazards. With regard to human capital, education has been given due consideration. The second is *entitlement to agricultural technologies and institutions* that range from the conservation activities to the modern high yielding inputs helpful for maintaining soil fertility and intensifying the land. The third is *entitlement to alternative employment opportunities* such as non-farm and off-farm activities, which are helpful to complement or substitute the agricultural activities particularly in the densely populated areas so that food shortage can be prevented at least in the short-term. Their application, in turn, is useful in the long run to prevent depletion of assets as well as relocate labour from agriculture to other sectors and prevent further diminution of the land, all, in the end, help to bring overall rural development. The last is *entitlement to favorable policy* in the areas of food production, access, disaster prevention and preparedness capabilities, land and tree tenure security, land use, community participation, etc.

2.9. Food Insecurity Measurement: Indicators

A number of different indicators can be used for specifying HFS. Food security is a concept that has evolved considerably over time and there is much literature on potential household food security indicators. According to Hoddinott (1995), there are about 450 indicators of food security. One volume on household food security by Maxwell and Frankenberger (1992) lists 25 broadly defined indicators. These are

divided into *process indicators* that reflect both food supply and food access, and *outcome indicators* which serve as proxies for food consumption.

2.9.1. Process Indicators

2.9.1.1. Indicators of Risk

Indicators of risk of food insecurity are the ones that reflect *food supply*. One critical dimension of HFS is the availability of food in the area for the households to obtain. A number of factors (indicators) play a role in limiting food availability. These indicators are those that provide information on the likelihood of a shock or disaster event that will adversely affect HFS. They include such things as inputs and measures of agricultural production (agro-meteorological data), access to natural resources, agricultural production, institutional development and market infrastructure, and exposure to regional conflict or its consequences (influx of refugees). These types of indicators are not mutually exclusive of food access indicators, and considerable overlap and interaction between the two categories may exist. For example, market infrastructure and market coping responses are strongly related (Maxwell and Frankenberger, 1992).

2.9.1.2. Indicators of Coping Ability

Indicators of coping ability against food insecurity are the ones that reflect *food access*. The importance of indicators that measure food access became apparent when governments and development agencies realized that household food insecurity and famine conditions were occurring despite the availability of food. Food entitlement and effective demand of households are now seen as crucial to HFS. These types of indicators provide information on the capacity of the population affected by a stress or a shock or disaster to withstand its effects. Hence, indicators that reflect food access are the various means or strategies used by households to meet (cope up) their HFS needs (Maxwell and Frankenberger, 1992).

2.9.2. Outcome Indicators

Given the cost and time involved with collecting individual food intake data for households, outcome indicators are usually proxies for adequate food consumption. In general, HFS outcome indicators can be grouped into direct and indirect indicators. *Direct indicators* of food consumption include those indicators which are closest to actual food consumption rather than to marketing channel information or medical status. Household budget and consumption surveys, household perception of food security, and food frequency assessments are cases in point. *Indirect indicators* of food consumption are generally used when direct indicators are either unavailable or too costly (in terms of time and money) to collect. Storage estimates during critical times of the year, subsistence potential ratio (the ratio of the households' ability to feed itself to its need), nutritional status assessments (like anthropometric measures) are cases in point (Maxwell and Frankenberger, 1992).

2.10. Theoretical Orientation

It is known that food (in)security is a complex and multi-pronged issue. As a result, many scholars tried to develop several paradigms about achieving economic growth in general and attaining food security in particular. In the following section, three volumes of write-ups on perspectives of food (in)security stated mainly by four authors are discussed; namely Maxwell (2001), Scanlan (2001), and Ramakrishna and Assefa, (2002). All of them are complementary to each other. An approach used to orient the study under consideration in available theories will follow the discussion on them.

Maxwell (2001) identified *five schools* of thought on food security. These are environmental pessimism, business-as-usual optimism, industrialized-world-to-the rescue lobbyism, new modernism, and sustainable intensification.

Environmental pessimists assert that ecological limits to growth are being approached and will either soon be passed or have already been reached. Following a neo-Malthusian argument[11], they claim that population continues to grow too rapidly, whereas yields of major staple crops have declined and will continue to slow, or even fall in future. They argue that, given the current state of knowledge, no new technological breakthroughs are likely; and that some agro-ecological systems have been thoroughly degraded to recover. According to them, solving these problems means making population control the first priority. *Business-as-usual optimists* have strong belief in the power of market. They contend that supply will always meet increasing demand, and so recent growth in aggregate food production will continue. They expect that innovations in biotechnology and dramatic expansion in many countries in the area under cultivation will sustain the growth in food output. The second group argues similar to Smithian and Boserupian schools[12] of thought. Members of the third group, *industrialized-world-to-the-rescue*, have ties with agrochemical industry. They assert that developing countries will never be able to feed themselves due to a variety of ecological, institutional, and political reasons.

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[11] This is an argument based on the work of Thomas Robert Malthus (1766-1834), an English demographer and political economist. In his work entitled "An Essay on the Principle of Population" and first published in 1798, he made the famous prediction that population would outrun food supply, leading to a decrease in food per person. According to his principle, population, if unchecked, increases at a geometric rate (i.e. 2, 4, 8, 16, etc.), whereas the food supply grows at an arithmetic rate (i.e. 1, 2, 3, 4, etc.). He suggested that only natural causes (such as accidents and old age), misery (war, pestilence, plague, and above all famine), and moral restraint and vice (which he included infanticide, murder, contraception, and homosexuality) could check excessive population growth (http://www.wikipedia.org/Wiki/Thomas_Malthus)

[12] These are schools of thought developed by John Maynard Smith and Ester Boserup respectively. Smithian growth comes from increased market integration, which allows an economy to take advantage of opportunities for specialization and to capture gains from trade. Ester Boserup, a Danish economist and writer, in her works published entitled "The Conditions of Agricultural Growth: The Economics of Agrarian Change under Population Pressure" showed that population determines agricultural methods. A major point of her work is that "necessity is the mother of invention". Thus, Boserupian growth comes due to population size effects whereby rise in population density causes technological and institutional innovation, which inturn leads to economic growth (Huck, 1992; http://www.wikipedia.org/Wiki/Ester_Boserup; http://www.wikipedia.org/Wiki/Maynard_Smith).

They insist that the threatening food gap will have to be filled by modernized (mechanized) northern-based (Europe and USA) agriculture. They argue that increasing production through the mechanized operations will force smaller and more marginal farmers to go out of agriculture. This takes the pressure off natural resources, enabling them conserved in protected areas and wilderness reserves. They assert that the large producers will then be able to trade their food with those who need it, or have it distributed by international agencies to provide famine relief or food aid. *New Modernists* believe that significant biological yield increases are possible on existing agricultural land. They claim that food growth can only come through high external-input farming. They argue that farmers simply use artificial fertilizers, pesticides, high-yielding seed varieties, and other external inputs, which are the only way to improve yields and reduce pressure on natural habitats. They also contend that high-input agriculture is more environmentally sustainable than low-input agriculture, as the latter requires the intensive use of local resources, which may be degraded in the process. Fifthly, advocators of *sustainable intensification* have a similar belief with members of the fourth group that significant biological yield increases are possible on existing agricultural land. However, they argue that sustainable agricultural production growth is possible in currently unimproved or degraded areas whilst protecting or even regenerating natural resources by the application of low-input (but not necessarily zero-input) agriculture, provided that farmers participate fully in all stages of extension.

In the second volume of write-up, Scandal (2001) identified *two perspectives* with regard to food security: one is optimistic while another is pessimistic. The promising perspective is that of *techno-ecological* approach while the ominous one is the *neo-Malthusian*. Broadly speaking, discussion of food security begins with the question, "How many people can the earth feed?" This query is central to *neo-Malthusians*. Paying particular attention to population growth, food production and consumption, and associated threats to the global ecosystem, this perspective examines the earth's

ability to support a sustainable society. According to this view, population dynamics is considered as the primary engine of social change and, if left unchecked, will result in ecological disaster. The second, *techno-ecological*, approach focuses upon human ability to adapt technology to population demands on the global ecosystem. This perspective takes human ingenuity as a key, with adaptation essential to confront potential challenges to the planet's well-being. Hence, as to this view, adaptive measures such as the application of fertilizer technologies, land-use intensification, infrastructural development, and the internationalization of food markets help balance the negative effects of population pressure.

Finally, as to volume of write-ups by Ramakrishna and Assefa (2002), there are broadly *three methodological approaches* to the analysis of food insecurity. One is *general explanations* in terms of drought, war, land degradation, etc. The other is *scientific explanations* that explain food insecurity with reference to specific circumstances and people, and *an eclectic approach* that combines the various explanations. The general explanations are imprecise, cannot be used in quantifying the problem, and are not helpful in leading to accurate predictions. Specific policy interventions cannot be made based on these approaches. Hence, specific models have been developed in the literature, based on supply, demand, and market failure theories. The *supply side explanations* are popularly known as *Food Availability Decline (FAD)* models and refer to the decline in per capita food availability. The *demand side explanations* are known as *Food Entitlement Decline (FED)* models. Food availability refers to the supply of food and entitlement refers to the household's or individual's command over it. The argument of FED is that the mere availability of sufficient food in aggregate terms does not necessarily entitle a person to access to it. What ensure access to food are trade-based entitlements, production-based entitlements, personal labour entitlement, inheritance entitlement, transfer entitlement, etc.

All of the three volumes discussed above are not independent explanations, but are complementary to each other. Relatively, the first viewed the issue in a narrower and detailed way than the second. The third seems to methodize the key points in the first two in a way possible to apply practically. For example, overlap and potential complementarities unquestionably exist between the two theories mentioned in Scandal (2001). They overlap because both are concerned with population change occurring in the confines of limited space. The *techno-ecological* focus can inform a *neo-Malthusian* approach by suggesting that population pressure under certain structural conditions can be beneficial given specialization in the labor force, increased economic productivity, and resulting patterns of development. At the same time, potential complementarities exist between them, for techno-ecologists can learn much from neo-Malthusians concerning the limits of technological progress and the danger in blind optimism regarding the margin of return of science. The overlap and potential complementarities between the two theories necessitates that drawing links between the two a logical means of examining food security. Thus, since these ostensibly contrasting perspectives are complementary and competing, this study examines an *eclectic* approach of the abovementioned perspectives and picks issues that combine all or a portion of their gists with regards to food supply, demand, entitlement, attitude, etc.

2.11. Ethiopian Cases

Ethiopia is generally characterized by extreme poverty, high population growth rate, severe environmental degradation and recurrent drought (Degefa, 2002). This has resulted in agriculture being poor for several years, to the extent that the country could not adequately feed its population from domestic production. According to this source, this has been manifested in the prevailing food insecurity, both chronic and transitory, which has almost become a structural phenomenon and the way of life for a significant proportion of the population of the country.

In Ethiopia, the seriousness of the food shortage problem varies from one area to another depending on the state of the natural resources and the extent of development of these resources. According to various sources, some 42 periods of food shortages (including the 1999 and 2000 food shortages) have been recorded in Ethiopia (Degefa, 2002; Ramakrishna and Assefa, 2002), most of which were concentrated along two broad belts, generally described as famine- and drought-prone areas. The former is the mixed farming production system area of highland Ethiopia, involving central and northeastern highlands stretching from Northern Shewa through Wello into Tigray. The land resources mainly the soils and vegetation of this part of the country have been highly degraded because of the interplay between some environmental and human factors such as relief, climate, population pressure and the resultant over-cultivation of the land, deforestation of vegetation and overgrazing. The second belt is the range-based pastoral economy of lowland Ethiopia, ranging from Wello in the north through Hararghe and Bale to Sidamo and Gamo Gofa in the south. Apparently, this belt is generally considered as resource poor with limited potential and hence highly vulnerable to drought.

CHAPTER THREE

DESCRIPTION OF THE STUDY AREA

3.1. Location

The study area, Lemo *Woreda*, is located in Hadiya Zone, which is one of the zones of the Southern Nations, Nationalities, and Peoples' Region (SNNPR). The zone has ten *woredas* and one city administration (i.e. Hossana). Excluding Lemo, the nine *woredas* are An Lemo, Shashogo, Misha, Ghibe, Gombora, Soro, Duna, Mirab Badawacho, and Misrak Badawacho. Hossana City is located bounded by the *kebeles* of Lemo *Woreda*. As indicated in **figure 3-1**, Lemo *Woreda* shares boundaries with most of the *woredas* of the zone.

Until recently, the study *woreda* had thirty-four *kebeles*. Nevertheless, after the reorganization of Shurmo Dubancho *kebele* to Dubancho and Shurmo Wit-Bira kebeles, currently it has thirty-five *kebeles*. Of these, Shurmo Wit-Bira is one of the three sample *kebeles* in the *Woreda*. The *woreda's* (which is also the zone's) capital, Hossana, is located at about 230 kilometer from Addis Ababa via Alemgena, 305 kilometer via Ziway, and 285 kilometer via Wolkitie. On the other hand, it is connected to Awassa, the capital of SNNPR, via Alaba-Shashemene route on one hand and via Ziway-Shashemene route on the other. The distance by these two routes is 210 and 265 kilometer respectively.

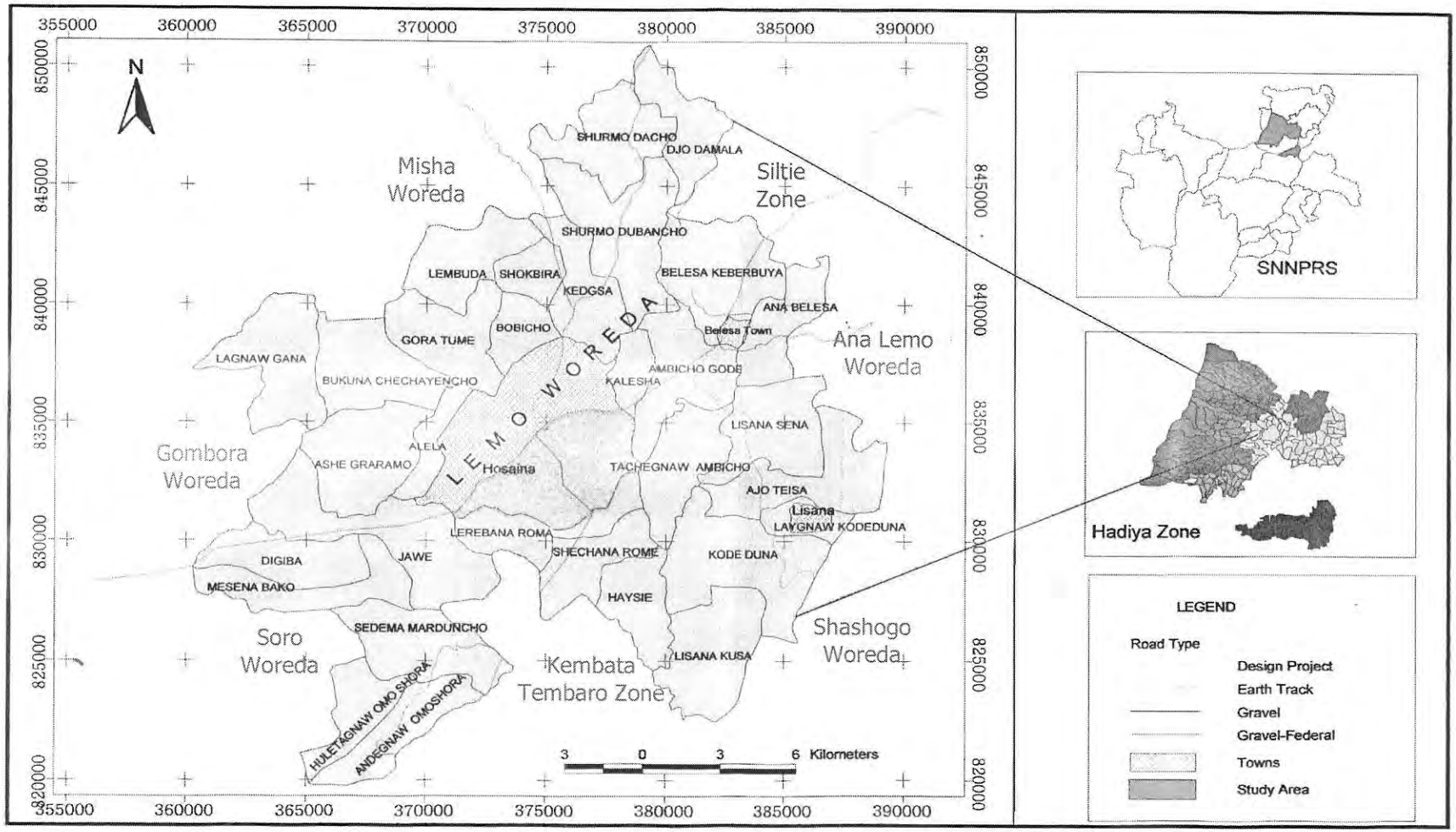

Figure 3-1: Location Map of the Study Area, Lemo *Woreda* (*Source:* SNNPRG, BoFED, GIS Section, 2007)

3.2. Relief and Climate

Hadiya Zone consists of diversified land relief; namely high mountains, low relief, plain lands, river valleys, etc. Elevation of the mountains ranges from 800 meters asl in Ghibe river valley in Ghibe *Woreda* to 2,700 meters asl at the summit of Sengiye in Duna *Woreda* (HZDoFED, 2006). As mentioned in HZDoTIUD (2004), the zone is stratified in three traditional agro-climatic zones; namely, *dega* (or the highland) (23.7%), *woina-dega* (or the intermediate highland) (64.7%), and *kolla* (the lowland) (11.6%). However, all the expanse of Lemo *Woreda* has only one agro-climatic zone: *woina-dega* (LWOoARD, 2007). According to the same source, *dega* is generally an agro-climatic zone which occupies an elevation between 2,500-3,000 meters asl, while the elevations for *woina-dega* and *kolla* are 1,500-2,500 and, 500-1,500 meters asl respectively. The altitude of Lemo *Woreda* ranges from 2,100-2,400 meters asl.

Climate can have a great impact on flora and fauna. Therefore, it is probably the most influential factor in socio-economic development. Lemo *Woreda* receives seasonal rainfall amount ranging between 469 and 1,168 mm annually in summer (locally named *hegeye*), which ranges from June to August (Yonas, 2003). The annual rainfall of Lemo *Woreda* in all the seasons ranges from 900 to 1,400 mm (LWOoARD, 2007). Based on the data obtained from Hossana Meteorological Station (cited in SERA, 2000), the intermediate highland parts (*woina-dega*) around Hossana City receives the mean annual rainfall of 1,139 mm with mean annual PET of 1,568 mm. The rainfall in the *woreda* is bimodal in temporal distribution. Months between June and September are the major rainy months (commonly called *meher*) for Lemo *woreda* while March to May are the second rainy months (called *belg*) (SERA, 2000). A period between October to February is usually dry in Lemo *Woreda* when most people face shortage of drinking water for themselves and their livestock. People have been suffering from shortage and erratic nature of rainfall. Especially, farmers at lower *woina-dega* used to supplement food production through *belg* rain. Hence,

absence of rain in March connotes an indicator of drought probability in the area, whereas heavy rain in autumn (i.e. September to November) is a symptom of wetness shock for upper *woina-dega* who mainly depends on *meher* crops such as wheat and barley.

From the temperature data collected for the last 30 years (1972-2000) at Hossana Meteorological Station (Yonas, 2003), means of the minimum and maximum annual temperature are 10.35 ^{0}C and 22.54 ^{0}C respectively, while the annual generalized mean temperature is 16.45 ^{0}C. In general, the climate in Lemo *Woreda* is a mild tropical highland type. It is convenient for the production of crops and rearing of livestock (LWOoARD, 2007). Especially, Hadiya Zone in general and Lemo *Woreda* in particular are notable to wheat production. This is probably the rationale behind the Zone's top standing in wheat production in the SNNPRG and for gaining its local nickname "The Miniature Canada or Mini-Canada".

3.3. Water Resources and Drainage

Hadiya Zone has a number of rivers and seasonal streams that drain it. They supply water for both drinking and sanitation purposes in many *kebeles*. Some of the rivers are recently used for irrigation in small-scale schemes. According to Yonas (2003), the major rivers that flow permanently throughout the year are Guder, Batena, Gombora, Bilate, Dogosa, Ghibe, Ameka, Bonka, Fofa, Gemuna, Cherake, Handosha, Honewa, Koraho, Ticho, Ajacho, Lintala, Gingita, and Jagani-Alabicho rivers. From these rivers, Gombora, Dogosa, Ameka, Gemuna, Handosh, Horuwa, and Ticho with their tributaries drain into Ghibe River. Together with Ghibe River, they end in Omo River. Similarly, Bonka, Cherake, Gingita, and Jagani-Alabicho drain to Bilate River and flow to Lake Abaya. The longest rivers are Bilate, Guder, Gombora, Gemuna, and Ghibe with the total drainage length of 116, 76, 69, 75, and 42.5 kilometer respectively. From these rivers, Guder, Batena and Gombora drain across Lemo

Woreda. In the zone, there are no big structural, volcanic, or manmade lakes apart from the small swampy lake named Boyyo located in Shashogo *Woreda*.

3.4. Soil Types and Fertility Status

The *woreda's* surface morphology comprises landforms like plains, plateaus, and mountains. Topographies with steep slopes are usually excessively drained forming coarse textured shallow soils. On the other hand, soils of flat plains are often poorly drained, black in color, clay in texture, and relatively deep. Areas with moderate slope gradients of 3-6 percent are usually well-drained forming reddish brown, deep, and relatively fertile soils. Physical hazards, like flooding, commonly occur in flat plains surrounded by steep sloped hills and mountains, whereas hazards like severe soil erosion usually affect side slopes of hills, rolling plains and mountains with poor land cover (SERA, 2000). According to the estimated figures in this source, about 20% of Lemo *Woreda* is flat, which appears with frequent breaks. These flat plains are well known for their repeated flood hazard. On the other hand, the hilly, rugged, and undulating terrain dominating the *woreda* exposed to soil erosion of varying degree of severity.

Experts of the LWOoARD and the key informants agree that the soils of the *woreda* mostly are not fertile for they have been repeatedly cultivated under high population pressure for longer period. Consequently, it is impossible to get enough crop yields to sustain communities' livelihood without the application of chemical fertilizers. According to LWOoARD (2007), flat plains totaling about an area of 20% of the *woreda* is either poorly or imperfectly drained; whereas the remaining 80% is either well or excessively drained. According to the same source, about 15% of the *woreda's* soils are silt-clayey-loam with the remaining 85% being sandy-clayey-loam in terms of texture. Concerning the soil classification made by FAO in 1997, molic andosols, eutric nitosols, chromic luvisols and lithosols are the dominant ones in the

woreda, with nitosols making the major portion (MoA, 1998 cited in HZDoFED, 2006).

3.5. Vegetation

The 1997 Woody Bio-mass Study (MoA, 1998 cited in HZDoFED, 2006) indicated that presently there is no any significant natural forest in the *woreda*. The key informants also agree that the residual natural forests existed even in the near past have been drastically cleared to get cultivation land. Most trees (which are mainly exotic) are planted at backyard farming in ridges, most of which are inundated by eucalyptus tree. Though eucalyptus is playing considerable role in fuel, fencing, sheltering and sale, some experts of Lemo *Woreda* were complaining for its demerits in reducing soil fertility. Except in very few of the poorly drained flat plains where the grazing lands are hardly any preserved due to natural factors, remarkable grazing lands are not available in almost all parts of the *woreda*. Even from the very few types of grazing lands available, the overwhelming portions are not accessible for grazing during rainy season due to flooding problem. Thus, shortage of grazing land is among the critical problems repeatedly mentioned by the community members in KIIs and FGDs during this study.

3.6. Land Use Pattern and Agricultural Practice

Particularly, in the context of agriculture, land is a critical resource that stands forefront in ensuring availability and access to food. According to LWOoARD (2007), Lemo *woreda* has an area of 25,569 hectare (6.9% of an area of Hadiya Zone). Out of this, 19,502 hectare is cropland; 2,221 hectare, forestland; 1,088 hectare, grazing land; 554 hectare, land with different institutions; 1, 272 hectare, eroded and temporarily uncultivable land; 932 hectare, others (i.e. land covered with infrastructures like roads, etc.). This shows that majority of the available land (76.3%) is already under cultivation. Moreover, crude agricultural density (rural population to cultivated land) is 542 persons per square kilometer.

Lemo *Woreda* is typified by a subsistence mixed agriculture. A considerable number of households were leading their livelihoods by the concomitant involvement in crop production and sedentary livestock husbandry. Agricultural production in the *woreda* did not go without difficulty. Crops, for instance, could be lost by natural and manmade factors; animals can get morbid and mortal. These in turn are hurdles to assure food security.

3.6.1. Crop Production

The sample householders acquire majority of their income through crop production. The major food crops grown in *meher* season by the sample householders were wheat (*Triticeae triticum*), barley (*Hordeum vulgare*), maize (*Zea mays*), sorghum (*Sorghum bicolor*), *teff (Eragrostis tef)*, field pea (*Pisum sativum*), faba bean (*Vicia faba*), lentil (*Lens culinaris*), chickpea (*Cicer arietinum*), potato (*Solanum tuberosum*), and *enset* (*Ensete ventricosum*). Besides these, the following food crops were also grown in the study *woreda*; namely, finger millet (*Eleusine coracana*), oat (*Avena sativa*), haricot bean (*Phaseolus vulgaris*), rapeseed (*Brassica napus*), linseed (*Linum usitatissimum)*, and nigerseed (*Guizotia abyssinica)* (LWOoARD, 2007). These crops demonstrate that the study area is a typical *woina-dega*. Among the crops produced in *meher*, *enset*, potato, and maize were the major ones that could also be grown in *belg* season.

3.6.2. Animal Husbandry

Livestock production was another means for making livelihood of the sample households. They tended their livestock, for they serve the purposes of pack, draught power, cash income, and food. Livestock were also used as an indicator of wealth ranking. Unless for coping against food insecurity situations and other household calamities, the householders never used to sell large ruminants and equines. They had been selling crops and chickens mostly as well as small ruminants at times to cover fees for land taxes and other government obligations, agricultural inputs, clothing, school, *meskel*, and other socio-religious celebrations, etc.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

Out of the two elements of the major objective of the study (description and explanation), the former was taken care in Chapter 3. In this chapter, empirical and analytical explanations with particular emphasis paid to the three key issues of this study; namely, level, determinants, and coping strategies are made in separate sub-sections.

4.1. The Human Environment

4.1.1. Demographic Characteristics

According to HZDoFED (2007), current total population of Lemo *Woreda* is estimated to be 116,748. Out of this, 105,785; 10,963 and 109,746 are rural, urban, and agricultural population respectively.

Table 4-1 shows the demographic composition of the 150 sample households. Their total population was 1,035, of whom 47.92% were males and the remaining (52.08%) were females. The female population outrun the male population giving a sex ratio of 112.96%. Household sizes ranged from 1 to 16. The average household size in the sample households was 6.9. According to the results of the 1994 Population and Housing Census (CSA, 1996), average household size in Hadiya Zone for urban, rural, and urban-rural combined were 5.4, 5.0 and 5.4 respectively. The result of the sample survey seems more exaggerated than the zone's average. Among others, this may be due to additional-to-real report made by the survey interviewees to the number of household members during their response, which, in turn, may be due to their mind-set of expectation for some sort of aid (donation). Some of the

respondents appeared as if they were expecting something out, for they were forwarding a query, "What will be yielded in return to my responses?" Males in young age group were somehow smaller than in other age groups mainly because of their out-migration in search of non-farm employment in urban areas. The case of shoe polishing and shining activity practiced in Addis Ababa by teenagers of Hadiya is a case in point.

Table 4-1: Demographic Composition of the Sample Households by Broad Age Category

Age	*Ana Bellesa*			*Gora Tume*			*Shurmo Wit-Bira*			*Grand Total*			
	Male	*Female*	*Sub total*	*Male*	*Female*	*Sub total*	*Male*	*Female*	*Sub total*	*Male total*	*Female total*	*Grand total*	*% of Grand total*
0-14	55	72	127	41	58	99	132	139	271	228	269	497	48.0
15-64	52	61	113	75	82	157	121	134	255	248	277	525	50.7
65+	2	0	2	7	0	7	1	3	4	10	3	13	1.3
Total	109	133	242	123	140	263	254	276	530	486	549	1035	100.0
	45%	55%	100%	46.8%	53.2%	100.0%	47.9%	52.1%	100.0%	47%	53%	100%	
	23.4%			25.4%			51.2%			100.0%			

Source: Author's Computation from the Field Survey (2007)

Majority of the population were those between the ages 15 and 64 (the productive age group). They made 50.7% of the total population in the sample households of the three *kebeles*. The population segment under the age of 15 years (young age group) was 48% of the total population. The absolute number of individuals with the age 65 and above was thirteen. It is known that in rural setting of Hadiya Zone, youngsters with ages between 7 and 14 are used to be deployed locally in productive works like hand-weeding, plough within maize and sorghum fields, etc. Even, some of them had been leaving for cities in search of self-employment, like shoe polishing. Though this is the prevailing situation in the zone, in this study, the conventional categorization (15-64 years) was taken for the working age population. Accordingly, the overall age-dependency ratio was 97.1%, which comprised 94.7% young-age and 2.5% old-age dependency ratios. These ratios are similar to results for Hadiya Zone indicated in the results of the 1994's Housing and Population Census (CSA, 1996): 98.2% overall dependency consisting of 94.5% young-age and 3.7% old-age dependency ratios. If the prevailing population structure of the study area is left unchecked by effective adaptive measures that harmonizes the merits and demerits of population growth, the fact that majority of the population was those under the working age category implies that the need of environmental resources (like additional land for cultivation, wood for fuel, etc.) is stepping up. This, in turn, poses a threat to environmental degradation making control and preventive solutions towards food insecurity more and more complicated.

The issue of population growth as per the existing land is a crucial one. The respondents, as a result, were asked about their attitudes on their current household size and its change status since the last five years, and the result of their responses is shown in **table 4-2**. Accordingly, 16% are in need of further birth while 47.4% responded that their household members are sufficient. The rest, 27.3% and 9.3%, reacted that their household sizes were large and excessive respectively. This indicates that 84% seemed to prefer to quit further birth. This, in turn, may imply the

perception they developed towards the heavy burden levied on their daily livelihood through unplanned and large family sizes.

Table 4-2: Attitude of the Respondents on the Current Household Size and its Change Status since the Last 5 Years

		Male (a)	*% of total*	*Female (b)*	*% of total*	*Total (a + b)*	*% of total*
Respondents' Attitude on their Current Household Size	*Small*	17	13.5	7	29.2	24	16.0
	Enough	60	47.6	11	45.8	71	47.4
	Large	35	27.8	6	25.0	41	27.3
	Excessive	14	11.1	0	0.0	14	9.3
Total		126	100.0	24	100.0	150	100.0
Respondents' Attitude on Change Status of their Household Size since the Last Five Years	*Increased*	49	38.9	0	0.0	49	32.7
	Decreased	6	4.8	22	91.7	28	18.6
	Unchanged	71	56.3	2	8.3	73	48.7
Total		126	100.0	24	100.0	150	100.0

Source: Author's Computation from the Field Survey (2007)

Concerning change in household size since the last five years, 48.7% responded that no change had been observed since the last five years. Nevertheless, the remaining (51.3%) reported the presence of cumulative change in their household sizes. The major causes for the change were birth, immigration, death, and emigration. The key informants and the focus-group discussants mentioned that birth highly surpasses death while emigration exceeds immigration in the study area. They, however, repeatedly mentioned to the enhancement of advocacy of family planning and

provision of the contraceptives towards birth control as it had been the leading factor for the cumulative change in population dynamics.

Table 4-3 shows the working age population of the sample households by their regular employment type. Among the economically active age group, 7.6% males and 2.5% females were unemployed in any regular productive activities. The proportion of students was 31.9%, with males outnumbering females. This indicates that out of the total active population, those who made themselves regularly involved in farm, off-farm, and non-schooling non-farm productive activities were 63.2%. Thus, the age dependency ratios abovementioned could not trace all these gaps, making actual dependency ratio much larger at least in the short-run than the computed one through conventional age categories.

Table 4-3: Economically Active Household Members by Productive Regular Employment

Regular Employment Type	*Male (a)*	*% of total*	*Female (b)*	*% of total*	*Total (a + b)*	*% of total*
Farmers	115	46.0	24	8.6	139	26.2
Housemaids	0	0.0	98	35.0	98	18.5
Students	98	39.2	71	25.3	169	31.9
Other Employees in Productive Ventures	18	7.2	80	28.6	98	18.5
Unemployed	19	7.6	7	2.5	26	4.9
Total	250	100.0	280	100.0	530	100.0

Source: Author's Computation from the Field Survey (2007)

4.1.2. Ethno-linguistic and Religious Issues

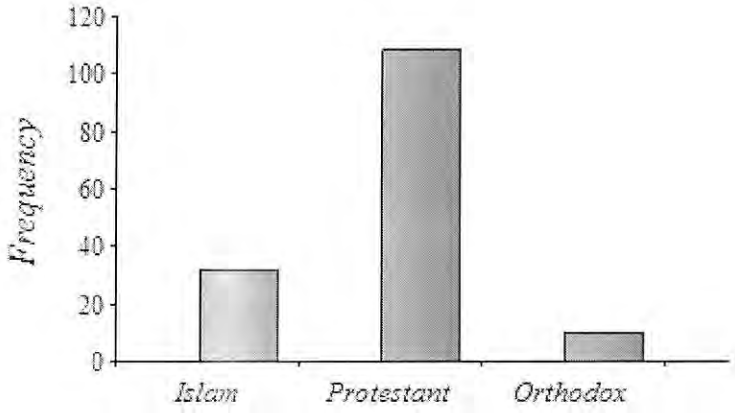

Figure 4-1: Religion of Household Heads

Source: Author's Computation from the Field Survey (2007)

All the sample household heads reported that they are from Hadiya ethnic group. As it is true in most parts of Ethiopia, the mother tongue of the respondents is consistent with their ethnicity. Thus, all the respondents were *Hadiyigna* speakers as their mother tongue. As shown in **figure 4-1**, the sample household heads pursue one of the three religions; namely, Islam, Protestantism, and Orthodox Christianity. Protestants outnumber pursuant of other religions.

4.1.3. Literacy Status

Table 4-4 presents results on literacy status of the sample household heads. Out of the sample household heads, only four of the 24 females who were heading their

households were literate[13]. Out of the 126 male-headed households, 55.6% household heads were literate and the rest (44.4%) were illiterate. This could be one of the indicators impeding food security enhancement in the locality. The relatively highest illiterate household heads were found in Ana Bellesa *kebele*. This was mainly due to the farther school access in the kebele than in other sample *kebeles*.

Table 4-4: Literacy Status of the Sample Household Heads

Kebele	*Literate*						*Illiterate*					
	Male	*% of Total*	*Female*	*% of Total*	*Total*	*% of Total*	*Male*	*% of Total*	*Female*	*% of Total*	*Total*	*% of Total*
Ana Bellesa	9	12.9	1	25	10	13.5	16	28.6	8	40	24	31.6
Gora Tume	15	21.4	1	25	16	21.6	17	30.3	10	50	27	35.5
Shurmo Wit-Bira	46	65.7	2	50	48	64.9	23	41.1	2	10	25	32.9
Total	70	100.0	4	100	74	100.0	56	100.0	20	100	76	100.0

Source: Author's Computation from the Field Survey (2007)

4.1.4. Landholdings and Crude Agricultural Density

As descriptive statistical analysis on the sample survey data indicates, the minimum landholding size was "zero", that is land-less, and the maximum was 3.25 hectare[14]. The average landholding size (a proxy used for per capita landholding) of the sample households was 0.92 hectare. This measure of central tendency might mislead since it could not show variations among the sample householders. There was a significant variation in the size (distribution) of the landholdings among the sample householders. The standard deviation was 0.57. The descriptive analysis further

[13] In this study, the term *"literate"* refers to those who at least can read and write through the knowledge acquired by formal, non-formal, or informal education.

[14] Almost all respondents replied their landholding size by *timad*. *Timad* is an Amharic term and used in most parts of Ethiopia to represent quarter of a hectare

showed that the total landholding of all sample households was estimated 138.50 hectare.

Table 4-5: Distribution of Landholdings among the Sample Households

Land Held (hectare)	*Ana Bellesa*	*Gora Tume*	*Shurmo Wit-Bira*	*Total*	*% of Total*
0	0	0	6	6	4.0
0-0.25	1	3	3	7	4.7
0.25-0.50	11	14	8	33	22.0
0.50-0.75	14	5	12	31	20.7
0.75-1.00	7	6	23	36	24.0
1.00-1.25	1	6	10	17	11.3
1.25-1.5	0	1	4	5	3.3
1.50-1.75	0	1	2	3	2.0
1.75-2.00	0	2	3	5	3.3
>2.00	0	5	2	7	4.7
Total	34	43	73	150	100.0

Source: Author's Computation from the Field Survey (2007)

Table 4-5 depicts the distribution of landholdings among the sample households. The majority (66.7%) of the sample households possessed between 0.25 and 1.00 hectare. Only 4.7% of the householders had more than 2.00 hectares. Those possessed below 0.5 hectare were 8.7%. Those cultivating less than a hectare were about three-quarters. About 4% of the sample householders, who all were living in Shurmo Wit-Bira *kebele*, were landless. On contrary to this, it was in this *kebele* that majority of the well-favored landholders, with the ownership sizes exceeding two hectares, were found.

Out of the total agricultural landholding, those who held land with "certification" book[15] were about three-fifth. The other land possession types were those rented in, share cropped from and/or transfers (gifts and inheritances). Moreover, landholders with certification book were used to cultivate additional lands mainly acquired by renting in and share cropping from those with cash problems, lack of draught oxen, lack of labour, etc. Mostly renting out (sharecropping to) was a common practice. Giving out and permanent "selling" was reported in rare cases. Out of the six land landless households, one "sold" his landholding for several socio-economic reasons.

As aforementioned in **table 4-1** and presentation of the results of the descriptive statistical analysis, the total population and total landholdings of the sample householders (in hectare) were 1,035 and 138.50 respectively. From this, it can be calculated that crude agricultural density (CAD) was 7.47 persons per hectare (or 747 persons per square kilometer). Unless feasible adaptive measures are taken, the situations will get worse and worse: CAD in general and the number of households with small landholdings in particular will increase as time goes on.

More than two-third of the sample householders replied that there had not been any change in the sizes of their landholdings since the last fifteen years. Hardly any all-encompassing redistribution and readjustment activities were launched in the communities at least for the last thirteen years. If any change in landholdings size happens to occur, it was within less than one-third of the sample households, mainly through inheritance and/or pushing ahead the communal land. All the respondents (95%), however, mentioned that agricultural lands were diminishing in size at their localities. This had been putting pressure generally on quality of land. For fear of the dwindling in the land carrying capacity, in addition to effective implementation of family planning, participants in KIIs and FGDs repeatedly mentioned the necessity for

[15] ***Certification book*** is a book given by administration division of rural land utilization in LWOoARD to the land rent (tax) paying households, which, among others, details the right to inherit land by the possessor.

enhancement of intensive cultivation accompanied by use of artificial yield-boosting inputs as well as the promotion of off-farm and non-farm ventures. Moreover, they stated resettlement of people from the localities of the *woreda*, where dense population and high environmental degradation are found, to the sparsely populated areas in the SNNPRG or somewhere else. They, however, underscored the prerequisite of assuring the willingness-to-resettlement from the sides of both settlers and recipients. Furthermore, they suggested preparations needed in advance by the sides of government and/or NGOs (if any) in facilitating owning of basic needs and some utilities. Despite the critics by some peoples against the current ethno-linguistic administrative regionalization for its possibility to be a bottleneck to resettlement, the practice in reality was promising. With this regard, officials of the LWOoARD mentioned that Hadiya people in thousands were settled three years ago in different parts of the SNNPRG and are making progress in their livelihood security. The KIIs and FGDs also ascertained the same. Moreover, no returnee was reported.

The variation in the farm landholdings within kebeles was not only in their sizes and fertility status but also in their fragmentation. The farmers reported that they had been undertaking their agricultural production in more than one parcels of land that were located relatively far apart. Official redistribution (about three decades ago) and periodic allocation to new land claimants (like the war-displaced) as well as the inherited transfer to descendants were the main ones that brought fragmentation of landholdings. As concerns the fragmentation status, analysis of descriptive statistics indicated that the minimum, maximum and average number of parcels were one, five and 1.6 respectively. Totally 234 parcels were reported. Their standard deviation was 0.83; moreover, households possessing only one parcel were the most frequent.

Table 4-6: Spatial Distribution of Landholdings: Fragmentation Status

Number of Parcels Held	*Number of Households*				
	Ana Bellesa	*Gora Tume*	*Shurmo Wit-Bira*	*Total*	*% of total*
1	14	21	46	81	56.2
2	17	12	11	40	27.8
3	3	8	9	20	13.9
4	0	1	1	2	1.4
5	0	1	0	1	0.7
Total	34	43	67	144	100.0
Missing cases	0	0	6	6	

Source: Author's Computation from the Field Survey (2007)

Table 4-6 shows the number of landholdings' fragmentation distributed spatially at irregular intervals. Out of the total sample householders, 43.8% replied that they were possessing fragmented lands with at least two parcels. About two-fifth (41.7%) of the sample householders possessed their landholdings with parcels ranging from two to three.

Agriculturalists in LWOoARD argued that had the landholdings not been fragmented, the effectivity and efficiency in which land can be utilized and crops managed could have been improved. Thus, money, labor, and time expenditures that could have been higher will be relatively fair. Moreover, it could have been better to extend soil-based extension activities. This could be the general truth behind. Few of the respondents, however, reported the merits of parceled location of their landholdings, in virtue of variations inherent in fertility status among the parcels.

About 69.8% of the sample households utilized all their landholdings for crops cultivation. The rest householders kept some of their holdings for grazing, fallowing, and/or tree planting. Among the total landholdings, those under persistent cultivation

were 133.25 hectares (96.6%) of the total. Only one-fifth of the respondents perceive that their landholdings were fertile or moderately fertile. This could be due to several reasons as they reported that they had been applying crop rotation (mostly legumes-based), using dung for soil manure, and applying external inputs like chemical fertilizers so that inherent soil nutrients could not be depleted easily. However, the overwhelming majority (97.6%) of the respondents were complaining for exorbitant prices of the chemical fertilizers, which had been getting nearly unaffordable. The problem of soil erosion in the sample households is not severe. Three-quarters of the households indicated the minor problem while the rest were not facing any soil erosion. Moreover, sample householders who had been facing water logging, lasting one to two months and covering 0.125 to 0.25 hectares were only two. Only one household was utilizing a small-scale drip irrigation scheme from the nearby running water.

4.1.5. Access to Agricultural Extension and Credit

All sample households replied that they had access to agricultural extension in the form of knowledge transfer. That is, development agents and experts from the LWOoARD had been advising and guiding them in their course of agricultural production. The variation among the sample households was, however, in agricultural extension aimed at transfer of technologies like improved chicken breeds, improved seed varieties, chemical fertilizers, water harvesting ponds, etc. These were non-refundable and/or interest free. Most of these assistances that were geared to the escalation of agricultural production and productivity came from governmental organizations. Hadiya Zone in general and Lemo *Woreda* in particular had been in paucity of NGOs. The NGOs that had been prevailing in the area were mostly church-based. If the services from them happened to be non-communal in nature, all other individual-based assistances would be engineered mainly to the members of that denomination. Rural households accessed most credit services for income generating

schemes from branches and sub-branches of Omo and Wisdom MFIs. Obtaining credit through Licha Hadiya Farmers Cooperative Union was possible for its members and those who paid back completely the previous years' debts.

Table 4-7 shows utilization of agricultural inputs and access to assistances and credits. Out of the total sample households surveyed, 11 had obtained different assistances from various sources. Only two in Ana Bellesa, one in Gora Tume, and four in Shurmo Wit-Bira had been donated draught oxen by South Central Synod. Farm Africa dairy goats' project provided the goats for only four sample households in Ana Bellesa and Gora Tume. Among those who did not receive assistance, only two replied their disinclination to take even if the assistances had been made available. Otherwise, all the rest (137) sample households expressed that they could have been assisted if NGOs of charity with sufficient resources had been in place. Livestock and Fisheries Development Division of the LWOoARD facilitated credit for the purchase of flocks of poultry in 1, 6, and 5 sample households of Ana Bellesa, Gora Tume, and Shurmo Wit-Bira respectively.

In Ana Bellesa, Gora Tume and Shurmo Wit-Bira, 18, 25, and 37 households respectively had chances of credit access for the purchase of improved seeds. The seeds were supplied by Ethiopian Improved Seed Organization and gathered from local farmers who produced improved seed. Out of the 54.7% of the households who took credit for the purchase of improved seed varieties and sown (utilized), 26.8%, 11.0%, 62.2% were households in Ana Bellesa, Gora Tume, and Shurmo Wit-Bira respectively.

Table 4-7: Access to Agricultural Extension, Assistances and Credits as well as Utilization of Agricultural Inputs and[16]

	Ana Bellesa	*Gora Tume*	*Shurmo Wit-Bira*	*Total*	*% of Total*[17]
Chemical fertilizer supplied through credit (Qt)	45.25	47.13	86.00	178.38	
Utilization of improved seeds	22	9	51	82	54.7
Herbicide application	39	27	71	137	91.3
Pesticide application	0	0	0	0	0.0
Insecticide application	0	0	0	0	0.0
Access to poultry supply	1	6	5	12	8.0
Access to goats supply	3	1	0	4	2.7
Access to oxen supply	2	1	4	7	4.7

Source: Author's Computation from the Field Survey (2007)

The credit to fertilizer and its supply were through Licha Hadiya Cooperative Union. However, the focus group discussants mentioned that no household was observed sowing without fertilizers. What had been seen was under-sowing. Those who were unable to get credit were purchasing from the "black" market at an exorbitant price, mostly by the sale of small ruminants. This reduced amount of fertilizer purchased and depleted their assets. Moreover, the supply was late having a direct impact on seeding time. These all consequentially led to decline in crops productivity and net benefit from the sector. Nearly all of the sample households (91.3%) mentioned that they mainly apply herbicides rather than hand-weeding.

[16] All variables in the table are expressed in number of households, except the chemical fertilizer stated in quintals

[17] The "total" here stands for 150 (size of surveyed households).

4.1.6. Agricultural Production

4.1.6.1. Crop Production

Table 4-8 shows food crops production by sample households in *belg*-1998 E.C and *meher* 1998/99 E.C combined. About 71.3% of the total sample households produced at least one annual crop in landholdings that were private, sharecropped, and/or rented. In bulk production (measured in kilogram), *enset (qocho)* constituted about half of the total food crops produced by the sample householders. Potato stood second. Nevertheless, in studies like food insecurity, bulk food availability does not suffice. Thus, to provide a universal yardstick to better comprehend the issue with regard to food insecurity and enable comparisons, the produces were expressed in terms of kilocalories-equivalent. In connection to this, wheat stood first constituting about one-third of the total calorific production. Yet, *enset* stood second. Participants in FGDs and KIIs were repeatedly mentioning the non-substitutable role of *enset*. They nicknamed *enset* as "insurance corporation" they established. *Enset* is every thing for every time and every one. Since *enset* is drought resistant, it insured them against bad times (like the 1977 E.C famine). The poorer segment of the people used to depend on the lesser quality of its products, *qocho* and *amicho*. It, moreover, yields sisal and *hoficho*, which in turn can be used for managing livestock by tying, shelter construction, fencing, filtration, etc. They witnessed the absence of technology transfer from research outputs except the introduction of modern *enset* decorticator and *qocho* squeezer. As a result, they were complaining of longer maturity period of *enset*, expressing their demand to fast maturing varieties.

Table 4-8: Food Crops Production of the Sample Households (*Belg* 1998 E.C and *Meher* 1998/99 E.C. Combined): Expressed in Kilograms and Kilocalories

Crop Type	*Ana Bellesa (Kg)*	*Gora Tume (Kg)*	*Shurmo Wit-Bira (Kg)*	*Total (Kg)*[18]	*% of Total*	*Total (Kcal)*[19]	*% of Total*
Wheat	19,950.0	37,200.0	49,200.0	106,350	18.50	355,209,000	36.67
Barley	5,970.0	3,850.0	6,150.0	15,970	2.78	53,020,400	5.48
Maize	6,770.0	2,050.0	23,350.0	32,170	5.60	114,525,200	11.82
Sorghum	4,130.0	150.0	550.0	4,830	0.84	16,566,900	1.71
Teff	3,430.0	5,100.0	3,150.0	11,680	2.03	39,712,000	4.10
Field pea	2,750.0	200.0	1,250.0	4,200	0.73	14,532,000	1.50
Faba bean	2,100.0	5,350.0	7,250.0	14,700	2.56	50,127,000	5.18
Chickpea	400.0	0.0	0.0	400	0.07	1,432,000	0.15
Lentil	150.0	0.0	0.0	150	0.03	519,000	0.05
Potato	30,900.0	15,400.0	65,200.0	111,500	19.40	74,705,000	7.71
Enset (Qocho)	745.2	376.8	1,606.0	272,800	47.46	248,248,000	25.63
Total	77,295.2	15,776.8	66,806	574,750	100.00	968,596,500	100.00

Source: Author's Computation from the Field Survey (2007)

It should be reminded that not all crop produces were consumed. For instance, portions of them were sold; some were lost post harvest; while the other were

[18] The respondents replied all crops except *enset* by quintal. *Enset* was reported by number of stands. 40Kg of *enset* products, namely, *kocho* was taken as estimate of produce from a single stand of *enset* crop (http://www.wikipedia.org/wiki/enset)

[19] The calorific composition (in Kcal) of 1Kg of each crop was taken from food composition tables prepared by FAO (2001) for international use. According to this source, Kcal per 1Kg of wheat=3,340; barley=3,320; maize= 3,560; sorghum=3,430; pea=3,460; faba bean=3,410; lentil=3,460; chickpea=3,580; and potato=670. The value for enset is that of average for root crops and tubers (910) and for teff is that of cereals' average (3,400).

reserved for seed. The householders used to sell food crops to cover different expenses mentioned below. Some of the households were growing cash crops like *chat* and coffee. Notwithstanding its irregular "maturity" for sale; especially *chat* had been playing a considerable role in covering household expenses. Had all the produced food crops consumed, household with the maximum daily per capita calorific intake could have been the one with 14,627.40 kcal (nearly sevenfold of the minimum recommended intake, 2,100 kcal). On the contrary, four households completely depended on food sources that they did not produce: they were trying to make their food accessed through purchase, aid, etc. Similarly, about 61 households could not fulfill the minimum per capita average requirement even if all crops produces were assumed for consumption. The least score was a household, who produced per capita kilocalories of crops food, amounting 218.7 kcal. Hence, net consumption (the amount of food produces that were actually consumed together with those acquired for consumption through other means) is presented in sampled households actual calorific intake.

Considerable number of the respondents (69.7%) mentioned that their crops production per hectare (i.e. the productivity) was dwindled for the last five years. They stated the supply problem of chemical fertilizers as the major reason behind the decline in productivity. All participants of FGDs agreed that there had been a supply problem of agricultural inputs, especially chemical fertilizers, in terms of appropriate seeding time as well as in demanded amount and type. According to them, mainly the non-returnability and fungibility problem of fertilizer credit had distorted the normal distribution. They also mentioned drought and erratic rainfall as factors that were detrimental to crops productivity.

4.1.6.2. Animal Husbandry

The sample households were raising species of livestock from bovines, equines, and aves. Chicken (*Gallus gallus*) was the only among the aves. **Table 4-9** shows the livestock types possessed by the sample householders in both an absolute number and a universal yardstick, tropical livestock unit (TLU).

Table 4-9: Livestock Types Possessed by the Sample Households: Expressed in Absolute Number and Tropical Livestock Unit

Livestock Type	*Ana Bellesa (No.)*	*Gora Tume (No.)*	*Shurmo Wit-Bira (No.)*	*Total (No)*	*% of Total*	*Total (TLU)*	*% of Total*
Oxen	33	41	71	145	8.6	162.4	23.5
Bulls	46	17	55	118	7.0	94.2	13.6
Cows	58	54	81	193	11.5	154.0	22.3
Heifers	41	13	39	93	5.5	74.2	10.8
Calves	38	27	44	109	6.5	87.0	12.6
Sheep	39	73	100	212	12.6	18.9	2.7
Goats	31	23	14	68	4.1	4.8	0.7
Donkeys	21	18	34	73	4.4	36.5	5.3
Horses and Mares	4	10	21	35	2.1	45.5	6.6
Mules	2	2	4	8	0.5	7.2	1.0
Chicken	173	124	327	624	37.2	6.2	0.9
Total	486	402	790	1,678	100.0	690.9	100.0

Source: Author's Computation from the Field Survey (2007)

The total number of livestock possessed by the sampled households was 1,678. The possession ranged from those who lacked any livestock to those with the maximum possession of 36 and with a per capita ownership of nearly 11. In absolute number, chicken constituted about two-fifth of total livestock possessed by the sample householders, with the sheep stood second. Nevertheless, in studies like food

insecurity, the mere absolute number does not meet comparison requirement. Thus, to provide a universal yardstick to better comprehend the issue with regards food insecurity and enable comparisons, the livestock possessions were expressed in terms of TLU equivalent. The concept of TLU[20] provides a convenient method for quantifying a wide range of different livestock types and sizes in a standardized manner. With this regard, oxen stood first followed by cows, both making nearly half of the total possessions of farm animals by the sample householders.

Table 4-10: Number of Oxen Possessed by the Sample Householders

Number of Oxen	*Number of Households*				
	Ana Bellesa	*Gora Tume*	*Shurmo Wit-Bira*	*Total*	*% of Total*
0	6	16	22	44	29.3
1	24	16	34	75	49.3
2	3	9	14	28	17.3
3	1	1	3	8	3.3
4	0	1	0	5	0.7
Total	34	43	73	150	100.0

Source: Author's Computation from the Field Survey (2007)

For traditional farmers like those in Lemo *Woreda*, animal driven traction is a non-substitutable production factor. Lack of oxen can be one of the determinants that lead a household to food insecurity. Those landholders without oxen had been sharecropping and renting their lands to others as well as committing their labor in exchange for oxen.

[20] The standard used for one TLU is one animal with a body weight of 250 Kg. Hence, the following TLU values were used in this study, which were cited in Degefa (2002) and Alem (2005). Ox= 1.12; Other cattle= 0.7979; Sheep= 0.0892; goat= 0.07; Horse= 1.3; Donkey= 0.50; Mule= 0.9; Chicken= 0.01

As shown in **table 4-10**, the sample householders ranged from "oxless" to those owning two pairs of draught oxen. Out of the total, 29.3% sample households were oxless. Moreover, about 49.3% were those with only one ox. Nevertheless, as in most other parts of Ethiopia, the traction technology in the study were towing by pair of oxen. This implies that about three-quarters of the sample households were suffering from the absence and shortage of animal-pulled traction power.

All respondents mentioned the decrease in livestock productivity both in giving birth and in their products like milk, egg, meat, etc. for the last five years. All the respondents and the key informants ascribed this greatly to the shortage of animal feed in both rainy (commonly *kiremt*) and dry (*bega*) seasons. They reported the critical shortage of animals' feed in the sample households in particular and in their communities in general. The shortage was in forests to browse, grasses to graze or cut-and-carry, and crop residues. The encroachment of forests and grasses through cultivation was the major cause for the shortage of grazing and browsing lands. Due to their diminishing, especially in *bega*, the sample householders were diverting some and at times all of their crop residues to fencing and fuel (like stalks of maize and sorghum) as well as roofing (like straws of wheat). Even worse than the considerable dwindling in sizes of the grazing and browsing lands, productivity of the ones left behind was also decreased, mainly due to the overstocking. During the rainy season, the livestock were mainly dependent on overgrazed and overbrowsed communal lands, followed by cut-and-carried grasses and occasionally crops (like maize stalk and *enset* tubers).

4.1.7. Rural Credit as well as Off-farm[21] and Non-farm Incomes

In general, a rural household can generate income from his/her farm as well as involving in the activities of off-farm and non-farm ventures. In the study area, off-farm activities were weeding, ploughing, tilling, *enset* decortication, threshing, mowing, etc. Non-farm activities in the communities included weaving (spinning), pottery, blacksmithing, wood/bamboo works, sale of local drinks, other petty trade, non-agricultural daily and wage labour, etc. In this study, labour-based activities of the "productive safety net" program were taken as off-farm ones. Furthermore, remittances, gifts, inheritances were considered as non-farm incomes in this research. Though it was tried, reliable responses on the incomes of these activities were not possible. As a result, approximation of the longitudinal survey design with the cross-sectional one was restricted for this issue to whether they were participated in the activities or not.

Table 4-11: Participation of the Sample Householders in Off-farm and Non-farm Activities

Activities Type	*Participation Status*	*Ana Bellesa*	*Gora Tume*	*Shurmo Wit-Bira*	*Total*	*% of Total*
Off-farm	*Participated*	3	16	18	37	24.7
	Not Participated	31	27	55	113	75.3
	Total	34	43	73	150	100.0
Non-farm	*Participated*	5	7	23	35	23.3
	Not Participated	29	36	50	115	76.7
	Total	34	43	73	150	100.0

Source: Author's Computation from the Field Survey (2007)

[21] Off-farm activities include those activities where a household member works out against payment in cash and/or in kind at someone else's farm other than his/her or in some other agriculture related activities (SERA, 2000[b]).

Table 4-11 shows involvement status of any of the members of sample households in off-farm and non-farm activities by kebeles. In nearly 24.7% and 23.3% of the sample households, the household head or any of their members participated in off-farm and non-farm activities respectively.

4.1.8. Expenditures

The major expenditure items were agricultural inputs purchase (chemical fertilizers, herbicides, seeds, etc.), *meskel* and other religious festivities, purchase of complementary food items (which their farmlands could not produce like salt, edible oil, sugar, etc.), purchase of fuel (especially kerosene), land use rent, children's schooling, social issues (like *edir* and church offerings), clothing, etc. The focus group discussants agreed indifferently that in great majority of the households in the community, the proportions of their expenses towards these items had been in the order they are placed here. Most of these items had been covered through sale of crops produce as well as off-farm and non-farm incomes.

4.1.9. Productive Safety Net Program

Table 4-12: Productive Safety Net Program in 2006/2007

Public Work Participants Households			**Household members**			**Public Work Participants Households**			**Household members**			**Total Household Members**		
MH	FH	Total	M	F	Total	MH	FH	Total	M	F	Total	M	F	Total
2004	762	2766	5543	4759	10302	190	275	465	319	473	792	5862	5232	11094

Source: Author's Computation from the Field Survey (2007)

Table 4-12 shows pieces of information on productive safety net program. According to LWOoARD (2007), in the year 2006/2007, about 5,862 males and 5,232 females (totally 11,094) household members have been benefiting from the program. For the

year, about 2, 062,632 Birr was allotted for the program. Amongst the activities of the program, purchase of agricultural inputs and participation in public works were the major ones. According to key informants during fieldwork, the program has been changing the lives of those included in it. What they mentioned repeatedly was the problem of corrupted implementation of the officials.

4.2. Food Insecurity: Level, Determinants and Coping Strategies

4.2.1. Food Insecurity: Level

4.2.1.1. Sample Households Net Calorific Intake

In this study, the results for food security level of the sample households is presented prior to the generalized level of the study *woreda* at large, because it serves as a springboard to compute the level for the *woreda*. Model for food balance sheet (FBS) of the household is the one similar to the model of the study *woreda*, except their breadth of application: it is for the household, narrower level. The model was adapted from Degefa (2002). Accordingly, FBS of the sample household was prepared by the following model for 12 months (June 2006 to May 2007, both inclusive):

$$Fc_i = (Fp_i+Fb_i+Fa_i) - (Fl_i+Fr_i+Fs_i)$$

Fc_i: Food supplied for consumption;

Fp_i: Total food produced;

Fb_i: Total food bought;

Fa_i: Food aid (gift) gained;

Fl_i: Food lost post-harvest;

Fr_i: Food reserved for seed; and

Fs_i: Food sold

Except for post-harvest losses, all the data needed for the model were obtained through household sample survey. Post harvest losses were estimated by 15% of the total production, which was stated in a magazine of MoA of FDRE (Million, 2007).

Table 4-13 shows daily per capita food availability in kilocalories. The presentation of the results in the table is by comparing the available daily kilocalories for each person in the sample households with the minimum recommended intake (MRI). MRI was taken 2,100 kilocalories per person daily.

In order to convert crops obtained from several sources for consumption, conversion factors aforementioned in sub-section "crops production" were also employed to convert bulk measurement in kilograms to kilocalories-equivalent. As indicated in the above (**table 4-13**), analysis of the food balance sheet of the sample households depicts that considerable number of households comprise members facing serious food shortage during the months under survey. The minimum daily kilocalories in the three sample kebeles that had been actually taken in by the members of sample households was about 229.9 kcal. This was even below a quarter of MRI. The maximum was also above threefold (6,557 kcal). An average intake was 1,649.9 kcal, which was still below MRI. Out of the total, 74.7% of the total sample households had been taking daily per capita kilocalories below the MRI. The sample households who were taking in above a quarter but below half of the MRI were 42.7% in all the sample kebeles. This in general shows that the food security level among the sample households was low.

Table 4-13: Sample Households' Daily Net Kilocalories Available for Consumption per a Household and a Member of a Household: Compared with Minimum Recommended Rate (MRI)

Comparison of Available Kcal from MRI	*Ana Bellesa*	*% of Total*	*Gora Tume*	*% of Total*	*Shurmo Wit-Bira*	*% of Total*	*Total*	*% of Total*
< One-fourth of MRI (<525)	0	0.0	8	18.6	0	0.0	8	5.3
< Two-fourth of MRI (525-1,049)	0	0.0	13	30.2	2	2.7	15	10.0
< Half of MRI (1,050-1,674)	2	5.9	12	27.9	11	15.1	25	16.7
< MRI (1,675)	16	47.1	10	23.3	38	52.0	64	42.7
< Twofold of MRI (2,100-4199)	12	35.3	0	0.0	20	27.4	32	21.3
< Threefold of MRI (4200-6,299)	4	11.7	0	0.0	1	1.4	5	3.3
< Fourfold of MRI (6,300-8,400)	0	0.0	0	0.0	1	1.4	1	0.7
Total	34	100.0	43	100.0	73	100.0	150	100.0

Source: Author's Computation from the Field Survey (2007)

Table 4-14: Daily Per Capita Kilocalories Intake per Person: Comparing Means

Kebele	*Number of Cases*	*Taken in Kilocalories*					
		Minimum	*Maximum*	*Mean*	*Sum*	*% of Total Sum*	*Std. Deviation*
Ana Belleisa	34	719.8	6,235.5	2,336.6	79,444.4	32.1	1,230.8
Gora Tumie	43	229.9	1,935.2	850.2	36,555.9	14.8	417.2
Shurmo Wit-Bira	73	633.8	6,557.2	1,801.3	131,494.2	53.1	922.0
Total	150	229.9	6,557.2	1,649.9	247,494.6	100.0	1,048.2

Source: Author's Computation from the Field Survey (2007)

Table 4-14 shows results of the analysis of "comparing means" with regard to daily per capita kilocalories available for consumption in the sample households. As shown in the table, there was a great variation among the sample kebeles. Mean daily per capita kilocalories of Gora Tume was much lower than the rest two kebeles. It was even less than one-third of MRI. The most destitute household member was found in this kebele, taking daily 229.9 kcal (less than a quarter of MRI). Even, all the sample households in Gora Tume were undernourished, for the maximum intake in the kebele was 1,935.2 kcal. The situation was more severe in this kebele than others were. From the tables of landholdings and crops production presented, it can be inferred that the lesser per capita landholdings and lesser *enset* and potato production in either of the cropping seasons might have contributed to the severity. The focus group discussants also mentioned the higher prevalence of skipping *belg* cropping, less opportunities and/or laziness of working in farm, off-farm and non-farm activities, lesser fertility of soil, etc. in the sample kebele for its food insecurity problem.

4.2.1.2. Aggregate Household Food Security Index (AHFSI) of the Study *Woreda*

What and how to measure food insecurity has been one of the challenges, for it is multidimensional and the factors determining are numerous and complicated. Since the last few years, the Committee on Food Security in FAO has been supporting efforts to develop an index for food security that incorporates the three major dimensions of FAO's concept of food security; namely, availability, access, and stability. Accordingly, the aggregate household food security index (AHFSI), which has been developed by FAO, combines an indicator of per capita food availability for human consumption (dietary energy supplies in kilocalories) with pieces of information on the distribution of the available food to all the people over time (Thompson and Metz, 1999). The index, which was adapted from this source for the study, takes the following form:

$$AHFSI = 100 - [H\{G+(1-G)I^P\} + 0.5\square\{1-H[G-(1-G)I^P]\}]100$$

Where:

H = a *head-count of* the proportion of the total national population *undernourished*;

G = a measure of the *extent of the food gap* of the average undernourished (shortfall) in dietary energy supplies in the study area from national average requirements for dietary energy;

I^P = a measure of *inequality in the distribution* of the individual food gaps of the undernourished in the sample households, based on the *Gini coefficient*;

□ = the *coefficient of variation* in dietary energy supplies in the sample households, which gives the probability of facing temporary food shortage.

The value of the index ranges from zero to 100. "100" represents *complete, risk-free food security*. "0" would presumably represent *total famine*. Measures, which have an AHFSI of "less than 65", are deemed to show a *critical (severe)* level of food security, while those "between 65 and 75" is categorized as *low*. Those "between 75 and 85" is *medium*; whereas "over 85" is deemed to be a *high* level of food security (Thompson and Metz, 1999).

In this study, the AHFSI has been computed using both primary data of sample household survey and secondary data of the study *woreda*. Before computing it, all the four variable elements that are framed in the formula should be known. Thus, values for H, G, IP, and □ are presented below one after the other.

As shown in **table 4-15**, for "**G**" (the food gap of the average undernourished household), 0.31 was taken from the computation of food availability ratio (FAR), which in turn was calculated in food balance sheet (FBS) of the study *woreda* from the secondary data of HZDoARD (i.e. successive annual performance reports) and expert estimations of LWOoARD during the survey time.

Table 4-15: Food Balance Sheet (FBS) of Lemo *Woreda* for the Last Three Years: 1996 E.C - 1998 E.C

Ser. No.	*Food Flow Items*[22]	*Year (E.C.)*		
		1996	*1997*	*1998*
1	*Crops food production*	23,643,200.0	32,256,000.0	57,415,700.0
2	*Crops food purchase*	472,864.0	645,120.0	1,148,314.0
3	*Crops food aid*	17,732.4	16,128.0	14,353.9
4	*Total crops food inflow (1+2+3)*	24,133,796.4	32,917,248.0	58,578,367.9
5	*Other food sources (animal products)*	213,566.0	219,712.0	225,894.0
6	*Total food supply (4+5)*	24,347,362.4	33,136,960.0	58,804,261.9
7	*Post-harvest loss*	3,546,480.0	4,838,400.0	8,612,355.0
8	*Seed reserve*	2,955,400.0	4,032,000.0	7,176,962.5
9	*Crops sale*	13,003,760.0	17,740,800.0	31,578,635.0
10	*Total crops food outflow (7+8+9)*	19,505,640.0	26,611,200.0	47,367,952.5
13	*Net food supply (4-10)*	4,841,722.4	6,525,760.0	11,436,309.4
14	*Total population*	106,783.0	109,856.0	112,947.0
15	*Average (per capita) food demand*[23]	24,026,175.0	24,717,600.0	25,413,075.0
16	*Food balance (13-15)*	(19,184,452.6)	(18,191,840.0)	(13,976,765.6)
17	*Food availability ratio, FAR (13/15)*	0.20	0.26	0.45
18	*Average FAR*	0.31		

Source: HZDoARD (2004); HZDoARD (2005); HZDoARD (2006); HZDoARD (2007)[a]; experts' estimation of LWOoARD

[22] Except the ratios, all were measured in kilograms.

[23] 2.25 quintals per capita per annum was assumed.

For "**H**" (the estimate of the proportion of the national *rural* population that is undernourished), 0.49 was taken from Diao and Eleni (2005).

The Gini coefficient ($\mathbf{I^P}$) can be calculated manually by plotting Lorenze curve and then measuring the ratio of the area between it and the diagonal to the total area of the triangle under the diagonal. Since its manual computation is time-consuming, the *free statistics software* posted in the internet by Wessa (2007) was used. The figures fed to the free internet software for Gini coefficient computation were 150. These were kilocalories consumed by the 150 sample households for a year until the survey time (June 2006 to May 2007, both inclusive). They are shown in broad categories in **table 4-13**. The resulted value out of the internet was 0.69.

The last element in the formula is "□". Its value was estimated from the perceptions of focus group discussants, key informants, and the survey respondents. They were driven to contemplate on all-encompassing major cause to crop failure (complete and partial) and lesser livestock productivity on temporary basis. They synonymously reported that the drought by shortfall of rain was the major one. They, however, differed in the estimate of damage by it, reporting 5-50%. Using this range as a take-off, in this study, 10% was estimated. This figure, that is, the probability of damage to food sources by the drought was used in this study as the proxy for the probability of facing temporary food shortage ("□").

Thus, entering all the values of H, G, IP, and □ stated above into the formula of AHFSI, the value obtained was 69.12. Since this figure is between 65 and 75, the level of household food security level in the *woreda* was *low*, which was similar to aforementioned result for the sample kebeles. Secondary data of the study woreda for AHFSI was taken for three consecutive cropping years to see the *stability* of food insecurity over time. Hence, the food insecurity situation had been more of *chronic* than transitory in the study *woreda*.

Comprehending the level of food insecurity by itself has little to do with practical alleviation of the problem. What is more was answering the question, *"What had been determining the food insecurity of the sample households in particular and of the study woreda at large?"* This is the issue discussed in the next sub-section.

4.2.2. Food Insecurity: Determinants

The linear multivariate regression model was used to analyze the determinants of the household food insecurity, which was low in extent as aforementioned. The model was based on the following hypotheses:

- ✧ Availing food through crop production was *a supply factor* influencing food security. It was hypothesized that an increase in crops production practiced in the area would reduce food insecurity; therefore, food production (availability) was negatively related with food insecurity;
- ✧ Household size was *a demand factor*, which would negatively influence food security;
- ✧ Income generated through non-farm and off-farm activities, TLU of total livestock and absolute number of oxen possessed, total size of per capita landholding and its and fragmentation status, soils fertility, masculinity and age of household head, and access to credit and agricultural extension were *entitlement factors*. All, except fragmentation of land, were hypothesized to have positive influences on food security. It was hypothesized that per capita food available for male-headed households would be greater than the female-headed ones. Furthermore, it was hypothesized that the lesser lands are fragmented, the more will be the food entitlement through production.
- ✧ Literacy status of household head, use (application) of modern agricultural inputs (like chemical fertilizers, improved seeds and herbicides), and involvement in *belg* cropping were *attitudinal factors* of the household heads and they were expected to influence food security positively.

General purpose of the multiple regression model was to learn more about the relationship between several independent or predictor variables and a dependent or criterion variable. Thus, there were two types of variables selected for the model; namely one dependent variable and eighteen independent (explanatory) variables.

The model had an equation:

$$y_i = \beta_0 + (\beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_{18} x_{18}) + \epsilon_i$$

where "β_0" is a constant and "β_i" is a slope. "y_i" and "x_i" stand for a dependent variable and regressors respectively. The constant is also referred to as the *intercept*, and the slope as the *regression coefficient* or *β-coefficient*. ϵ_i is a mean zero error term.

The dependent variable (y_i) is the daily per capita food available (in kilocalories) for consumption by each member of a household. It was taken from the estimates presented in the sample households' food balance model for twelve months (June 2006 to May 2007, both inclusive). The independent variables (x_i) with their value labels and values were the following:

- ✧ Sex of household head (*0= female; 1= male*)
- ✧ Age of household head (*in full years*)
- ✧ Literacy status of household head (*0= illiterate; 1= literate*)
- ✧ Size of household (*in number*)
- ✧ Size of landholding of household (*in hectare*)
- ✧ Fertility status of landholding (*0= infertile; 1= fertile or moderately fertile*)
- ✧ Fragmented parcels of landholding (*in number*)
- ✧ Head count of all livestock (*in TLU*)
- ✧ Head count of oxen (*in number*)
- ✧ Participation in off-farm activities (*0= no; 1= yes*)

- ✧ Participation in non-farm activities (*0= no; 1= yes*)
- ✧ Access to agricultural and rural extension (*0= no; 1= yes*)
- ✧ Access to agricultural and rural credit (*0= no; 1= yes*)
- ✧ Involvement in *belg* cropping (*0= no; 1= yes*)
- ✧ Application of chemical fertilizers (*in quintals*)
- ✧ Application of herbicides (*0= no; 1= yes*)
- ✧ Use of improved seeds (*0= no; 1= yes*)
- ✧ Total crops production (*in kilocalories*)

Table 4-16 shows the results for the model summary and ANOVA of linear multivariate regression analysis on the eighteen independent variables for the dependent variable. The *R-square* value (*coefficient of determination*) is an indicator of how well the model fits the data (e.g., an *R-square* close to 1.0 indicates that one has accounted for almost all of the variability with the variables specified in the model). Here, the value of *R square* was 0.62. Thus, the eighteen independent variables included in the regression analysis were able to predict or explain 62% of the facts of determinants or the original variability, leaving 38% residual variability. This implies that had other independent variables been included, the rest 38% could have been explained to exhaust all determinants. However, nature is rarely (if ever) perfectly predictable. *F-ratio* with the value of 11.23 was statistically significant. This shows the presence of statistically significant variation in calorific availability for daily consumption among the sample households.

Table 4-16: Model Summary and ANOVA of the Regression Analysis

R	0.79
R square	0.62
Adjusted R square	0.57
Standard error of the estimate	703.44
Sum of Squares (Regression)	99,988,188.00
Mean Square (Regression)	5,554,899.36
F	11.23
Sig.	0.00

Source: Author's Computation from the Field Survey (2007)

Table 4-17 also shows the results for the coefficients of linear multivariate regression analysis on the eighteen independent variables for the dependent variable. In the analysis, the 95% confidence level was used. Hence, those independent variables with their significance values less than or equal to 5% (0.05) were taken statistically significant. These variables were major determinants of food insecurity in the sample households in a statistically significant manner. These are size of household, total crops production, participation in off-farm activities, involvement in *belg*-cropping, application of herbicides, sex of household head, access to agricultural credit, and fragmented parcels of landholding. No zero value in "beta" and "t" was found in the results of the analysis. Hence, the rest of the eighteen variables (though not statistically significant) had their own determining effect on food insecurity with their stamina dwindling in the order they are listed. These are head count of oxen, literacy status of household head, age of household head, head count of all livestock, fertility status of landholding, size of landholding of household, participation in non-farm activities, access to agricultural extension, use of improved seeds, and application of chemical fertilizers.

Table 4-17: Coefficients of the Regression Analysis

Predictors in the Model		Coefficients			t	Sig.
		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta		
0	(Constant)	2,174.80	538.29		4.04	0.00
1.	Sex of household head	519.22	183.48	0.18	2.83	0.01
2.	Age of household head	-7.06	5.67	-0.09	-1.25	0.22
3.	Literacy status of household head	191.16	151.98	0.09	1.26	0.21
4.	Size of household	-252.73	25.59	-0.68	-9.87	0.00
5.	Size of landholding of household	-76.83	164.84	-0.04	-0.47	0.64
6.	Fertility status of landholding	221.32	230.20	0.06	0.96	0.34
7.	Fragmented parcels of landholding	-161.98	81.78	-0.13	-1.98	0.05
8.	Head count of all livestock	-18.31	15.53	-0.13	-1.18	0.24
9.	Head count of oxen	83.71	51.29	0.23	1.63	0.11
10.	Participation in off-farm activities	623.35	156.69	0.25	3.98	0.00
11.	Participation in non-farm activities	76.96	166.72	0.03	0.46	0.65
12.	Access to agricultural extension	97.61	217.95	0.03	0.45	0.66
13.	Access to agricultural credit	-359.39	165.32	-0.16	-2.17	0.03
14.	Involvement in belg cropping	-545.41	158.12	-0.22	-3.45	0.00
15.	Application of chemical fertilizers	-13.27	161.15	-0.01	-0.08	0.93
16.	Application of herbicides	-471.29	143.96	-0.22	-3.27	0.00
17.	Use of improved seeds	79.10	188.70	0.03	0.42	0.68
18.	Total crops production	0.00	0.00	0.62	5.14	0.00

Source: Author's Computation from the Field Survey (2007)

Besides, looking at the statistical significance, examining strength and direction of determination (relation) for each variable has of paramount importance. As shown in table 4-16, total crops production was the strongest positively influencing determinant while household size was the strongest negatively influencing determinant, with the

stamina of the latter excelling the former. As shown in the table, the observed results had shown deviations from the expected ones (hypotheses). Accordingly, based on the features of the study area, probable explanations on observations of each of the eighteen variables are made as follows.

Food availability had shown an increase with *increase in food production*. This confirms the hypothesis. Since it has the highest positive value, it was the leading positive determinant of food security in the study area. As assumed, the per capita food availability of male-headed households exceeded that of female-headed ones. The drudgery of home making imposed on females might have played negatively in agricultural productive activities. *Skipping belg-cropping* had negative effect on food availability in the sample households. This is against the hypothesis, which may be explained by land cultivation issue. By and large, it is true that *belg* crop production adds cumulatively to bulk production in *meher* one. However, when *belg* crops grow, they decrease the time to prepare intensely lands for *meher* (the major cropping season). Unless *belg*-cropping was accompanied by inputs comparable to the situation, like commensurate pairs of oxen to cultivate intensely, it might reduce production in *meher*.

The relations were also in harmony to the assumption that per capita food availability decreases with an increase in the *number of household members*. This shows that large household size had more repercussions on food consumption than labor supply to boost agriculture. This is also consistent with description of the effects of some of the salient feature of the study area: age dependency ratios and widespread unemployment in productive activities regularly were higher (see chapter 3). As shown in table 4-17, household size was the leading negatively influencing determinant. Similarly, food availability increased by taking part in off- and non-farm activities, for they might have diversified sources of household incomes.

It was hypothesized that as age of a household head gets higher, experiences pertaining the socio-economic environments will get richer and household economy will be more stable. The regression result was against to the hypothesis showing a decline in food availability with an increase in *household head age*. The inverse relationship may be explained by the fact that as the age increases, household heads will get biologically limited and feeble to run here and there in search of income generating activities outside the sphere of his farms whose size is meager. Moreover, as the age increases, the likelihood of having more household size increases, with an increase in food consumption demand and consequential decline in actual supply (availability).

Having farm landholdings with the highest likelihood of *fragmentation* is correlated negatively to food availability. This was consistent with the hypothesis that as fragmented lands increase in number, the intensity with which they are cultivated and management of crops grown in them keeps on decrease, thereby putting negative impact on food production. However, against with the hypothesis, food availability decreases with an increase in *landholding size*. This may be justified by the facts in fragmentation and income outside the sphere of private farms. As shown in fragmentation status of the households in chapter 3, there were considerable number of fragmented lands possessed by the sample households. The increase in size was mostly by fragmentation. This also had negative implication in the intensity of cultivation of land and crops management there of. Moreover, as the land gets bigger in size, the probability of seeking alternative sources of income will get down. Hence, farmers with larger landholdings were busy of agricultural produce with insignificant return out of it.

As hypothesized, food availability increases with increases in *inherent fertility* of land and in head count of *draught oxen*. As the inherent fertility of land increases, the cost incurred due to the exorbitant purchases of external fertilizing inputs will get lower. Hence, food crops that could have been sold to cover expenses of their purchases will

be lower, making better chance for production geared to home consumption. It goes without much explanation that the intensity of cultivation of private land can step up by possession of sufficient pairs of oxen. Moreover, as the number of oxen increases, the probability of sharecropping increases, positively influencing food production and the consequential increase in food availability. However, contrary to expectation of total livestock to have positive influence on food availability, owing to their merits in giving birth to farm oxen, covering various household expenses and sale to narrow food gap, they in general has played a negative role in food availability. This may be due to opportunity costs of reserving farmland to grazing and cut-and-carry instead of crops production. At least in the short run, food crops production can be increased by physical increase of farmlands and encroaching to forestlands. Moreover, as livestock number increases, the householders will be busy of tending livestock, leaving aside the seeking attempt for alternative sources of income, like off- and non-farm incomes. Moreover, since general livestock were kept, among others, for attaining wealth rank in the community, which is merely in number, the incommensurate quality of them as regards input-output has played negatively to food availability.

Literacy status played a positive role to food availability as expected. Notwithstanding this, the results of regression compared to the hypotheses on the relationships between the availability of food and use of *technological agricultural inputs* were found mixed; that is, some were as expected and the others were vice versa. Use of improved seed varieties and access to agricultural extension had contributed positively, as intended, to food availability. On the other hand, access to agricultural credit, application of fertilizer, and use of herbicides played negative role in food availability. However, though it is very cumbersome to draw conclusion about the correlation between the size of crops' harvest and use of external agricultural inputs, their positive influence on food availability might have been undermined by other factors, such as exorbitant prices of such inputs. That is, the net benefit gained through them and prices paid back might not be matching.

Nevertheless, like the prices of external inputs, the prices of food crops are on increase. Hence, the complexities that are prevailing in making rural livelihood should be dug in depth. As a result, they are left for further and extended research to draw possible and lasting explanation on the precarious nature of determinants of food insecurity in rural settings.

Surprisingly, most of the determinants identified through regression analysis fit the perceptions of the focus group discussants, key informants, and the surveyed sample household heads. They picked out various environmental, demographic, social, economic, infrastructural, and technological factors causing chronic and transitory food insecurity in their localities.

They identified erratic rainfall patterns and skipping of *belg*-cropping by most households as the major *environmental problems* hindering them from being self-sufficient in food production. Among the *demographic factors*, rapid population growth and the consequential diminishing of land holdings were thought to be the most significant causes of food insecurity. Poor household food savings and inefficient utilization, followed by illiteracy and health problems, were perceived to be the most important *social factors* adversely affecting household food security. They also perceived an *economic factor*, shortage of draft power, followed by lack of extra cash for further investment in agricultural production ventures, as the main obstacle against the expansion of agricultural production. The absence of small-scale irrigation practice and the consequent dependency on rainwater for crop cultivation was among the *infrastructural bottleneck*. Finally, among the *technological* problems, they gave a due emphasis to participatory-research-based transfer of technology, especially for *enset* production, concerning shortening maturity time, increasing yield increase, curbing disease, etc.

4.2.3. Food Insecurity: Coping Strategies

Household coping mechanisms with food insecurity might vary from village to village and from household to household. The mechanisms were targeted to enable households to keep all or some of their members alive under a given level of food deficit situations within the existing social, economic, moral, etc. setups of the community. During the sample household survey, the respondents were asked whether the food shortfall had happened since the last *fifteen years* and had occurred for the last *twelve months*. Moreover, those households who faced the deficit were asked the frequency of its occurrence since the last fifteen years and specific point of time when the coping strategies with it were applied. To bring out this possible, they were asked to pick from thirty-six specific alternative strategies: 15 in insurance stage, 17 in asset depleting stages (both productive and non-productive assets), and 4 in complete destitution stage. Remarkably large portion (96.4%) of the sample households reported that they had faced food deficit at least once since the last fifteen years. Those who had passed through food shortfall for the last twelve months were 63.8%. **Figure 4-2** shows the proportion of the households who responded the occurrence of food shortfall in the last twelve months. About three-fifth of food insecure were in Gora Tume.

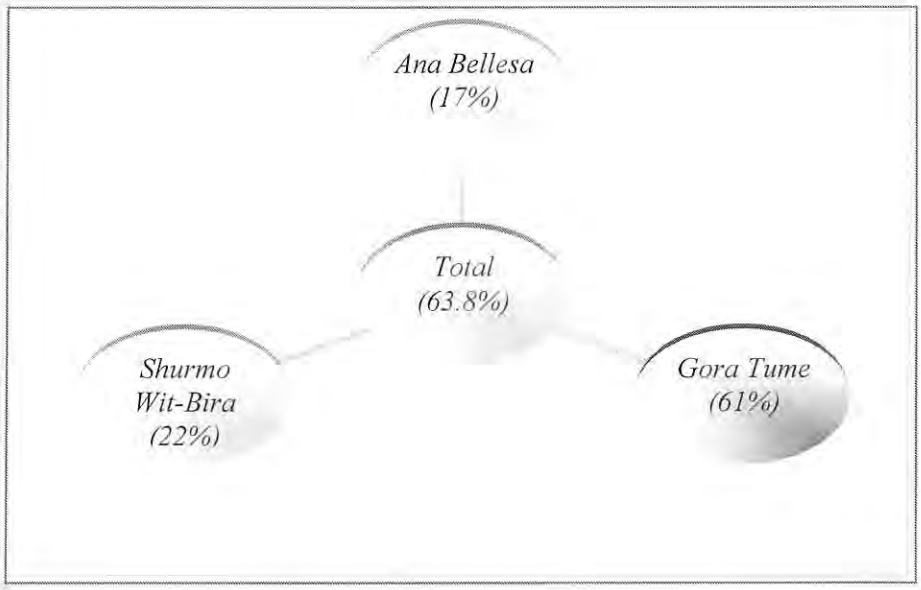

Figure 4-2: Households with Food Deficit for the Last Twelve Months

Source: Author's Computation from the Field Survey (2007)

Within a given food insecurity stage, the sample households employed single or combinations of alternatives. As a result, sum of figures of the sample households in a stage exceeded the total sample size (150). Similarly, they used them once or more. In their livelihood history of the last twelve months, the great majority (89.3%) faced food deficit coped with at least one of the first stage response mechanisms, i.e. *insurance mechanisms*. Those that used coping strategies (*non-productive asset depleting*) in response to second stage food insecurity were 24%. Those employed the third stage responses (*productive asset depleting*) were 11.3% and no one had been in complete *destitution stage*.

Tables 4-18 to **4-21** show the results of coping strategies used by the sample households during the survey 12 months at the four stages of destitution. About 73.3% of the respondents mentioned that they had been attempting to intensify their

household food production mostly by diversifying and rarely specializing their crops production. About two-fifth of the sample households reported that they used to sale firewood. Those who sought menial (casual) daily labour in their kebeles as well as localities that are vicinal were 24% and 27.3% respectively. A considerable number of the sample households (68%) reported that they were reducing the number and quantity of meals a day. About 71.3% of them stated that they had come down to feed continuously on the less preferred foods. A meal comprising a type of less quality *qocho* (locally known as *tiqota*) with slightly roasted cabbage and pepper (ground or wholesale) was a case in point. Though they expressed that looking for someone's hand had not been in earlier times, 20.7% of them reported that they used to rely partly on some sort of assistance, in which the majority were through productive safety nets. Only under severe food insecurity situation, 2% of the sample households refrained their children from schooling. No one exercised missing meal the whole day. Only two of the sample households sold cattle, for supplementing food shortage.

Table 4-18: Coping Strategies against *Stage-1* Destitution used by the Sample Households during the Last 12 Months Period (June 2006 – May 2007)

Coping Strategies	*Ana Bellesa*	*Gora Tume*	*Shurmo Wit-Bira*	*Total*	*% of Total*
1. Intensify household food production	21	35	54	110	73.3
2. Sale of livestock products	7	5	28	40	26.7
3. Eating less preferred foods	19	36	52	107	71.3
4. Reducing quantity of meals	19	39	44	102	68.0
5. Reducing number of meals	19	39	44	102	68.0
6. Eating wild food (like "bird-sown" cabbages)	5	12	0	17	11.3
7. Eating taboo and toxic food	0	0	0	0	0.0
8. Household members seeking work within their living PA	8	2	26	36	24.0
9. Household members seeking work vicinal to their PA	1	23	17	41	27.3
10. Sale of firewood/dung/charcoal/grasses	21	12	33	66	44.0
11. Increase of other petty trade (sale of local drinks)	1	16	5	22	14.7
12. Participating in FFW/EGS program	4	13	12	29	19.3
13. Inter-household (relatives) transfers and borrowing of food or cash	1	7	2	10	6.7
14. Postponing wedding and other social engagements	0	1	0	1	0.7
15. Search for temporary food aid	6	14	11	31	20.7

Source: Author's Computation from the Field Survey (2007)

Table 4-19: Coping Strategies against *Stage-2* Destitution used by the Sample Households during the Last 12 Months Period (June 2006 – May 2007)

Coping Strategies	*Ana Bellesa*	*Gora Tume*	*Shurmo Wit-Bira*	*Total*	*% of Total*
1. Temporary migration (to find work/food, etc)	1	3	4	8	5.3
2. Non-kinship loan of food/grain or cash to buy food	4	8	0	12	8.0
3. Selling chicken	10	5	21	36	24.0
4. Sale of shoats	5	1	18	24	16.0
5. Sale of personal household valuables	0	1	0	1	0.7
6. Withdrawing children from school	0	2	1	3	2.0
7. Skipping eating (not eating) for whole day	0	0	0	0	0.0

Source: Author's Computation from the Field Survey (2007)

Table 4-20: Coping Strategies against *Stage-3* Destitution used by the Sample Households during the Last 12 Months Period (June 2006 – May 2007)

Coping Strategies	*Ana Bellesa*	*Gora Tume*	*Shurmo Wit-Bira*	*Total*	*% of Total*
1. Return long-term migration	1	7	8	16	10.7
2. Sale of cattle	0	1	0	1	0.7
3. Sale of equines	0	0	0	0	0.0
4. Selling farm tools (all or a portion)	0	0	0	0	0.0
5. Sharecropping land	1	4	2	7	4.7
6. Eating the reserve for agricultural inputs (like seed)	3	5	9	17	11.3
7. Renting land	0	1	0	1	0.7
8. Selling of land (all or a portion)	0	0	1	1	0.7
9. Redistribution of children	0	0	0	0	0.0
10. Selling domicile (house)	0	0	0	0	0.0

Source: Author's Computation from the Field Survey (2007)

Table 4-21: Coping Strategies against *Stage-4* Destitution used by the Sample Households during the Last 12 Months Period (June 2006 – May 2007)

Coping Strategies	*Ana Bellesa*	*Gora Tume*	*Shurmo Wit-Bira*	*Total*	*% of Total*
1. Begging for food/resources	0	0	0	0	0.0
2. Complete dependence on external aid	0	0	0	0	0.0
3. Permanent migration in search of support, land, job	0	0	0	0	0.0
4. Dissolution of family	0	0	0	0	0.0

Source: Author's Computation from the Field Survey (2007)

The survey respondents, key informants, and focus group discussants informed that in normal years, food shortages mostly occur in considerable households between months after sowing seeds at fields until harvesting seasons, mostly July to October.

To draw out their perception on the preparedness issue towards food insecurity, the respondents were asked about the specific point of time when the sample households employ the coping mechanisms. Accordingly, 21%, 68%, and 11% of the household reacted that they used the coping strategies when the problem started, around the middle of the problem and only when the problem became severe respectively. In connection to this, only 9.3% of the households perceived that one of reasons why they plant *enset* was to bypass the drought situation, as it is drought-resistant crop. Only two of the total sample households told that they had a minimal amount of saving in Omo Micro-Finance Institution at Hossana Branch. Hence, there were constraints as regards cash savings and local-borne transfers of technologies from research outputs through extension for bringing out development. That is the link in research, extension, and development seems to have loose local participation.

In a nutshell, based on their coping strategies used, most of the households seem resilient to food insecurity. Unless proper measures are taken, the coping strategies used in all kebeles in general and Gora Tume in particular may indicate that the households in the future will be prone to fragility.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

Descriptions of salient features of the study area indicated that most of the prevailing situations were those, which can make households vulnerable to food insecurity. Pressure of human population was among the major features identified to be associated with vulnerability to food insecurity in the study area. Crude agricultural density of the *woreda* and sample households was estimated 542 and 747 persons per square kilometer respectively. The household sizes in the sample households ranged 1 to 16, with an average of 6.9. Age dependency under conventional categorization was high (97.1%). Moreover, there had been considerable number of the unemployed under the working age segment.

Because of the high population pressure, both cultivation and grazing lands were the scarcest resources in the *woreda*. Six sample households were land-less. As informed by the focus group discussants, considerable proportions of the inhabitants in the sample kebeles were land-less. According to the key informants, opportunities of out-migration in order to get cultivation land had been decreasing from time to time. Currently, this opportunity is declined to near zero. Landholdings were not only small but also highly fragmented. According to focus group discussants and key informants, soils of the sample kebeles were depleted mainly due to repeated cultivation for longer period. As a result, its natural productive capacity was very low and forced the farmers to use chemical fertilizers continuously and at high seeding rate. There was extreme devegetation due to encroachment for crops cultivation. On the contrary, invasion of most fields by eucalyptus trees, which the rural dwellers call a "soil-drying", was another problem. Using wholly or partially dung and crop

residuals by some households as fuel that could have been applied as organic fertilizer were also exacerbating depletion of soil's fertility. Majority (66.7%) of the sample households possessed landholdings between 0.25 and 1.00 hectare. About 69.8% of the sample households utilized all their landholdings for crops' cultivation. The rest kept some of their holdings for grazing, fallowing, and/or reforestation and afforestation. Among the total landholdings, those under persistent cultivation were 133.25 hectares (96.6%) of the total. Due to these and other reasons, per capita food production, which had been already very low, was further decreasing over time. Three-quarters of the households indicated the minor problem of soil erosion while the rest were not facing any. Moreover, some sample householders reported that they had been facing water logging, lasting one to two months and covering 0.125 to 0.250 hectare. Only one sample household was utilizing a small-scale drip irrigation scheme from the nearby running water.

The study *woreda* was suffering from not only human population pressure but also high livestock stocking rate. Their possession of livestock ranged from those who lacked any livestock to those possessing 36, with per capita ownership of nearly 11. Shortage of grazing land was almost every household's problem. Moreover, the types of livestock in the *woreda* were mainly local breeds with low productivity. The livestock sector also had endured a limited supply of veterinary services to the tenders. Adult literacy programs had been nonexistent at least since the last seventeen years.

All households had extension service with regard to transfer of knowledge. However, extension of technological inputs were more emphasized to few sectors, especially cereals while other important extension programs like livestock, apiculture, and natural resource management were less emphasized. Development agents in the area were also criticized for their emphasis to tax collection, distribution of inputs and collecting back debts instead of giving enough time to orient and train the farmers in

relevant extension activities. Hadiya Zone in general and Lemo *Woreda* in particular had been in paucity of NGOs providing various assistances.

Not all sorts of their income can satisfy their food needs. Opinion surveys conducted at sample households, key informants interview, and focus groups discussion indicated that majority of inhabitants of the study area were suffering from extreme poverty mainly due to scarcity and depletion of land resources which in turn is the result of high population pressure. Less opportunities of income outside the spheres of private farms was also prevailing in the localities. Because of all these, majority of the inhabitants are either temporarily or permanently food insecure. According to the household sample survey, for about 74.7% of the households, calorific availability obtained through all their food sources (production, purchase, aid, etc.) was not sufficient to satisfy their recommended daily energy intake requirement.

This thesis research is the first of its type carried in Lemo *Woreda*. In the research, an attempt was made to answer various questions. What is the extent of food insecurity in the sample households in particular and in the study *woreda* at large? Who are vulnerable to food insecurity? Where does the more vulnerable section live? Why are they more prone? When do they get food insecure? How do they cope up against the food insecurity situations?

Analysis of net food availability through food balance sheet and aggregate household food insecurity index showed that the food security extent in the study area was low. In this study, eighteen independent variables were hypothesized and regressed to test their effect on food availability. The results with regards direction of the variables were mixed: some were as expected while other observations were against the hypotheses. Each variable, however, was observed to have its own impact on food availability of the study area. Among these, eight variables were major determinants as they were statistically significant. These with the magnitude of determination descending in their order of listing were size of household, participation in off-farm

activities, involvement in *belg*-cropping, application of herbicides, total crops production, sex of household head, access to agricultural credit, and fragmented parcels of landholding. Out of these, households headed by male, produced more food, and taken part in off-farm activities were those who were better off in per capita food availability. The rest major determinants played negatively: the increase of and/or participating in them were negatively influencing food availability of the study area.

5.2. Recommendations

Since food insecurity is a multifaceted, attaining it (especially in most vulnerable localities) is a daunting task demanding efficient formulation and proper implementation of policies, strategies, and programs that recognize all environmental and socio-economic realities of the society. It can happen by multitude of interrelated but complicated combinations of factors. Thus, suggesting a panacea against it is not at least easy. Moreover, it is not simple to recommend strongly remedies for quite a lot of factors causing food insecurity in general and for the eighteen determining factors identified through this study in particular. In this study, it is believed that food insecurity should be addressed by broad-based and multi-pronged efforts. Thus, some options are suggested by this study to alleviate the identified problems in the study area and the options are presented in the order of short-term, intermediate, and long-term alternatives. These alternatives can foster endurance and resilience of households to food insecurity situations.

Assistance of Food/Cash-for-food:

Those household members with chronic and severe food insecurity should be provided, in the short-run, opportunities of getting food and/or cash, like productive safety net program. These measures refrain the food insecure at least from depletion of productive assets. Unless biologically restricted, this measure should be

accompanied by productive works to get food/cash in return so that dependency syndrome could be reduced. To this end, international-world-to-the-rescue lobbyism may be applied, on top of the national efforts. As to the focus group discussants and key informant interviews, though it is too early to draw lasting conclusion, beneficiaries of productive safety net program in the study *woreda* were showing hopeful progress in changing their livelihood. They were also complaining for concomitant occurrences of mistargeting (biased by nepotism and/or corruption). Hence, giving due consideration in developing stringent selection criteria at least to lessen mistargeting, programs like productive safety net and other measures similar to it should keep on implementation.

Agronomical Practices and Access to Agricultural Inputs

The second short-term solutions are combined measures of new modernism and sustainable intensification, like use of modern technological inputs and application of proper agronomical practices, like intensive cultivation of lands. For purchase of the external inputs, credit facilities at affordable prices should be facilitated and ways should be envisaged to get them at reasonable prices. Moreover, care should be taken to avoid fungibility problems. Service cooperative societies should attract farmers as much as possible. The cooperatives should grow in a vision to form unions, federations, and confederations that can import the inputs, there by lessening the selling price by driving out compradors. In the end, they can even establish factories that produce the inputs, so that their members might get at reasonable price. On top of inorganic fertilizers, use of organic fertilizers (like dung and crop straws) should also be encouraged. The competition of dung to fuel use may be reduced by promoting fuel-saving stove technology.

Access to Agricultural Extension

Agricultural extension service with regard to technological transfer was found unevenly distributed both in type of the technologies and the beneficiaries of it. There had been greater emphasis on cereals than other crops. That is, extension programs were more biased to attempts of attaining food self-sufficiency through boom in cereals crops productivity. Though performances had been encouraging in cereal production, the extension programs should further be strengthened by incorporating research-extension linkages toward other crops, like *enset*. Inhabitants mainly depending on *enset* were rarely involved in extension programs. However, in areas suffering from erratic nature of rainfall recurrently, expanding extension on *enset* is crucial. In line with this, the focus group discussants and key informants were repeatedly mentioning the need for research outputs on boosting yield as well as lessening maturity time and disease of *enset*. They also underscored the need for a commensurate attention to livestock husbandry, for cultivating *enset* is on another face of rearing farm animals. The animals provide organic fertilizer for *enset* growing. Moreover, all food products of *enset* (*qocho, bulla,* and *amicho*) are hardly any palatable unless animal products like meat, milk, butter, cheese, etc complement meals based on *enset* products. Hence, an extension should not be limited to extension of food crops; livestock, apiaries, and natural resource management should also be given due emphasis. Extension on livestock should consider the issue of livestock productivity and shortage of feed supply without significantly compromising croplands. It was reported that agricultural development agents had been busy of additional responsibilities levied on them by higher officials. Hence, they should not be burdened by additional responsibilities and allot sufficient time proportional to the extension works that enable them to efficiently assist farmers and develop smooth relationship with the community whom they serve.

Off-farm and Non-farm Activities and Rural Credit Facilities

Out of the measures that could be taken as an intermediate alternative, participation in off-farm and non-farm ventures to diversify income sources and improve communities livelihood might be cited. Involving in them promotes and expands chances especially for the newly formed young families with no or little land for cultivation. For instance, the locally existing skills like woodwork, carpentry, poetry, blacksmithing, carpet making by *enset* products, etc. should be appreciated and improved through training. Efforts toward curbing negative attitudes on some of the activities should be in place. Micro- and small-scale petty trades should be encouraged. To run such activities, credit facilities should also be secured along with saving and asset creation parameters. Facilitating access to credit for the draught oxen based on revolving fund might also be there. These all should give special attention to female-headed households.

Resettlement Programs

Population pressure is not a widespread problem throughout Ethiopia. Distribution of population over spaces is uneven; there are places relatively under-populated or sparsely populated. For instance, in the SNNPR, population density ranged from about three persons per square kilometer in Selamago *woreda* of South Omo Zone to about 727 persons per square kilometer in Wonago *woreda* of Gedeo Zone (SERA, 2000[a]). Though the carrying capacity differs from place to place, the above-mentioned data indicate that there are rooms for launching resettlement programs from some pockets with extreme overpopulation to the sparsely populated areas. Though it is too early to draw lasting conclusion, the resettlement programs from Hadiya Zone to other localities in the SNNPR since the last three years has been showing promising performances. Therefore, it should carefully be designed in an attempt to cope up with the population pressure observed in the study area. By careful design, it does mean not to repeat similar mistakes committed during Dergue

regime where resettlers were not given, among others, enough protection from the attack of the former settlers. Hence, its participatory design by officials and communities of both resettlers and recipients that has been done since three years should be kept steadfast and fine-tuned.

Out-Migration Opportunities

Besides arranging sound resettlement programs, the policy environment should encourage population mobility from place to place either temporarily or permanently within the country so that they can get jobs in either of the forms. The focus group discussants also mentioned out-migration as one of the effective ways to fight against poverty. They even suggested cross-border out-migration by appreciating the role of remittances from abroad, especially South Africa, that has been changing considerably the livelihoods of many households recently in the study *woreda.*

Infrastructures and Basic Services

In areas like the study *woreda,* where the agricultural communities are vulnerable to the erratic nature of rainfall, ways out should be devised that address the mere dependencies in rainwater. One is development and expansion of small-scale irrigation schemes for horticultural produces. This could be made possible by harvesting rainwater. The rainwater harvesting should be participatory and accompanied by close follow-ups of proper professionals. Despite large livestock population, there is extreme shortage of both veterinary clinics and personnel. Especially, in areas like Lemo, oxen's decline in productivity or loss by death is highly depressing. Thus, attention should be given to improve physical availability of vet clinics, fully facilitated and with sufficient and proper personnel. Moreover, informing farmers on the available veterinary services should be there. Provision of quality basic education is believed to reduce population pressure on land resources by creating chances of non-farm jobs and creating awareness to family planning.

Absence of adult literacy program was found contributing for the increasing illiteracy. Hence, agricultural development extension as well as execution of training at farmers training centers (FTCs) should be integrated with making farmers literate.

Natural Resource Management

It is obvious for everybody that agricultural economy heavily depends on the natural resources. Thus, enhancing conservation of soils, water and land cover is among the priority areas to obtain sustainable yield from the land resources. For physical structures could compete for the already scarce land resources, biological conservation methods like agro-forestry, intercropping and crop rotation (preferably legumes based) should be given emphasis. In fact, physical structures like soil bands and terracing might not to be missed at localities that are steep in slope. In either of the cases, professional assistance must be in place. Professionals should not prescribe from above but begin from the realities on the ground, generated through participation by beneficiaries. At least, they should come up with a bunch of alternatives, from which the beneficiaries can pick. Above all, it is better to promote environmental awareness among the people of the study area by pertinent organizations. Even, it could be mainstreamed in activities of different line departments.

Family Planning

For population pressure was found among the major factors for exposing the inhabitants more vulnerable to food insecurity, activities geared on two challenges should be carried out. The first challenge is feeding the already extremely dense population in the study area and the second is matching the current rapid population growth with the resources they have currently while keeping the rate of growth not compromising opportunities for the future generation. One of the activities is family planning or effective implementation of the existing population policy. Family planning is a long-term alternative and probably can trace the root causes of food

insecurity. There were a considerable proportion of the households in favour of family planning if the homegrown and international organizations are able to educate better the users in family planning measures and provide contraceptives with lesser side effects. There were also a non-ignorable number of the respondents, who still need more children despite all the prevailing hardships. Hence, homegrown and international organizations should work hard to influence the inhabitants accept and pursue family planning measures. In any way, there is a promising environment to implement family planning if its proper education is provided besides providing wide variety of contraceptives. Its education should be provided for both partners since female discussants informed that most wives were found not using any contraceptive only in fear of their husbands.

Networking: Research-Extension-Development

It is widely known that efforts for development should be supported by continuous research findings. Most of the time, sustainable impacts brought by extension works from research in the livelihoods of communities left unevaluated. Hence, research endeavors to evaluate impact of the previous and develop new should be in place to back up development. Increasing agricultural productivity, for instance, requires careful development of new better varieties of crops and breeds of livestock as regards shortening maturity time, drought resistance, high yielding, cutting down diseases, etc. For instance, diseases on some drought resistant crops like *enset* have been disturbing the most important economic base of the community in the area. Such constraints can only be minimized by using outputs obtained from participatory research reflecting the local reality in so far as possible. Thus, various organizations and government offices involved in agricultural activities should form strong link with the consultation firms evaluating impacts and agricultural research institutes (ARIs) in the country developing new technologies. Similarly, there should be networks and information exchanges among the development actors (GOs, NGOs,

private investors) so that duplication of similar efforts could be minimized, which in turn lessens unnecessary wastage of the scarce resources.

Robust Database

One of the requisites for coping against situations of food insecurity is to learn from the past and devise diverse and numerous response packages for the future. To do so, availability and accessibility of data showing records of the past events should be there. Interventions through different response packages can also be more rewarding if their planning is based on reliable data. Nevertheless, the database of *woreda* offices and zonal departments was found very weak during the survey period. Lack of up-to-date, sufficient, and reliable data was one of the bottlenecks this study endured. Archives (commonly called *mezgeb bet*) took the responsibility to keep both correspondences and technical write-ups. There were no separate stores and personnel for published and unpublished technical write-ups. Moreover, employees at the archives were those who lost their position due to their less merits in consecutive repositioning and compelled for assignments at low grades. Nonetheless, data and pieces of information are not things that deserve lower consideration; rather, they are humankind's life. Hence, archives should be paid special attention and grades of their position should be scaled up in consultation with the regional Civil Service Office so that individuals with proper expertise would be recruited. Launching in-service training opportunities in archival management for the already assigned ones could be another option.

Experts who were working in zonal departments and *woreda* offices were complaining critically about loss of technical write-ups. According to them, most often, the technical write-ups were entrusted to heads at *woreda* offices and zonal departments. They had chances to receive technical reports from external personalities *not signed*. However, they are appointees who were unstable in their post with frequent dismissal from office. At this juncture, they used to leave the

office without transferring to their successors the technical materials that they received unsigned. Even in some cases, data were kept somewhere else outside the premises the permanent experts were working. Hence, documents should be kept at their respective offices in an accessible and responsible way; otherwise, such data can easily disappear following transfer of the experts.

Further and Extended Research

Since the study is the first in the woreda and did not consider all factors, the solutions suggested in this study can not be a recipe but are subject to further fine-tuning through similar and extended research works. Among others, the following issues can be considered:

- Participating all females at the ages of preparing meal in providing pieces of information in food consumption pattern;
- The role of rural-urban linkage in food insecurity in the vicinity;
- Agricultural produce flows (outflows, inflows, net flow); and
- Factors affecting agricultural production and the magnitude of damage by them.

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APPENDICES

APPENDIX-A
Questionnaire: Sample Household Survey (A Synoptic Version)

This semi-structured questionnaire is administered to collect data for an M.A. Degree survey research entitled *"Level, Determinants, and Coping Strategies of Rural Household Food Insecurity in Lemo Woreda, Hadiya Zone"*.

GENERAL PIECES OF INFORMATION

(a1). Interviewer's name ----------

(a2). Interviewer's ID: 1= Ana Bellesa 2= Gora Tume 3= Shurmo Wit-Bira

(b1). Respondent's (household head's) name (including grandfather's name) ----------

(b2). Respondent's (household head's) ID: ----------

(b3). Respondent's (household head's) Sex: 1= male 0= female

(b4). Respondent's (household head's) k*ebele:* 1= Ana Bellesa 2= Gora Tume 3= Shurmo Wit-Bira

(b5). Respondent's (household head's) exact place of residence:
Sub-*kebele* ---------- *Got* ----------

(c1). *Progress monitorial:* result (fate) of the questionnaire during its filling visit by an interviewer (specified for each date of visit separately)
1= fully completed 2= partially completed
3= postponed 4= not around
5= refused 6= other (specify)

(c2). *Progress monitorial:* Time elapsed during an interview (specified for each date of visit separately) Started time ---------- Completion time --------- Elapsed time ---------

PART ONE

DEMOGRAPHIC AND SOCIO-CULTURAL HOUSEHOLD CHARACTERISTICS

(1). Total number of regular members of the household and their age composition:

Age Category	Male	Female	Total
0-14			
15-64			
65+			
Total			

(2). In your view, your current household size is: 1= Small 2= Enough 3= Large 4= Excessive

(3). Since the last five years, your household size on average has:
1= Increased 2= Decreased 3= No change

(4). If there is any average change in your household size, what is the reason?
1= Birth 2= Immigration 3= Death 4= Emigration 5= Other, specify

(5). To what ethnic/tribal group do (*name*) belong?
1= Hadiya 2= Siltie 3= Guraghe 4= Kembata 5= Amhara 6= Other (specify)

(6). What language do *(name)* speak most often in your home?
1= Hadiyigna 2= Siltigna 3= Guraghigna 4= Kembatigna
5= Amharigna (Amharic) 6= Other (specify)

(7). What religion do *(name)* pursue?
1= Orthodox 2= Protestant 3= Catholic 4= Other Christianity
5= Islam 6= Traditional Believer 7= Non-Believer 8= Other (specify)

(8). What is (*name's*) literacy status? 1= Literate (at least read and write) 0= Illiterate

(9). If "illiterate", why so? .....

(10). If "literate", what is the highest grade completed? Write "00" for "read and write only" or for those "who have never been to school for formal education"
.....

(11). What is the (na*me's)*current marital status?
1= Never married 2= Currently married 3= Divorced 4= Widowed
5= Separated 6= Other (specify)

(12). What is the (na*me's)*current marital type
1= Polygamous 0= Monogamous

(13). If "polygamous", to how many spouses? .....

(14). Had any member of the household regularly participated in productive activities for the last 12 months? (For all current residents in the household, males and females age 15-64)

1= yes 0= no

(15). How many members of the household members had regularly participated in productive activities for the last 12 months? (For all current residents in the household, males and females age 15-64)

Activities (Occupation)	Number of household members participated	
	Male	Female
Farmer		
Shepherd		
Merchant/Petty Trader		
Permanent employee (GO, NGO, etc.)		
Daily laborer		
Wage laborer		
Driver		
Handcraft		
Housemaid/Home-making		
Priest/Evangelist		
Soldier		
Student		
Other (specify)		

(16). Was there any immigration, emigration (out-migration), long-term return migration, and temporary moves among you and your household members? (For all current residents in the household, males and females age 15-64) 1= yes 2= no

(17). If "yes" to immigration,

a. What was the place of departure?
b. When (in Ethiopian calendar year) was the departure?
c. Who was departed from?
d. What was the reason for the departure?

1= Job transfer 2= Marriage
3= Divorce, Separation 4= Better job/economic opportunities
5= Health services 6= To live with family, relatives, friends
7= To join army 8= Leave from army
9= Displacement from job villagization 10= Resettlement, displacement,
11= Lack/shortage of land 12= Attracted to urban life style
13= "Chigir" (forced to move by drought, famine, etc.)
14= Educational/training opportunities 15= Other (specify)

(18). If yes to "long-term return migration" (move from this place to another place for six months or more and then returned here),

a. What was the place of destination?

b. When (in Ethiopian calendar year) was the departure to the place?
c. Who was departed to?
d. What was the reason for the departure?

1= Job transfer
2= Marriage
3= Divorce, Separation
4= Better job/economic opportunities
5= Health services
6= To live with family, relatives, friends
7= To join army
8= Leave from army
9= Displacement from job villagization
10= Resettlement, displacement,
11= Lack/shortage of land
12= Attracted to urban life style
13= "Chigir" (forced to move by drought, famine, etc.)
14= Educational/training opportunities
15= Other (specify)

(19). If yes to "temporary/short-term/seasonal moves" (move from this place to another place for less than six months but more than a week and then returned here) within the last 12 months,

a. What was the place of destination?
b. When (in Ethiopian calendar month) was the departure to the place?
c. Who was departed to?
d. What was the reason for the departure?

1= To work temporary jobs
2= Visit/Relief
3= Health services
4= Short-term training
5= To bypass the "chigir" in the surrounding
6= Other (specify)

(20). If yes to "emigration), now think and try to remember all the persons who were usual residents in your household since 17 years (or more recently since your family formation), or have moved into the household or been born. Hence, think any of them moved out from your household and are now living elsewhere, and who do not intend to return.

a. What was the place of destination?
b. When (in Ethiopian calendar year) was the departure to the place?
c. Who was departed to?
d. What was the reason for the departure?

1= Job transfer
2= Marriage
3= Divorce, Separation
4= Better job/economic opportunities
5= Health services
6= To live with family, relatives, friends
7= To join army
8= Leave from army
9= Displacement from job villagization
10= Resettlement, displacement,
11= Lack/shortage of land
12= Attracted to urban life style
13= "Chigir" (forced to move by drought, famine, etc.)
14= Educational/training opportunities
15= Other (specify)

PART TWO

PRIVATE RESOURCES AND SUPPLY STATUS OF BASIC SOCIO-ECONOMIC SERVICES

(21). Have you had land holding since you started farming (i.e. your own, rented out, sharecropped to, rented in, sharecropped out, given out, etc?

1= yes 0= no

(22). What is the total size of your landholding in *timad*? ----------

(23). Out of your total landholding:

a. Owned ---------- (in *timad*)
b. Rented out or sharecropped to ---------- (in *timad*)
c. Why rented out or sharecropped to ----------
d. Rented in or sharecropped from ---------- (in *timad*)
e. Why rented in or sharecropped from ----------
f. From whom rented in or sharecropped from ---------- (mention their status, not name)
g. Given out ---------- (in *timad*)
h. Why given out ----------
i. Given out for whom ---------- (mention their status, not name)
j. Received temporarily or permanent gift ---------- (in *timad*)
k. From whom received temporarily or permanent gift ----------

(24). Since the 1960s (E.C.), has your land holding size:

1= Increased 2= Decreased 3= No change

(25). If there is any average change in your land holding size, mention the reason (s)

(26). Do you cultivate your entire holding? 1= yes 0= no

(27). If "no", what is the total size of your cultivated land this past year among your entire holding? ---------- *timad*

(28). If "no", how do you use the other part of your holding (other than the cultivated)?

For grazing ---------- *timad*
For fallow land ---------- *timad*
For other, specify ---------- *timad*

(29). How did you obtain all your land? (Circle all that apply; i.e. multiple response is possible)

1= through inheritance
2= during land reform
3= during land redistribution before the fall of Dergue regime
4= during redistribution after the fall of Dergue regime
5= by cash rental
6= by permanent purchase
7= other, please specify

(30). Is your cultivated landholding all in one parcel?

1= yes (skip to Q.32 and fill in "plot-1" row) 0= no

(31). If "no", how many plots do you have? ----------

(32). If "no", why not in one parcel?

Fragmented Plots	Size (ha)	Fertility (see codes below)	Slope (Topography) (see codes below)
Plot-1			
Plot-2			
Plot-3			
Plot-4			
Plot-5			
Total		xxxxxxxxxx	xxxxxxxxxx

Codes (Q.030d4b):
1= Fertile *(lem)*
2= Moderately fertile *(lem-tef)*
3= Infertile *(tef)*

Codes (Q.030d4c):
1= Top of hill and upper slope (steep)
2= Middle slope (moderate)
3= Lower slope
4= Valley
5= Plateau
6= Escarpment
7= Plain
8= Other, specify

(33). Have you ever practiced crop rotation on your main plot? 1= yes 0= no

(34). Why have you decided to use crop rotation?
1= For shortage of land 2= To keep soil fertility 3= Other (specify) --

(35). How do you view (recognize) the level of erosion on your main farm plot since you started farming?
1= Very severe 2= Severe 3= Minor 4= No problem
5= Not certain for the change occurrence

(36). Have you observed a decrease in soil depth of your cultivated land? 1= yes 0= no

(37). How do you view (recognize) the change in soil fertility on your farm main plot, since you started farming?
1= Very severe decline 2= Severe decline 3= Medium decline
4= Minor decline 5= No problem (decline) 6= Improved fertility
7= Not certain for the change occurred

(38). Do you use any irrigation scheme for cultivation? 1= yes 2= no

(39). If "yes", what type is it? 1= Modern 2= Traditional 3= Both modern and traditional

(40). Did you face water-logging on your cultivated land? 1= yes 0= no

(41). If "yes",
a. What is the size of plot water-logged ---------- *timad*
b. How much does the waterlogging occur per annum? ---------- times?

c. How much does the waterlogging last long after its occurrence? ------- weeks or ------ months?

(42). Are you currently raising livestock? 1= yes 0= no

(43). Do you graze your livestock in the same areas during both the rainy and dry season?
1= yes 0= no

(44). If "yes", where is your grazing area in both (rainy and dry) seasons?

(45). Is the both-seasoned grazing area (Multiple responses are possible):
1= Your own plot 2= Communally owned by villagers
3= Owned by PA 4= Other, specify ---------

(46). If you graze in different areas during both seasons, where is your main grazing area during the rainy season?

(47). Is the rainy-seasoned grazing area:
1= Your own plot 2= Communally owned by villagers
3= Owned by PA 4= Other, specify ---------

(48). If you graze in different areas during both seasons, where is your main grazing area during the dry season?

(49). Is the dry-seasoned grazing area:
1= Your own plot 2= Communally owned by villagers
3= Owned by PA 4= Other, specify ---------

(50). Do you face shortage of grazing land since the last 17 years? 1= yes 0= no

(51). If "yes", during which season? 1= Rainy season *(Kiremt)* 2= Dry season *(Bega)*
3= Rainy and dry season 4= Other, specify

(52). If "yes", what other sources of animals supplemental feed have you used?

(53). Do you plant trees? 1= yes 0= no

(54). If "no", why it is not?

(55). If "yes, whose holding is it? 1= Private 2= Communal 3= PA possessed 4= Other, specify

(56). If "yes", what types of trees do you plant?

(57). What do you use trees for, in order of importance?

(58). Is there currently any valuable household asset and cash saving?
1= yes 0= no

(59). If "yes", answer the following:

Item			If "yes"	
			Number owned	Average Cost (Birr)
Cash saving account at bank	1= yes	0= no		
Equib membership	1= yes	0= no		
Functional mini-business structure	1= yes	0= no		
Tape Player	1= yes	0= no		
Radio (with out tape service)	1= yes	0= no		
Jewellry	1= yes	0= no		
Housing rofed with corrugated sheet	1= yes	0= no		
Other (specify) ----------				

(60). If "no", what are the reasons for the complete dispossession of these household assets?

(61). Has your household received any type of agricultural extension and assistance from any government or non-government organization to improve your crop or livestock production in the last two years? 1= yes 0= no

(62). What organizations(s) provided the assistance for crop or livestock production?

(63). What type and how many of assistance have your household members received from these organizations? (Multiple responses are possible)

(64). If you didn't receive any type of assistance, why not?

1= No need to take 2= No institute which provide such services (in the vicinity or the surrounding) 3= other (specify)

(65). Has your household received any type of agricultural credit or loan from any GO or NGO to improve your crop or livestock production in the last two years? 1= yes 0= no

(66). What organizations provided the credit or loan for the crop or livestock?

(67). What type and how many of credit or loan has your household members received from the organizations?

(68). If you didn't receive any type of credit or loan, why not?

1= No need to take 2= No institute which provide such services (in the vicinity or the surrounding) 3= other (specify)

PART THREE

CROP PRODUCTION AND INCOME (*BELG*-1998 E.C)

(69). Was there any crop produce in *belg*-1998 E.C. 1= yes 0= no

(70). What was the reason for the complete (partial) failure of your crop production in *belg*-1998 E.C?

1= Lack of agricultural inputs 2= Insufficient agricultural input use rate

3= Late supply/use of agricultural inputs 4= Drought

5= Erratic rain (Excessive, insufficient and untimely) rain 6= Other, specify

(71). If "yes" was there partial failure of your crop production in *belg*-1998 E.C? and why?

(72). If "yes" was there any sale from the produce in *belg*-1998 E.C? and why?

Crop type produced (stable and cash) (*belg*-1998 E.C)	Harvest from your own land including sharecropped to		Harvest from rented land	Sale	
	Total (Quintal)	Per *timad* (Quintal)	(Quintal)	Total Qty (Quintal)	Total revenue (Birr)
Wheat					
Barley					
Maize					
Sorghum					
Teff					
Field pea					

Faba bean					
Chickpea					
Lentil					
Enset (Qocho)					
Potato					
Sweet potato					
Chat					
Coffee					
Other (specify)					

PART FOUR

CROP PRODUCTION AND INCOME- MEHER (1998/99 E.C)

(73). Was there any crop produce in *meher*-1998/99 E.C. 1= yes 0= no

(74). What was the reason for the complete (partial) failure of your crop production in *meher*-1998/99 E.C?

1= Lack of agricultural inputs 2= Insufficient agricultural input use rate

3= Late supply/use of agricultural inputs 4= Drought

5= Erratic rain (Excessive, insufficient and untimely) rain 6= Other, specify

(75). If "yes" was there partial failure of your crop production in *meher*-1998/99 E.C? and why?

(76). If "yes" was there any sale from the produce in *meher*-1998/99 E.C? and why?

Crop type produced (stable and cash) (*meher*-1998/99 E.C)	Harvest from your own land including sharecropped to		Harvest from rented land	Sale	
	Total (Quintal)	Per *timad* (Quintal)	(Quintal)	Total Qty (Quintal)	Total revenue (Birr)
Wheat					
Barley					
Maize					
Sorghum					
Teff					
Field pea					
Faba bean					
Chickpea					
Lentil					
Enset (Qocho)					
Potato					
Sweet potato					
Chat					

Coffee					
Other (specify)					

PART FIVE

ANIMAL OWNERSHIP AND NCOME (DURING SURVEY PERIOD)

(77). Is there any livestock you currently possess? 1= yes 0= no

(78). What was the reason for the complete dispossession of any livestock?

(79). If "yes" was there any livestock death since the last 12 months?

(80). If "yes" was there any sale from the produce i since the last 12 months?

Type of Livestock	Number owned and present at your farm or residence	Number owned but present at somewhere else	Number not owned but cared for	If you would sell one, today how much would you receive from the sale? (in Birr)	Sale (last 12 months)		If you bought in the last 12 months, how did you get the money with which you bought
					How many sold?	Average head cost (Birr)	
Ox							
Young bull							
Cow							
Heifer							
Calf							
Sheep							
Goat							
Horse (male+female)							
Mule							
Donkey							
Chicken							
Beehive							

(81). Was there any animal products unusual decrease last 12 months? 1= yes 0= no

(82). If "yes", why the decrease?

(83). Did you sell any livestock product since the last 12 months? 1= yes 2= no

(84). What is the total amount earned from the sale? ----------

PART SIX

OFF-FARM AND NON-FARM INCOMES (DURING SURVEY PERIOD)

(85). During the last 12 months, did you or any other members of the household work out against payment in cash or in-kind at the household's land either on someone else's land or in some other agriculture related activity? (For example, weeding, hoeing up, virgin land plough, etc.) (This works for all except for Cash-for-work, CFW, and/or Food-for-Work, FFW, programs by GOs and NGOs) 1= yes 0= no

(86). If "no", why have you not been engaged in it?

(87). If "yes", why have you been engaged in it other than agricultural works?

(88). If "yes", what is the total amount of income earned (Birr)?

(89). Have you or other members of your household been involved in the non-farm activities in the last 12 months. (For example, weaving, handicraft, etc.) 1= yes 0= no

(90). If "no", why have you not been engaged in it?

(91). If "yes", why have you been engaged in it?

(92). If "yes", what is the total amount of income earned (Birr)?

(93). Has the household received any other income (such as remittance, gifts, dowry and/or other transfers) in the last 12 months? 1= yes 0= no

(94). What is the amount received through food aid, safety net, other FFW and CFW, dowry, maintenance cash and/or other transfers) in the last 12 months?

PART SEVEN

FOOD CONSUMPTION (LAST 12 MONTHS)

(95). What was the estimated actual food consumption in the last 12 months? For the enumerator: Ask the daily actual average food consumption to arrive at the monthly and annual average for the last 12 months.

Food Items	Own Produce *(kg)*	Purchased *(kg)*	Food Aid *(kg)*	Total
Cereals				
Wheat				
Barley				
Maize				
Sorghum				
Teff				
Enset (Qocho)				
Pulses				
Vegetables				
Animal Products				
Oil (*liter*)				

Fruits				
Spices				
Other foodstuff (specify)				
Total				

(96). What could be daily actual food need for 12 months (if the supply is not restricted)? For the enumerator: Ask the daily amount needed for the level required for satisfaction for the last 12 months.

Food Items	Own Produce (Kg)	Purchased (Kg)	Food Aid (Kg)	Total
Cereals				
Wheat				
Barley				
Maize				
Sorghum				
Teff				
Enset (Qocho)				
Pulses				
Vegetables				
Animal Products				
Oil (Litre)				
Fruits				
Spices				
Other foodstuff (specify)				
Total				

(97). Indicate the types of food frequently consumed by the family (in the order of importance)

(98). Indicate the types of foodstuffs frequently lacking in your family (in the order of severity)

(99). Indicate the average number of meals per day in the family.

Age range	Daily meal frequency	
	Normal years	Deficit years
0-5		
5-14		
15-65		
65+		

(100). Was there any expense for non-food items in the last 12 months?

1= yes 0= no

(101). For the total household, what and how many have you used for the following non-food items in the last 12 months?

Expense Items	Cost (Birr)
1. Medical expenses	
2. School expenses	
3. *Mahberoch* and other social engagements	
4. Support to relatives	
5. Fuel purchase	
6. Other household non-food expenses (specify)	
Total	

(102). Was there any crop loss after harvest in the last 12 months?
1= yes 0= no

(103). What is the crop loss after your harvest? (Mention the crop type and the lost amount)

(104). Have you experienced reserving for seed and other agricultural inputs (like fertilizers) in the last 12 months?
1= yes 0= no

(105). What amount have you reserved for seed? (Mention the crop type and the reserved amount)

(106). Have you used chemical fertilizer? 1= yes 0= no What and how many?

(107). Have you used herbicide? 1= yes 0= no What and how many?

(108). Have you used improved seed variety? 1= yes 0= no What and how many?

PART EIGHT

PERCEPTION/RECOGNITION OF HAZARDS AND RISKS

(109). Have you perceived any household problem in the last 17 years?
1= yes 0= no

(110). What are the major problems that your household has faced in the last 5 years?
1= Lack of farm implements 2= Lack of adequate land
3= No farm land at all 4= Labor constraints
5= Lack of time 6= Lack of credit facilities
7= Money constraints 8= Lack of oxen
9= Lack of grazing land 10= Other agricultural problem (specify)
11= Other non-agricultural, social problem (specify)

(111). What are the major undesirable consequences that your household has encountered due to the above problems in the last 5 years?
1= Famine 2= Epidemic/mortality
3= Forced migration/displacement 4= Morbidity (sickness)
5= Inappropriate exploitation 6= Poverty
7= Household conflict/violence 8= Other (specify)
9= No undesirable consequences

(112). Of these, which is the most frequently occurring?

(113). Of these, which one is the most severe?

(114). Did your household experience food insecurity/food shortage in the past 15 years?

1= yes 0= no

(115). What do you think are the causes of that food shortage/food insecurity in the household?

1= No enough rain (for major crops) 2= Too much rain
3= Untimely rain 4= Water-logging
5= Insects/pests 6= Poor quality land (i.e less fertile)
7= Land is too steep 8= Not enough land for the household
9= Inappropriate land management practice 10= Use traditional farm implements
11= Market inaccessibility (fertilizer, improved seed, etc.) 12= Lack of agricultural inputs
13= Lack of family labor 14= Problem of food "selectivity"
15= Prevalent unemployment in the family price/condition 16= Unaffordable market
17= Large family size 18= Shortage of food supply
19= Food utilization mismanagement 20= Livestock disease
21= Human disease 22= Others, specify____

(116). From these, which are the three major ones (in the order of weight)?

(117). What do you think are the solutions for these problems of food insecurity? (Circle the most important ones only).

1= Getting additional land 2= Resettlement
3= Villagization 4= Irrigation by water harvesting
5= Irrigation by other water sources 6= Changing the traditional land management which hinders productivity and natural resources
7= Sufficient supply and use of agricultural inputs (Example: Availability of selected seeds, improved agricultural implements, fertilizers, pesticides, etc.)
8= Getting oxen for traction 9= Expanding credit services
10= Family planning practices management 11= Participatory education on food use
12= Others, specify

(118). Have you been experienced and coping strategy against food insecurity in the last 15 years?

1= yes 0= no

PART NINE

COPING STRATEGIES WITH FOOD INSECURITY

(119). Have you been experienced and coping strategy against food insecurity in the last 15 years?

1= yes 0= no

(120). If "yes", fill the following table based on the codes below:

Column-2 (a)

1= yes 0= no

Column-3 (b)

1= Frequently 2= Rarely 3= Never (skip to next strategy)

Column-4 (c)

1= yes 0= no

Column-5 (c)

1= When the problem starts 2= Around the middle of the problem
3= Only when it becomes severe

Coping Strategies and Responses against Food Insecurity (Food Stress)	*Was this used during the last 15 years?* (a)	*Application frequency experienced in the last 15 years* (b)	*Was this used during the last 12 months?* (c)	*During the past 15 yrs, when did you use this strategy?* (d)
Stage-1 Coping Strategies				
Intensify household food production				
Sale of livestock products				
Eating less preferred foods				
Reducing quantity of meals				
Reducing number of meals				
Eating wild food (like "bird-sown" cabbages)				
Eating taboo and toxic food				
Household members seeking work within their living PA				
Household members seeking work vicinal to their PA				
Sale of firewood/dung/charcoal/grasses				
Increase of other petty trade (sale of local drinks)				
Participating in FFW/EGS program				
Inter-household (relatives) transfers and borrowing of food or cash				
Postponing wedding and other social engagements				
Search for temporary food aid				
Stage-2 Coping Strategies				
Temporary migration (to find work/food, etc)				
Non-kinship loan of food/grain or cash to buy food				
Selling chicken				
Sale of shoats				
Sale of personal household valuables				
Withdrawing children from school				
Skipping eating (not eating) for whole day				
Stage-3 Coping Strategies				
Return long-term migration				
Sale of cattle				

Sale of equines				
Selling farm tools (all or a portion)				
Sharecropping land				
Eating the reserve for agricultural inputs (like seed)				
Renting land				
Selling of land (all or a portion)				
Redistribution of children				
Selling domicile (house)				
Stage-4 Coping Strategies				
Begging for food/resources				
Complete dependence on external aid				
Permanent migration in search of support, land, job				
Dissolution of family				

(121). Thinking of right now, how adequate or sufficient is the stock of food items (harvested or ready for harvest) in your household until the next harvest?

1= Sufficient 2= Insufficient

3= Out of stocks even now 4= Other (specify)

(122). If insufficient, how many more months will it last? No. of months

(123). If out of stocks currently, how will you supply food for your household until the next crop harvest time?

(124). For how many months of the year is your annual household income or/and production sufficient to make the family's food needs meet?

(125). In your opinion, how do you say about the sufficiency of your current annual household income or/and production to make the family's annual food needs meet?

1= Much too small 2= Too small 3= Barely sufficient

4= Sufficient 5= Other (specify)

"SINCE THE FACE-TO-FACE INTERVIEW WITH YOU IS COMPLETED, I VERY THANK YOU FOR YOUR COOPERATION!"

(SKIP TO THE NEXT SAMPLED HOUSEHOLD)

APPENDIX-B
Questionnaire: Key Informant Interviews (KIIs)

Note: Before conducting a KII, it is better to review secondary data.

Interviewer's name ..... Date of interview .....

GENERAL INFORMATION ON THE INTERVIEWEE

Name ..... *Kebele* ..... Age ..... Sex .....
Category of position or roles in the community .....
Marital status ..... Size of regular household members .....
Number of children ..... Regular occupation .....
Highest educational level achieved .....

PART 1

COMMUNITY LIVELIHOOD STRUCTURE AND WEALTH RANKING

1). **Livelihood Structure:**

a). Describe the livelihoods (staple cropping, cash cropping, herding, trade, daily labor, handicrafts, etc.) of the majority of households in the PA now. Relate them specifically to food insecurity

b). What are the main sources of income for the majority of the population in a normal year (food inflows)? Can you also indicate their annual average value and average proportion?

i). .....
ii). .....
iii). .....
iv). .....

c). What are the main expenditures for the majority of the population in a normal year (food outflow ventures)? Can you also indicate their rate (draw average proportion)? How are they covered (or sources of cash to cover them)?

i). Daily (Recurrent) .....
ii). Non-recxurrent/Occasional/Ceremonial .....
iii). Other .....

d). What are the most important off-farm and non-farm employment activities? What proportions of the households are engaged in these activities?

i). ....
ii). ....
iii). ....

2). **Wealth Ranking:**

a). How would you describe the characteristics that distinguish among strata of the community in the *kebele* (*the wealthy* or better off, *the middle*, *the poor*, and *the very poor*) in terms of land, oxen, labour, capital, etc?

b). What proportions of the households in the *kebele* would you characterize as *the wealthy* or better off, *the middle*, *the poor*, and *the very poor?* (Use traditional proportions like $1/4^{th}$, $1/2^{nd}$ or half, $3/4^{th}$, $1/3^{rd}$, $2/3^{rd}$, very few or $1/10^{th}$, almost all or $9/10^{th}$, etc.)

3). **Ways out from Poverty:**

It is known that the poor or poorer segment of the households usually attempt different ways to improve their livelihood status. What are they? Probe, only if necessary, for types of work, family arrangements, labour inputs, education, migration, remittances, etc.

a). Spontaneous responses

.....

.....

b). Probed responses

.....

.....

PART 2

POPULATION DYNAMICS, ACCESS TO NATURAL RESOURCES, AND ENVIRONMENTAL STRESS

1). **Population Dynamics:**

a). Describe population size and change in your *kebele* in the past 17 years (since the downfall of the *Dergue* regime):

i). Has the population increased since the last 17 years? If "yes", what are the reasons? What is the rate of the causal factors in their impact proportion?

ii). Has the population been increasing slowly, moderately, or rapidly?

iii). Is it good or not so good for the development of the *kebele* and welfare of the households? Why are they so?

iv). If not good, what are the coping mechanisms and the lasting preventive solutions?

b). Describe the major migration movements in and out of the *kebele* (community). For each type of migration type, describe that who (males, females, entire family, etc.), from where and why (pull factors) came in here to live. Moreover, describe that who, to where and why (push factors) went out.

i). In-migrants (never lived here before) .....

ii). Return migrants (born here, left and returned) .....

iii). Out-migrants (born here and left) .....

iv). Temporary (seasonal) migrants (i.e. those periodically coming and going) .....

2). **Natural Resources: Agricultural Land**

a). What are the main groups of landholding sizes in the *kebele* and the proportion of households in each type? What changes have there been since the 1960s E.C. (Before 1967, 1970s, 1980s and 1990s)

Note that 1 hectare is 4 *timads*. For proportions, use traditional proportions like $1/4^{th}$, $1/2^{nd}$ (half), $3/4^{th}$, $1/3^{rd}$, $2/3^{rd}$, very few ($1/10^{th}$), almost all ($9/10^{th}$), etc.

Landholders Group	Category of Landholding Size (ha)	Proportions of Households			
		Before 1967	1970s	1980s	1990s
Large					
Medium					
Small					
Very small					
Landless					

b). What is the most frequent per capita landholding?
c). Is there any change in landholdings size? What are the reasons?
d). What is the status of fragmentation?
e). What is the status of land sloppiness? What is the status of soil erosion through run-off? What is the status of water logging?
f). What is the practice in application of irrigation and crop rotation?
g). Who are landless? Why are they landless?
h). What have been the means for acquiring additional cultivable land? How about is the role and trend of out-migration in this regard?

3). **Environmental Change:**

What major environmental changes or stresses (if any) have occurred since 1960s? What were the causes? How was the degree of severity? What types of corrective measures were taken then?

Environmental Stresses	Proportions of Households			
	Before 1967	1970s	1980s	1990s
Soil Erosion and Fertility Depletion				
– Causes				
– Severity (high, moderate, low)				
– Measures taken				
Deforesation				
– Causes				
– Severity (high, moderate, low)				
– Measures taken				
Devegetation of Grasslands				
– Causes				
– Severity (high, moderate, low)				
– Measures taken				
Flooding/Water-logging				
– Causes				
– Severity (high, moderate, low)				
– Measures taken				

Other Environmental Problem (specify)				
– Causes				
– Severity (high, moderate, low)				
– Measures taken				

4). **Environmental Management:**

What are the natural resources management practices exercised in the *kebele*? How effective are they? How extensive is their coverage?

5). **Land Management:**

a). How would you describe the overall land management in the *kebele*?

b). Has it changed over time (since 1960s)? Was the change for the better or the worse? (What is the fertility status of landholdings in the sample kebeles?) Why is it so? (What are the reasons for continuous depletion of inherent fertility, if any)?

c). Do farmers use natural fertilizers? If "no", why do they not? If "yes", how many proportion of the households do use and in how many land size.

6). **Vegetation Cover:**

a). What are they (exotic and indigenous; afforested and natural)?

b). What is their status currently?

c). What is their purpose for the householders? What are the demerits embedded with them?

d). What are the causes for their encroachment (if any)?

7). **Population-Land-Environment Nexus:**

How does the changing relationship between population, land, and environment affect the future generation in the *kebele*?

PART 3

FOOD PRODUCTION, MARKETING, AND ACCESS TO FOOD

1). **Crops Production:**

What are the main crops grown in the *kebele*? Are there major production shortfalls or complete failure? If so, when, how often, in whom (where) and why did they occur? Out of the reasons, what was an all-encompassing major one and how many damage does occur due to it? What coping mechanisms had they been using? What are the solutions against them?

2). **Livestock Husbandry:**

a). What are the main types of livestock in the *kebele*? Are there main problems? If so, when, how often, in whom (where) and why did they occur? Out of the reasons, what was an all-encompassing major one and how many damage does occur due to it? What coping mechanisms had they been using? How was their effectivity? What are the lasting preventive solutions against them?

b). What are the main types of livestock products and their productivity in the *kebele*?

3). **Agricultural Inputs**

a). What are they?
b). What are the problems in demand, supply, and utilization?
c). What coping mechanisms had they been using?
d). What are the lasting preventive solutions against the constraints?

4). **Agricultural Produce market:**

What crops and animals are marketed? What do affect decisions on what and how many to produce? How good is their market? Are there market price differences of crops at the time of plenty (post-harvest) and scarcity (pre-harvest)? Which important crops do have the greatest differences and why? What do affect bargaining power on their market?

PART 4

FOOD INSECURITY AND PERCEPTION OF ITS RISK

1). How do you understand the term "food insecurity"?
2). When (years and specific months), in what severity, why, in how many proportion of the households, in what population group (children, mothers, the aged, etc), and where did the food insecurity happen since the last 17 years?
3). What is the daily meal frequency of most of the household during normal and lean months (seen separately)?
4). Are there any religious or cultural practices that might impede the productivity and consumption of food? (Probe with prohibited days, food taboos, ceremonial expenditures like marriage, funeral, baptism, etc.) How they affect them?
5). Do you expect food insecurity to occur again in the near future? If "yes", will it be more or less severe than in the past? Why will it be so?

PART 5

LOCAL CAPACITIES, RESILIENCE, AND COPING STRATEGIES

1). What have been the main types of responses and coping strategies (short-term, mid-term, and long-term) to food insecurity? (Forward an interview separately for those acted by households and the *kebele*.)
2). Are there formal institutions/organizations that help in protecting the resource poor and highly vulnerable households in your community? If "yes", which are they? What main activities do they carry out (state separately for each)? How effective is their activities in the short, medium, and long run?
3). Can you suggest ways to improve the prevention and preparedness for food insecurity situation in the future (by households, community, and other institutions)?
4). Compared to earlier times (1960s ago), has the overall resilience to food insecurity now become greater, stayed the same, lesser, or mixed?

APPENDIX-C
List: Key Informant Interviews

Name		*Kebele*	*Position/Occupation*
1. Ergicho	Tiramo	Ana Bellesa	Evangelist
2. Wosoro	Sebro	»	*Edir* leader
3. Tesfaye	Menedo	»	Community elder
4. Awol	Mohammed	»	PA chairman
5. Askale	Molla	»	DA
6. Tadelech	Hundale	»	HEA
7. Simeon	Assefa	»	School director
1. Dawit	Ertenbo	Gora Tume	Church leader
2. Tumiso	Molbeto	»	*Edir* leader
3. Abebe	Beliso	»	Community elder
4. Moloro	Masebo	»	PA chairman
5. Ayalew	Siyum	»	DA
6. Workinesh	Abraham	»	HEA
7. Iyasu	Getachew	»	School director
1. Hebib	Nuri	Shurmo Wit-Bira	Mosque leader
2. Shemsu	Nurala	»	*Edir* leader
3. Ashoro	Tisoro	»	Community elder
4. Shigute	Aliye	»	PA chairman
5. Solomon	Abuye	»	DA
6. Emebet	Iwunetu	»	HEA
7. Temesgen	Leroro	»	School director
1. Kebede	Shishore	Lemo Woreda	Leader, Agronomy Team, OoARD
2. Fikre	Tumsido	»	Leader, Rural Land Administration Team, OoARD
3. Tesfaye	Darebo	»	Head, DoFSDPP at OoARD
4. Belachew	Haile	»	Head, OoARD

APPENDIX-D
Checklist of Issues: Focus Group Discussions (FGDs)

Note: It is better to review secondary data and KII results before embarking on FGDs

Place of discussion ..... Date of discussion .....

Time started ..... Time ended .....

Name of moderator ..... Name of recorder .....

Interviewer's name ..... Date of interview ....

GENERAL INFORMATION ON THE DISCUSSANTS

Kebele .....

Characteristics	*Name 1*	*Name 2*	*Name 3*	*Name 4*	*Name 5*	*Name 6*	*Name 7*
Age							
Sex							
Marital status							
Religion							
Ethnicity							
Regular occupation							
Exact place of residence (sub-kebele, got, etc.)							
Native or immigrant							
Years lived here							
Literacy/educational level							
Category of position or roles in the community							
Size of regular household members							
Number of children							

1. *Let's discuss the following issues on human population pressure*

   - Presence of any population growth
   - Rating land carrying capacity and population growth
   - Causes of population growth
   - Rate of the causal factors in their impact proportion
   - Coping mechanisms (adaptive measures) with population pressure
   - Lasting preventive solutions

2. *Let's discuss the following issues on landholdings*

   - The most frequent per capita landholding
   - Presence of any change in landholdings size
   - Reasons for the change in landholdings size
   - Status of land fragmentation
   - Status of land sloppiness
   - Status of soil erosion through run-off
   - Status of water logging
   - Practice in application of irrigation and crop rotation
   - Landlessness- Who, what proportion, and why
   - Means for acquiring additional cultivable land
   - Role and trend of out-migration in acquiring additional cultivable land

3. *Let's discuss the following issues on soil fertility*

   - Fertility status of landholdings in the sample *kebele*
   - Reasons for continuous depletion of inherent fertility (if any)

4. *Let's discuss the following issues on agricultural inputs*

   - Types of agricultural inputs in use in the locality
   - Constraints in the inputs' demand, supply, and utilization
   - Coping mechanisms against the constraints
   - Lasting preventive solutions against the constraints

5. *Let's discuss the following issues on food crops failure and lesser livestock productivity*

   - Time when food crops failure (completely or partially) and lesser livestock productivity happen
   - Place where (or in whom) they happen
   - Reasons why they happen

- Out of the reasons, an all-encompassing major one and extent of damage occured due to it
- Coping mechanisms they had been using
- Preventive solutions against them

6. *Let's discuss the following issues on food insecurity*

- Comprehending the term
- Major reasons for vulnerability to it among householders
- Coping mechanisms they had been using
- Solutions against it
- Food inflow sources, food outflow ventures, and their average values

7. *Let's discuss the following issues on vegetation cover*

- Vegetation cover types: exotic and indigenous; afforested and natural
- Current status of vegetation cover
- Purpose of vegetation for the householders
- Demerits embedded with vegetation (all or some)
- Causes for the vegetation cover encroachment (if any)

8. *Let's discuss the following issues on household income items*

- Income sources of a household
- Average values of income sources per annum

9. *Let's discuss the following issues on household expense items*

- Recurrent and non-recurrent household expense items
- Rating (drawing the proportion of) the recurrent items by their amount of expenditures
- Ways (sources) of covering the expense items

APPENDIX-E
List: Focus Group Discussions

Name		Sex	Age-group	Kebele
1. Desalegn	Aboye	M	Elder	Ana Bellesa
2. Getiso	Ahmed	M	Youth	"
3. Abayneh	Wamisho	M	Elder	"
4. Iyaya	Huluko	F	Adult	"
5. Tarekegn	Erbeto	M	Adult	"
6. Womiso	Ana	M	Adult	"
7. Tsegaye	Sayid	M	Elder	"
1. Ayele	Dunoro	M	Adult	Gora Tume
2. Teshale	Hesbeto	M	Adult	"
3. Ashenafi	Alemu	M	Adult	"
4. Kemal	Tisore	M	Elder	"
5. Kasho	Zemede	F	Youth	"
6. Habtamu	Anoro	M	Elder	"
7. Degneh	Elias	M	Youth	"
1. Fekadu	Desta	M	Adult	Shurmo Wit-Bira
2. Netsanet	Godebo	M	Youth	"
3. Yonas	Ashebo	M	Elder	"
4. Meseret	Yohanes	F	Adult	"
5. Argaw	Lechamo	M	Elder	"
6. Teshome	Erkalo	M	Youth	"
7. Itagegnehu	Wondimu	F	Adult	"

APPENDIX-F
Tabulation Sheet: Secondary Data

(Table-1). Distribution of Population Size of Lemo *Woreda* by Sex: *Rural and Urban, 1996-1999 E.C*

Year	Rural			Urban			Total		
(E.C)	Male	Female	Male	Female	Total	Total	Male	Female	Total
1996									
1997									
1998									
1999									

Source:

(Table-2). Distribution of Population Size of Lemo *Woreda* by Sex and Broad Age Category: *Rural and Urban, 1999 E.C*

Year	Rural			Urban			Total		
(E.C)	Male	Female	Male	Female	Total	Total	Male	Female	Total
0-14									
15-64									
65+									
Total									

Source:

(Table-3). Fertility Rate of Lemo *Woreda*: *1999 E.C*

Indicator	Rural	Urban	Total
Average household size			
Mean number of children ever born (women 15-49)			
Total fertility rate (adjusted)			
Total			

Source:

(Table-4). Migration Status of Headship of Lemo *Woreda* by Sex: *Percentage, 1999 E.C*

Migration Status	Rural	Urban	Total
Immigrants			
Male			
Female			
Non-immigrants			
Male			
Female			
Total			
Male			
Female			

Source:

(Table-5). Headship Rate of Lemo *Woreda* by Sex and Marital Status: *Rural and Urban, 1999 E.C*

Year (E.C)	Rural			Urban			Total		
	Male	Female	Male	Female	Total	Total	Male	Female	Total
Single									
Currently married									
Divorced									
Widowed									
Not Stated									
Total									

Source:

(Table-6). Location, Relief and Climate

Neighboring woredas/zones to the study woreda	Distance of the woreda's capital		Relief of the woreda	Agro- ecological zones and their share of the woreda	Topographies their share in the woreda
	From Addis Ababa	From Awassa			

(Table-7).

(Table-8). Water and Drainage in Lemo *Woreda*: *1999 E.C*

Name of the River Basin	Length within the *woreda* (a)	Area within the *woreda* (b)	Drainage density (a/b)
Permanent Rivers			
Intermittent Rivers			

Source:

(Table-9). Total and Arable Land Areas of Lemo *Woreda* by AEZ and Altitude: *1999 E.C*

AEZ (Agro-ecological zone)	Altitude (metres asl)	Total land (km^2)	Arable land (km^2)
Dega	2,500 and above		
Woina-dega	1,700 – 2,499		
Kolla	Below 1,700		

Source:

(Table-10). Total and Arable Land Areas of Lemo *Woreda* by Angle of Slope (Gradient): *1999 E.C*

Angle of Slope (%)	Total land (km^2)	Arable land (km^2)
Flat (0-2)		
Gently sloping or undulating (2-6)		
Sloping or rolling (6-13)		
Moderately steep or hilly (13-25)		
Steep (25-55)		
Very steep or mountains (above 55)		

Source:

(Table-11). Soil Fertility Status of Lemo *Woreda*: *1999 E.C*

Fertility	Total land (km^2)	Arable land (km^2)
Fertile *(lem)*		
Moderately fertile *(lem-tef)*		
Infertile *(tef)*		
Total		

Source:

(Table-12). Soil Texture Status of Lemo *Woreda*: *1999 E.C*

Texture	Total land (km^2)	Arable land (km^2)
Clayey *(Below 0.002)*		
Silty *(0.002-0.02)*		
Sandy *(0.02-0.20)*		
Gravely *(above 0.20)*		
Total		

Source:

(Table-13). Soil Drainage of Lemo *Woreda*: *1999 E.C*

Drainage quality	Total land (km^2)	Arable land (km^2)
Poorly drained		
Imperfectly drained		
Well drained		

Source:

(Table-14). Soil Colours of Lemo *Woreda*: *1999 E.C*

Drainage quality	Total land (km^2)	Arable land (km^2)

Source:

(Table-15). Vegetation Cover Estimates of Lemo *Woreda: 1999 E.C*

Vegetation Type	Area of Natural Vegetation (km^2)	Area of Manmade Vegetation (km^2)
Forest		
Wood land		
Bush land		
Shrub land		
Grassland		
Other (specify)		
Total		

Source:

(Table-16). Rainfall (Precipitation), Temperature, and Potential Evapo-transpiration of Lemo *Woreda: 1990-1999 E.C*

Year	Unit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1990	RF (mm)												
	T (^{O}C)												
	PET												
1991	RF (mm)												
	T (^{O}C)												
	PET												
1992	RF (mm)												
	T (^{O}C)												
	PET												
1993	RF (mm)												
	T (^{O}C)												
	PET												
1994	RF (mm)												
	T (^{O}C)												
	PET												
1995	RF (mm)												
	T (^{O}C)												
	PET												
1996	RF (mm)												
	T (^{O}C)												
	PET												
1997	RF (mm)												

	T (^{o}C)												
	PET												
1998	RF (mm)												
	T (^{o}C)												
	PET												
1999	RF (mm)												
	T (^{o}C)												
	PET												

Source:

(Table-17). Total Household Landholding Size of Lemo *Woreda*: *1999 E.C*

Landholding category (ha)	Total Area (ha)	Households (no.)
Landless (0.00)		
Below 0.25		
0.25-0.74		
0.75-0.99		
1.00-1.24		
1.25-1.49		
1.50-1.74		
1.75-1.99		
2.00-2.24		
2.25 and above		
Grassland		
Other (specify)		
Total		

Source:

(Table-18). Average Household Landholding Size of Lemo *Woreda*: *1999 E.C*

Landholding category (ha)	Total Area (ha)
Average crop land	
Average grazing land	
Average no. of plots	
Average size of plots	

Source:

(Table-19). Land Use Pattern of Lemo *Woreda*: *1999 E.C*

Landholding use pattern	Total Area (ha)
Potentially Cultivable area	
Cultivated area	
Annual crops	
Biennials and Perennials	
Fallow land	
Grazing land	
Forest land	
Nonproductive land	
Other land use, specify	

Source:

(Table-20). Crop Production of Lemo *Woreda*: *1996-1999 E.C*

Crop Type	Output or Yield (Quintal)								Area Covered (Hactare)							
	Belg				*Meher*				*Belg*				*Meher*			
	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999
Total																

Source:

(Table-21). Crop Sold Post-Harvest in Lemo *Woreda*: *1996-1999 E.C*

Crop Type	Output or Yield (Quintal)								Area Covered (Hactare)							
	Belg				*Meher*				*Belg*				*Meher*			
	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999
Total																

Source:

(Table-22). Crop Lost Post-Harvest in Lemo *Woreda*: *1996-1999 E.C*

Crop Type	Output or Yield (Quintal)								Area Covered (Hactare)							
	Belg				*Meher*				*Belg*				*Meher*			
	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999
Total																

Source:

(Table-23). Crop Productivity of Lemo *Woreda*: *1996-1999 E.C*

Crop Type	Output or Yield (Quintal) per Hactare							
	Belg				*Meher*			
	1996	1997	1998	1999	1996	1997	1998	1999
Total								

Source:

(Table-24). Livestock Population of Lemo *Woreda*: *1999 E.C*

Livestock Type	Local (Indigenous)	Improved (Exotic)	Total
Cattle			
Ox			
Cow			
Young bull			
Heifer			
Calf			
Shoat			
Sheep			
Goat			
Equines			
Mule			
Donkey			
Mare			
Horse			
Poultry			
Chicken			
Beehives			

Traditional			
Modern			

Source:

(Table-25). Average Livestock Productivity of Lemo *Woreda*: *1999 E.C*

Livestock Product Type	Unit	Productivity (Unit/day)
Milk		
Meat		
Butter		
Egg		
Hides and skins		
Honey		
Other (specify)		

Source:

(Table-26). Participation in Agricultural Extension and Extension Agents of Lemo *Woreda*: *1999 E.C*

Type of Extension Program	Households Used the Inputs under the program	Number of Extension Agents (DAs)	Total number of agricultural households	Extension Service Coverage Potential
Improved seed variety				
Improved livestock breed				
Veterinary services				
Natural resource management				
SWC programs				
Afforestation				
Irrigation				
Other (specify)				

Source:

(Table-27). Use of Agricultural Inputs of Lemo *Woreda: 1999 E.C*

Input Type	Quantity of Agricultural Inputs Used		Households Used the Inputs
	Amount	Unit	
Chemical fertilizer			
Improved seed			
Pesticides			
Herbicides			
Improved agricultural implements			
Other (specify)			

Source:

(Table-28). Access to Rural Credit Facilities of Lemo *Woreda: 1999 E.C*

Name of Credit Institutions	Households Used the Facilities
Omo MFI	
WISDOM MFI	
LICHA Hadiya Framers CU	
Other (specify)	

Source:

(Table-29). Food Aid Distributed due to Food Stress in Lemo *Woreda: 1996-1999 E.C*

Aid Type	Amount of aid								Number of households benefited			
	1996		1997		1998		1999		1996	1997	1998	1999
	Qty	Unit	Qty	Unit	Qty	Unit	Qty	Unit				

Source:

(Table-30). Food Purchase in the *Woreda: 1996-1999 E.C*

Food Type	Amount of Food								Number of households purchased			
	1996		1997		1998		1999		1996	1997	1998	1999
	Qty	Unit	Qty	Unit	Qty	Unit	Qty	Unit				

Source: