Strengthening Emergency Response Abilities
SERA Project

Vulnerability Profile

Lemo Woreda (district)
Hadiya Zone
Southern Nations, Nationalities and Peoples Region

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Table of Contents

List of Tables

List of Figures

Executive Summary

Preparation of vulnerability profile is valid so as to come up with alternative ways of improving communities' livelihood by identifying the underlining factors that easily make the inhabitants exposed to disasters resulting from various risks and less resilient. This is in line to the new disaster prevention and preparedness policy of the country that aims to cope up with risks of disaster by integrating relief aid with development. Thus, the attempts are made in this profile to answer some major questions like who are the most vulnerable, why are they more vulnerable, where are these more vulnerable group living and what can be done by the households, community at large and institutions in order to make them less vulnerable to potential disasters in the future.

In line to the above objectives, Lemo wereda is selected based on its past disaster history. The wereda is then systematically stratified in to three agro climatic zones namely the high land or dega, the intermediate high land or weina dega and the low land or kolla so as to collect representative information for the purpose. For there are 7 high land PAs, 24 low land PAs and 43 intermediate high land PAs in the wereda, 1 PA from the high land, 3 PAs from the intermediate high land and 3 PAs from the low land were selected as samples for both structured and semi-structured surveying. The sampled households were deliberately made larger in the low land compared to other agro-climatic zones due to the fact that this part of Lemo is known for its repeated occurrence of disasters. The more structured surveying was carried out by sampling 100 households from each sampled PAs where the household head mainly male and all the eligible women aged 15-49 years in each sampled households were included in the survey besides including children aged 3-36 months for anthropometeric purpose. The data obtained through this way was further triangulated by the information gathered from the key informants' and community focus group discussion in each sampled PA. Relevant secondary data collected from various offices and documents were also included as a background chapter.

The data obtained through various ways are analyzed using both qualitative and quantitative methods and presented by the help of tables, line graphs and charts. Accordingly, cross tabulation tables were widely used to analyze the relationship between various factors and binary logistic regression is also used to statistically test the major causes behind the perceived food insecurity in the area. Even though various efforts are made to minimize their negative impacts, lack of well established experience in the preparation of vulnerability profile as well as related literatures can be considered as the major limitation of this survey.

The survey revealed that Lemo is one of the most densely populated weredas of the region with still rapidly increasing population. Accordingly, the current population growth rate is over 3 % per annum and its crude density reached 351 persons per square kilometer in 1992 during this survey. The estimated agricultural density of 342 persons per square kilometer in the same year indicates that Lemo is one of the weredas with extreme scarcity of cultivation land. With the current average land holding size of only 0.52 hectare, households in the high land part of Lemo are found the most vulnerable compared to the households in the low land with an average land holding size of 0.91 hectare and those in the intermediate high land with an average land holding size of 0.8 hectare. As discussed in the consecutive chapters, most of the

factors associated with vulnerability of the inhabitants in this wereda are mainly emanating from population pressure and scarcity of land.

Land is not only scarce resource but also less productive due to the impacts of different physical resource depleting factors. Among these are: severe soil erosion in the steep slopes and mouth of the rivers, overgrazing and over cultivation in most parts of the wereda, water logging and flooding problems in the flat plains of Shashogo area, dominance of eucalyptus plantation, and clearing of the residual natural forest in search for more farm land and wood for fuel and construction purposes.

Physical availability of some basic services have shown improvement through time in the wereda. However, quality of the services is not appreciated by the inhabitants. Shortage of qualified teachers and relevant educational materials were found the major factors contributing for the low quality of primary education. Similarly, shortage of trained health personnel and medical equipment including medicine were the major ones impeding the community from getting the required health services. Except for Polio, immunization coverage is still very low in the wereda. It is promising to see that primary school participation rates had been found steadily increasing between 1987 & 1992 for boys and girls in the wereda, however, relatively higher and stable drop out rates still need attention. Over 90 % the rural population in the wereda still do not have access to potable water. Despite large livestock population, vet clinics are rarely available in the wereda.

Even though it is still with various shortcomings, efforts made through the agricultural extension service are promising especially in the intermediate high land part of Lemo. The program is particularly successful in increasing the productivity of cereals. However, enough attention is not given to the extension of the natural resource management and that of the livestock sector. Perennial crops like enset are also forgotten in the extension program. It is still with out any alternative to improve the falling prices of grains in the area.

Findings indicated that, over 85 % of the inhabitants in Lemo are suffering from transitory food insecurity. Though data is not available for longer years so as to say enough about chronic food insecurity, the causes mentioned behind the perceived food insecurity indicate that most of them can still suffer from chronic food insecurity too. Shortage of rain, shortage of oxen, inadequacy of land, lack of economic access to modern agricultural inputs, infertility of the soil, occasional flood hazard and crop diseases and pests are the major causes mentioned for the perceived transitory but repeated food insecurity in the area. Households with no or little land, female heads, low income, no ox, no livestock, and infertile soil were identified to be the most vulnerable to perceived transitory food insecurity. Besides, those settled along the mouth of occasionally flooded rivers are to be included in the more vulnerable group to food insecurity. Discussions with the relevant key informants revealed that months between March and September are with critical food shortage both in the low land and the intermediate high land where as months between June and November are known to be with critical food shortage in the extreme high land even in a normal year in Lemo.

As reflected in the results of anthropometric measures, considerable proportion of children aged 3 to 36 months and their respective mothers are malnourished in the wereda. Accordingly, 43.1 %, 13.2 %, and 46.5 % of children aged 3-36 months are

respectively stunted, wasted and underweight in Lemo. Besides, about 25 % of women aged 15 to 49 years were found malnourished. Reflecting the extreme food insecurity and the associated malnutrition, prevalence of infectious diseases were found common occurrence in the area.

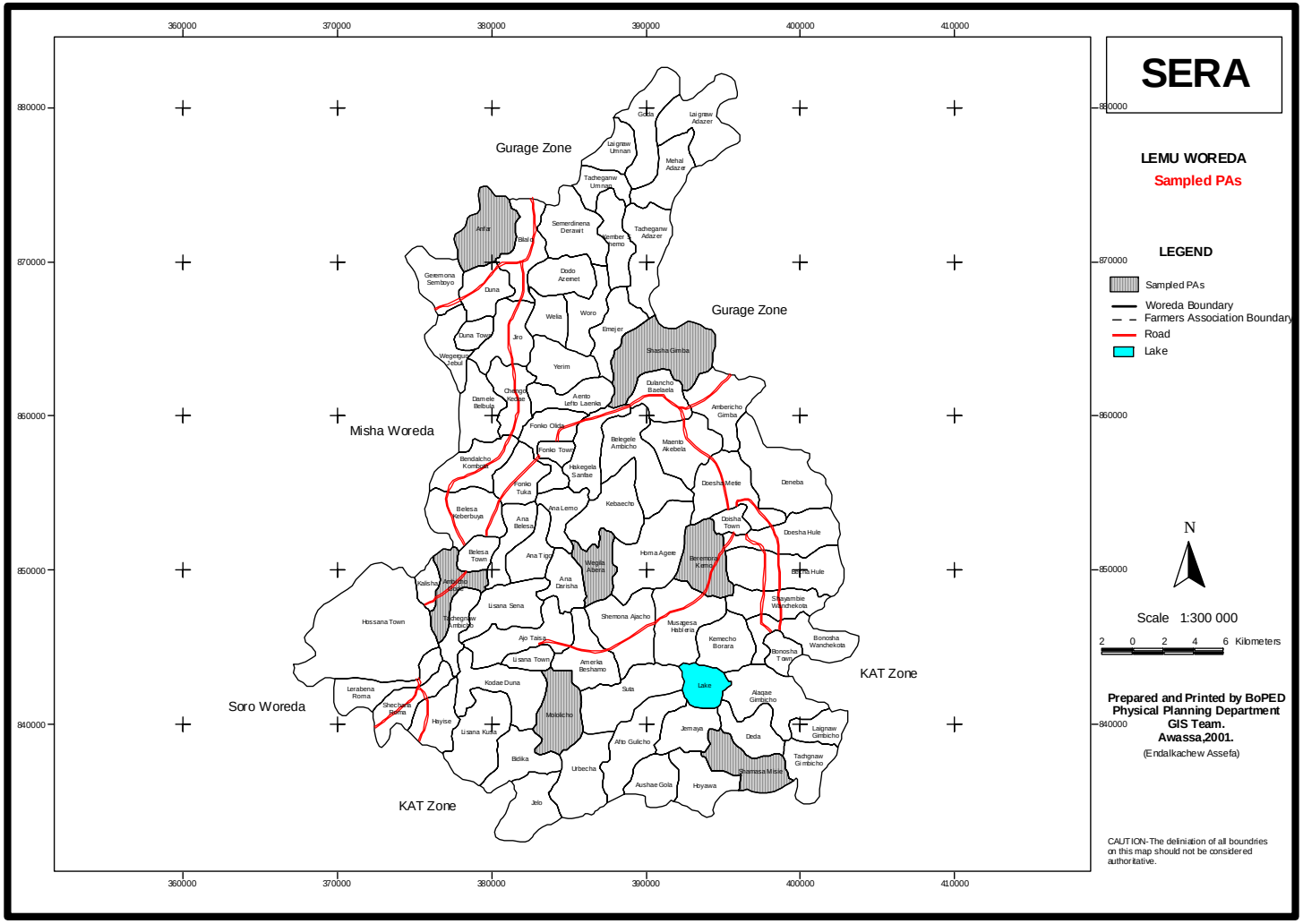
As defined in the new disaster prevention and preparedness policy of the country, disaster is the cumulative effect of various hazards and natural calamities. The major calamities and hazards associated with disaster in Lemo are drought, epidemics, flooding, pests and diseases, water logging and hailstorms. Their effects are further aggravated by population pressure, scarcity of land, and poor response capacity in the area. Drought is well known for its repeated occurrence as well as leading to famine among the ones mentioned above. Discussion with the focus group as well as key informants revealed that resilience to drought and its resultant famine is deteriorating due to factors mainly related to population pressure and expanding poverty.

Inhabitants of Lemo were found practicing various measures to cope up with the occurrence of disaster. Accordingly, reducing frequency and quantity of meal, eating less preferred or foul food, seeking daily labor within or closer to the PA were the measures taken while disaster is at its beginning stage where as withdrawing children from schools, renting land or other productive assets, skipping eating the whole day, selling personal household effects, and out migration were the ones practiced while the problem/disaster becomes more severe. On the other hand, borrowing food grain or cash and selling livestock, firewood, charcoal, and dung were the coping strategies mainly practiced at the middle of disaster. In fact copping strategies such as growing drought resistant crops, participation in off farm activities, participation in petty trade and reserving food for bad days were practiced by some people even before the onset of disaster in the area. Business related out- migration especially by the middle age men is also common strategy practiced even at a normal time in the intermediate high land and the high land part of the wereda.

The poor and very poor, land less with out non farm practices, female headed households, households with large family size, kolla inhabitants mainly with poor land cover and heavily dominated by cereals, households depending only on agriculture, the kolla inhabitants occasionally flooded due to their flat topography along the mouth of big rivers, children, pregnant women and lactating mothers, and old age group with out the support of active family members were the ones identified to be more vulnerable to disaster and consequences of disaster in the wereda.

Vulnerability to disaster is the result of various interrelated factors. In the case of Lemo, these interrelated factors are directly or indirectly linked to population pressure and increasing poverty. Thus, the recommendations should also be suggested in line to this interrelationship. Accordingly, strengthening family planning education, strengthening and diversifying agricultural extension, finding alternatives to improve the falling grain prices in the market, giving emphasis to the natural resource management, establishing flood controlling mechanism or dry period cultivation on the alluvial deposits using irrigation, supporting the agricultural extension with timely research, promoting non and off farm activities, establishing regular and effective credit system, and further improvement of quality and coverage of basic services are the major ones to be considered so as to make the community less vulnerable to future disasters in the area.

Figure 1. Location Map



Chapter One

1. Background of the Project

1.1 Introduction to SERA project & the VP

The country has been suffering from frequent disasters resulting from the occurrence of various hazards such as drought, famine, epidemics and mass displacement. The Ethiopian government through DPPC has been responding to the problems by providing food aid and relief mainly obtained from external donors. Recently, the government has realized that providing relief food aid will not be a sustainable solution for the problem except saving lives. It is in relation to this that DPPC in its 1993 National policy on disaster prevention and management gave emphasis to an approach that integrates relief with development. In addition, the 1993 NPDPM was aimed at tackling the root causes that make people vulnerable to disaster.

Obviously, accurate and timely information on the incidence, prevalence, nature and causes of disaster should be available at all levels in order to make the new approach practical. Understanding the need for such type of information, a workshop on vulnerability in Ethiopia- from Disaster to Development was held at Ghion Hotel, Addis Ababa between June 23 and 25,1997. Representatives of relevant ministries, international and national donors, representatives of regions, prominent researchers and consultants took part in the Ghion workshop and recommended the development of vulnerability profile that could identify the areas and population group that are vulnerable to particular hazards/risks and associated reasons for such vulnerability. It is based on this recommendation that DPPC developed the project proposal Strengthening Emergency Response Abilities (SERA) that has been funded by the United States Government through USAID. The project was proposed for the four bigger regions in terms of population namely Oromiya, Amahara, SNNPR and Tigray. Lemo is out of the four pilot weredas proposed in SNNPR.

Users of this profile should be noted that this is a profile but not the indepth research so as to follow all the routine proceedures of a scientific research. On the other hand, it is not intended to provide all the line departments with the base line data rather its intension is to assess factors of vulnerability to disaster from various angles by integrating relevant multi-sectoral data.

1.2 Objectives of SERA & the Vulnerability profile

As indicated in the National Guidelines for Vulnerability Profile Development, the project (SERA) was established to satisfy the following major objectives.

1. Develop vulnerability profiles of selected disaster prone areas of the country
2. Conduct relevant vulnerability research and special studies on root causes of vulnerability.
3. Strengthening response mechanisms and development interventions through incorporation of the results of vulnerability profiles and research. This wereda base vulnerability profile is prepared to fully satisfy the objective mentioned under number 1 and party satisfy the objective stated under number 3 above.

The vulnerability profile to be prepared based on the above mentioned SERA project objectives will have the following major objectives

1. It will be an information guide by which policy makers, planners, donors, relief and development practitioners will better be informed about the nature, magnitude and the factors that makes people vulnerable to disaster in the wereda.
2. The VP is also believed to help as a guide for medium and long term program directions in the wereda

1.2.1 Specific questions to be answered by the VP

As stated in the National Guidelines for Vulnerability Profile Development, the wereda level vulnerability profile is expected to answer the following questions in particular. These specific questions are:

1. Who are the vulnerable to a particular hazard?
2. Where do they live? Where are they located?
3. When do they face these hazards most frequently?
4. What is the nature/degree of the hazard that they face?
5. What is the nature of their coping strategies in response to these risks?
6. What are the factors most highly associated with their vulnerability?
7. How do they become highly vulnerable?

1.3 Major Uses & Users of the profile

1.3.1 Major uses of the wereda vulnerability profile

As stated in the National Guideline for vulnerability Profile Preparation, the profile will have the following major uses.

1. Can be used as an input in preparing development plan incorporating disaster prevention.
2. Can be used as supportive document in vulnerability reduction activities
3. Can be used as an input of preparedness planning.
4. Serves as a base line data in relief and rehabilitation planning
5. Can be used as an input in policy formulation and review

1.3.2 Major Users of the Profile

According to the National Guideline for vulnerability Profile Preparation, the following are the major users of the profile

1. Policy makers and their advisors at national, regional and wereda level that can direct funds and services to vulnerable groups.
2. Wereda, Zonal and Regional disaster prevention and preparedness committees and their members who are directly involved in vulnerability related planning, interventions, management and monitoring.

3. NGOs, International Agencies and Donors that are engaged or involved in activities related to vulnerability at national, regional, and local levels and researchers and training institutes interested in vulnerability issues.

1.4 Content of the Vulnerability Profile

The profile is organized in nine chapters. The first is brief background of the project and the vulnerability profile itself. The second deals with over all methodologies followed during data collection and analysis. The third chapter briefly discusses about the background of the study wereda as well as the zone where the wereda is located. Some vulnerability related issues obtained from secondary data are discussed in chapter 4. Chapter five presents some discussions from the carefully selected key informants while chapter six is with main findings obtained from community focus groups discussions. Chapter seven presents major findings obtained from formally structured household survey. We tried to integrate major findings from all the preceding chapters in chapter eight. Finally, conclusions and some remarks for future interventions are presented in chapter nine.

Chapter 2

2. Methods, Sample Design and Instruments

2.1. Coverage and Sample Design

Before we proceed to the sample PAs selection process, it is important to note that the sample weredas were selected at national level through consultation of the concerned regions as well as the secondary data that indicate about the disaster history of the weredas. The zonal project office simply selected sample PAs and the respective EAs in each of the sampled PAs under some criteria set by the Federal SERA project coordination. Among the criteria set by the Federal SERA project coordination are:

1. A maximum of six PAs should be selected from each of the target wereda regardless of some variations in terms of population size, agro-climatic zones and size of land area between the target weredas. However, for Lemo is a very big wereda with more than 300,000 population, one additional sample PA is added after requesting the regional and federal SERA Coordination Offices.
2. From each of the sampled PAs, only one EA has to be selected for primary data collection
3. From each of the sampled EAs, a total number of 100 households should be selected for the survey.

The main reason behind this methodology is to tackle with time and financial limitations, as pointed out by the Federal SERA coordination. It was under the above circumstances that we selected our sample PAs. Accordingly we had to select 7 PAs from the whole of Lemo with the total area of 1030 km^2 and a total projected population of 354910 in the year 1992. However, as discussed in more detail in the following section, the PAs were selected proportional to the traditional agro-ecological coverage using systematically stratified random sampling method. Including 100 households from each of the sampled 7 PAs, about 1.2 % of the total rural households in Lemo were surveyed.

2.2 Selection Scheme and Sample Size

2.2.1 Selection of Sample PAs

Based on the instruction sent from the federal SERA project coordination, 7 PAs and corresponding 7 EAs were selected by using stratified random sampling method so as to make the sample PAs representative of the wereda.

Traditional agro-ecological Zonation was used to stratify the wereda in to more or less homogeneous physiographic units. Thus Lemo was divided in to three agro-ecological units- kolla or lower weina dega, upper weina dega and dega. For there are 43 upper weina dega PAs out of the total 74 PAs in the wereda, we decided 3 of the 7 sample PAs to be randomly taken from the 43 upper weina dega part and the other 3 sample PAs to be randomly taken from the 24 kolla or lower weina dega PAs and selecting the remaining 1 sample PA from the 7 dega PAs. Thus, our sampling is more or less proportional to the distribution of land in terms of agro-ecological coverage except the Shashogo area, that is sampled with more emphasis for it is well known to suffer from frequent disasters. Accordingly, Ambicho Gode, Shesha Gimba and Wogila Abera

PAs were sampled to represent the upper weina dega part; Mololicho, Bira Mora Kemo and Shamsa Mise were sampled to represent lower weina dega or kolla part of the wereda commonly called Shashogo area and Anfar was sampled to represent the high land or dega part of the wereda.

2.2.2 Selction of EAs

EAs are enumeration areas delineated by Central Statistical Authority during population and housing census. We were also told to randomly select one EA from each sampled PA as mentioned above. Accordingly the required EAs were randomly selected by using lottery method from the selected PAs as shown in the following table. Selection of EAs was followed by identification of households for the survey.

Table 2.1 : Description of Selected Sample PAs and EAs

No	Sample PA	AEZ	Identification number of sampled EA	Total No of households in each EA	Number of sampled households
1	Shamsa Mise	Kolla/Lower weina Dega	03	198	100
2	Mololicho	"	01	326	100
3	Biramora Kemo	"	02	188	100
4	Ambicho Gode	Upper Weina dega	01	186	100
5	Shasha Gimba	''	01	244	100
6	Wogila Abera	''	03	205	100
7	Anfar	Dega	02	215	100

Source: SERA February, 1992

Before identifying the sample households, the team had to register all the households living within the EA. Latter this record helped the team as a frame book so as to select the samples. As you can see from the above table, about 100 households were selected from each of the selected EAs regardless of the household size variation. This was another methodology suggested by the federal SERA coordination. At the beginning we were not convinced with this methodology. However, latter on, this methodology was found time saving and cost minimizing. If our sampled households were scattered throughout the PA as we needed at the beginning, it could have been impossible to complete the survey with limited financial resources and specified time period.

As an approach, male enumerators were assigned to interview the household heads who are males where as the female enumerators had to interview the eligible women in each of the households and women household. In fact, measuring mid upper arm circumference of women, height and weight of eligible children were additional responsibilities given to female enumerators. Both male and female interviewers had to fill the household roster jointly before they begin their differentiated task. Filling the roasters were strictly supervised by the supervisors so as to avoid deliberate exclusion of the eligible children and women from the survey. The supervisors also keep the record of eligible children and women in each of the households in order to follow up the works of enumerators properly.

2.2.3 Selection of the key informants

Separate questions are also prepared for the key informants so as to get some of the qualitative information on selected topics. Minimum of 15 knowledgeable key

informants were selected from each of the sampled PAs consulting the DAs, PA officials and other relevant informants with enough knowledge about the PAs. School Principals, DAs, elders, influential women, influential youth, health workers, agents of active NGOs in the area, PA leaders and wereda officials were the major categories included as key informants.

2.2.4 Selection of Elders for Community Focus Group Discussion

In addition to the information collected through the household questionnaires, women's questionnaires and anthropometric tools, communities' focus group discussions were also made at each of the sampled PAs to get the general picture of the PAs regarding the major factors associated with vulnerability of the inhabitants. Accordingly a minimum of 6 knowledgeable elders were selected at each of the sampled PAs so as to share their views about the general problems prevailing in the PAs. In order not to miss about the problems affecting the women, at least two of the focus group members were made women. All of them were selected after thorough discussion with other pertinent key informants in the PA such as PA leaders, school teachers and DAs who stayed long enough in the PA.

2.3 Questionnaires and Field Instruments

Various materials were used during the sample design as well as the actual primary data collection. Among these were the questionnaires. Questionnaires for household heads and eligible women were printed in the commercial printing press where as questionnaires for the key informant and discussion questions for the communities focus group discussion were printed at office level using personal computer supplied by the federal project coordination.

1:50.000 topographic maps, wereda level CSA maps & enumeration area maps were intensively used during the selection of sample PAs and EAs. Measuring tapes, length board, weighing scales and hanging punts were also widely used for anthropometric purpose. Most of the instruments were supplied by the Federal and Regional SERA Coordination Offices.

3 Vehicles were continuously used throughout the survey period. One of them belongs to the project where as the remaining two were temporarily supplied by the zonal planning and Economic Development Department and the regional DPPO. Out of the three vehicles, one was used for zonal coordination where as the remaining two were used by the two wereda's primary data collection teams.

For the enumerators as well as supervisors had to check their work during night- time being at their camps, we were also forced to buy 8 lamps (fanoses) for the data collection teams at both weredas. Stationers such as pencils, pens, sharpeners, erasers and notebooks were also widely used.

With regard to camping sites, DA offices, schools, health institutes, PA offices and farmers houses were used from the beginning to the end of the survey. Camping sites were selected by consulting the PA leaders and heads of the respective offices.

2.4 Selection and Training of Field Staff

Two types of field staffs were trained. These are enumerators for household and women's questionnaire and RRA team members for collecting information on selected issues from key informants and community focus group discussion.

With regard to the selection of enumerators, both written and oral exams were given so as to get competent ones. In fact, candidates with experiences of rural surveying were given priority. Zonal VIMU, VWG, and some of the wereda DCG members were included in the training of RRA team. Some of the wereda DCG members and other experts, mainly from Wereda Agriculture Office were carefully selected to be trained as supervisors for enumerators in the process of data collection through household and women's questionnaires.

2.4.1 Training of Enumerators and Supervisors

Enumerators and their respective supervisors were trained together for they are going to be involved in similar activities. Carefully prepared enumerator's manual, household questionnaires, women's questionnaires and guide for anthropometric measurements were intensively used during the two weeks long training in this group. Zonal research assistant and wereda data collection coordinators took the lead in the training of this group besides invited trainers from the region.

Major areas given emphasis in the training of enumerators and their respective supervisors were:

- Objective and purpose of the project
- Understanding household and women's questionnaires
- How to undertake the interview
- How to approach the respondents
- Where to interview the respondents
- How to handle the road guides
- How to take anthropometric measurements
- How to work in a team

Before winding up the training, the trainees in this group were allowed to practice filling the questionnaires in the field for two days together with their supervisors. The training was concluded after conducting a daylong discussion on the major problems faced in the field while they practice filling the questionnaires.

2.4.2 Training of RRA Team

As mentioned above, zonal VWG, VIMU and wereda level DCG took part in the training of RRA. Similar to the other group, RRA training also took two weeks including field practices. The main topics included in the training of RRA team are:

- Objective and purpose of the project
- Basic concepts associated with disaster and disaster prevention
- Understanding key informant's questionnaire
- Understanding selected discussion topics for community's awaki discussion
- How to work in a team
- Rules and principles of RRA

- Advantages and limitations of RRA
- Basic principles to conduct a good group discussion

Zonal project coordinator, Regional VIMU member, and Federal VAG member took the lead in the training of RRA team. Unlike the other group, the training in this group was more of participatory in which experience sharing between the trainers and trainees were given due attention.

2.5. Field Organization and Field Work

Fieldwork was started in both pilot weredas at the same time. With regard to coordination the wereda SERA coordinators were assigned as overall coordinators of the household survey team. The RRA team for Lemo was coordinated by Zonal Research Assistant. Zonal project coordinator assisted by some zonal VIMU and VWG member served as overall coordinator of the field work by moving from one wereda to another accordingly. Having such organization, some important steps were followed so as to make the objective successful. The major ones are discussed as follows. It is due to the following coordinated efforts that we are able to complete the fieldwork within only 39 days in Lemo.

2.5.1 Steps Followed to Get Communities Support during the Field Work

From the very beginning, the project has valued the importance of building a good relationship with the local community so as to be able to collect reliable data without much impediment. In order to build a good working environment we had to communicate both with the officials and the local community through written letters and personal contact. As part of this, the following major steps were followed.

- One day long workshop was conducted to make the representatives from zonal council, wereda council and relevant zonal and wereda line ministries familiar with the objectives of the project, just two weeks before the field work begins.
- Official letter was written to the wereda council requesting them to write official letters to each of the sampled PAs regarding the survey besides requesting their own cooperation.
- Briefing about the objective of the data collection and requesting them to arrange shelter for the field workers.
- Organizing brief PA level meeting with the participation of all of the selected EA's household heads, government workers, religious leaders, and representatives of elders, youth and women in the PA to explain about the objectives of the project and data collection.

2.5.2 Time Saving Steps Followed During the Field Work

At the beginning, we tried to conduct field works in two PAs at the same time. Latter, this arrangement was found inconvenient for supervision and coordination besides difficulty of giving relevant support for the field workers. As a result, we had to rearrange in a way that allows finishing one PA and move to the next. For we have only one car for the whole wereda, both the RRA and household survey teams had to stay in the same PA at a time. Even if the RRA team finishes its work before the household team, it has to give some support for the household team until they finish their work.

Both teams had to pass the night within the PA so as to minimize time wastage and build harmony with the local community. Through prior discussion with the local authorities, comfortable camp- sites and shelters were arranged in each of the sample PAs. The enumerators were also kept away from cooking by hiring a cook so as to use their time effectively. The vehicle was made to stay with the team to assist in the field besides transporting clean drinking water and foodstuff from places closer to the sample PAs. In addition, it has to bring field workers to the near by health institutes in cases of incidences and sickness.

For it was found very difficult to get people around their residence on major weekly market days, the afternoon market days were used as rest days for the field workers. In fact, they had to work on Sunday's afternoon as compensation. Thus, working in the morning of the weekly market day and the afternoon of Sunday together save one working day in a week. Otherwise, we had to loose two days a week.

2.5.3 Overall Methods/Approaches of Primary Data Collection Followed in the Field

As already discussed above, 4 major types of primary data were collected. These are household information, women's information, key informant's information and information obtained through community elders discussion. With regard to the household information both female and male enumerators fill the household roster together. After that, the male enumerator takes the responsibility of male household head while the female enumerator interviews the eligible women in the household besides recording the anthropometric indicators. Usually, the male household head was interviewed under a shed tree found in front of the house where as the women respondents were interviewed inside the house. Both respondents were kept isolated from any other persons until the interview is completed so as to avoid disturbance and biased responses. The enumerators were well trained on how to create favourable environment for interview. Each interview had to be preceded by brief explanation about the objective of the survey and greetings so as to be in harmony with the respondents.

Some times, it was not possible to get the required information in the first visit due to absence or sickness of the sampled respondents. In such cases, at least 3 visits were arranged to get respondent with such cases. If, it was impossible to get such people in the third visit we had to substitute by new sample respondent. The procedures were strictly supervised by supervisors and wereda level data collection coordinators. The road guides were intensively used to reach the respondents at their own residences.

The second major type of information collected was the key informant's information. As discussed above the key informants were carefully selected depending on the expected depth of knowledge on various topics. Those key informants with own offices were interviewed at their own respective offices where as the key informants selected among the farmers were interviewed in sites that were found convenient to them after prior joint discussion. A team of two interviewers was assigned to each key informant. This is so since one had to record while the other interviews. It was usual for the interviewers to adequately explain about the objective of the interview as well as the project to each of the key informants. Similarly, they had to begin with greeting and end the interview with thanks. The type of questions and the key informant categories proposed to each topic are described in the following table.

Table 2.2: Proposed Key Informants for Specific Topics

Major Topic	Proposed Key Informant
Community Infrastructure	- PA leaders knowledgeable youth - Male elders
Primary school drop out rates	- School Principal
Immunization coverage	- Health worker
Agricultural extension coverage	- DA representative
Water supply situation	- Women key informants Knowledgeable youth - Male elders PA leaders
Economic and communication facilities	- PA leaders - Knowledgeable youth - Male elders
Community livelihood(p5)	- Elderly knowledgeable PA leaders - Knowledgeable male elders Knowledgeable youth
Population change, access to natural resources and environmental stress(p6)	- Male elders - Development agents who stayed long in the area Teachers who stayed long in the area - Accordingly, health worker
Food production, marketing and access to food	- Development agents - Knowledgeable PA leaders Knowledgeable youth - Supervisors with WAO
Disaster history and perception of risk of disaster	- Knowledgeable women - Male elders - PA level DPP committee Wereda officials - NGOs with interventions in the sampled PAs
Local capacities, resilience and coping strategies	- Knowledgeable women - Male elders - PA leaders - PA DPP committee - Wereda Oficials - NGOs with interventions in the sampled PAs - Development agents - Leaders of local self help organizations like Edir
Health Nutrition status and food consumption	- Health worker - Teachers - DAs(preferably those working as Home Economists) - Knowledgeable youth
Women's status, gender differences and cultural practices	- Knowledgeable women - Teachers - Community health assistants - Knowledgeable youth

The third major type of primary data collected was the qualitative information from the communities' focus group discussion. In this case questions were not formally designed but topics for discussion were carefully identified. Four team members took part in the discussion. One of them had to lead the discussion, the other assists the team leader where as the remaining two serve as rapport. We strictly followed the cultural procedures of group discussion applicable to each locality. Thus elders blessings or prayers were usually used for the opening of the discussion. After that the

team had to create harmonious environment for open discussion by greeting and briefing the objectives of the discussion. The women were also encouraged both by the project team and elderly group members so as to openly give their views on gender related problems. For the discussion took 4 to 5 hours on average, the project organized a coffee break during which both the project team and discussion group members share fans and further harmonize the relationship among each other. Following such methods the project was able to collect quiet valuable information from the communities focus group discussion.

2.6. Response Rate.

As indicated in the following table, the response rate was very high in Lemo especially for the household heads. The main reason behind this high response rate carefully designed field strategy that helped to work more closely with the local community. In fact, some household heads were substituted after a minimum of three visits if they were not available. The contribution of locally recruited road guides is still appreciable in this regard. However, the number of eligible women responded were relatively low since the community were not happy to expose unmarried girls for interview due to various reasons. Sickness was the major obstacle behind relatively low response rate for children.

Table 2.3: Response Rates in Lemo

PA	Number of sampled households	Number of sampled households responded	Number of eligible women	Number of eligible women responded	Number of Eligible women Measured	Number of eligible Children	Number of eligible Children measured
Shamsa Mise	100	100	121	121	119	43	38
Mololicho	100	100	126	126	122	38	37
Biramora Kemo	100	100	148	148	143	45	39
Ambicho Gode	100	100	138	138	138	52	48
Shasha Gimba	100	100	124	124	123	56	56
Wogila Abera	100	100	138	138	132	44	41
Anfar	100	100	114	114	114	44	38
Total	700	700	909	909	891	322	297

Source: SERA Field Survey, Feb. 2000

2.7. Data Processing

Data collected through household and women's questionnaire were edited manually before entry was made at regional level. External Entry Clarks were hired besides SERA staff for entry. Post entry cleaning and editing works were done mainly by the help of computers using SPSS data editors and cleaning facilities. Production of outputs for analysis and chapter write up were also done by the help of computer using SPSS facilities and specialized programs such as ANTHRO, QFIVE or EPI 2000, and MORTPACK. In fact the role of Microsoft Excel was not overlooked in this regard.

2.8. Limitations and Constraints

Even though much was done to minimize their negative impacts, we can not deny that some of the identified constraints can still have their own influence on the quality of

this profile. The following are some of the major limitations and constraints the profile preparation has suffered from data collection to analysis.

- **Lack of well established experience and literatures in the area**. The impact of this is significant for such type of profile preparation is the first of its type to be conducted at local level.
- Inadequate number of supervisors and road guides during the fieldwork.
- **Expectations from the respondents.** Despite the continuous efforts made to explain about the objectives of the survey, some respondents insisted to expect some sort of aid in return to their response.
- **Shortage of cars during the fieldwork**. Conducting the fieldwork in two weredas simultaneously required at least 3 vehicles. For the project has got only one vehicle, it was not easy to secure the remaining ones from government offices until the fieldwork is completed.
- **Time stress**. It was planned for the 12 enumerators to fill 600 household questionnaires each having 24 pages and about 1200 women's questionnaires each having 15 pages within 30 days. For the enumerators were too slow during the first week of surveying, the data collection was done under a very high time stress.
- **Poor quality and coverage of secondary data**: In most of the zonal and wereda offices, secondary data are not well documented. Data on some issues are in the hands of individual experts. In some cases, even these experts are already transferred together with the data. Besides, most of the available data are estimated with out field survey. Data like early warning and water supply do not have responsible body at wereda level.
- **Political instability**: During our survey, two parts were contesting for election. As a result it was not easy to convince the community that the project is neutral.
- **Part time wereda coordinators**: For the project duration was very short in Hadiya, it was very difficult to get coordinators with release from the government offices. As a result we had to arrange conditions for the coordinators to work for SERA simultaneously reserving their former posts in the government offices. As a result, they had to serve their offices occasionally.
- **Competition for the project's vehicle**. For the car is frequently required by the zonal council, we had to face problem even for project's regular activities.

Chapter 3

3. Brief Background to the Wereda

3.1. Geography and Natural Resources

3.1.1 Location

Lemo wereda, approximately located between 7^0 23' 02" to 7^0 56' 00" North Latitude and 37^0 50' 00" East to 38^0 07' 00" East Longitude is relatively bounded by former KAT zone in the south, former Guraghe zone in the north east, Misha wereda of Hadiya in the north west and Soro wereda of Hadiya in the south west. Hossana Town, located at the southern tip of Lemo serves both Hadiya zone and Lemo wereda as their capital.

3.1.2 Climate

There is only one meteorological station in the wereda. For it is located at Hossana, the figures obtained from NMSA mainly represent the intermediate high land or upper weina dega part of the wereda. Thus, the low land and extreme highland part of the wereda are explained mainly based on the topographic maps, some studies and qualitative information of the key informants as well as field observation. According to the 1:50,000 topographic map, elevation of the wereda ranges between 1780 m.a.s.l around Bilate River in the south eastern part of the wereda and 2880 m.a.s.l at Anfar PA in the north western part of the wereda. Having this altitudinal range, the whole wereda is divided in to three major traditional agro- ecological zones namely lower weina dega or kolla (low land), upper weina dega (intermediate highland) and dega (highland).

According to the Woody Bio-mass Study of the 1997*, mean annual temperature in Lemo ranges between 12.6-15.0, 15.1-17.5 and 17.1-20.0 degree Celsius for high land, intermediate high land and low land parts of the wereda respectively. Based on the data obtained from Hossana station, NMSA (1996*) revealed that the intermediate high land part of the wereda around Hossana Town receives mean annual rainfall of 1139 mm with mean annual PET of 1568 mm. Consisting 43 out of the total 74 PAs in the wereda, the intermediate high land covers most part of the wereda. With 24 PAs out of the total, the low land ranks second in terms of area coverage where as accounting for only 7 PAs, extreme high land covers the lowest share.

Months between July and September are the major rainy months for Lemo wereda while March and May are the second rainy months with some amount. Months between December to February are usually dry in Lemo when most people face shortage of drinking water for themselves and their livestock. For the lower weina dega farmers mainly depend on belg rain for their cereal production, absence of rain at March means an indicator of drought probability in the area where as heavy rain at Autumn is a symptom of wet shock for the highlanders who mainly depend on meher crops such as wheat and barley.

The project doesn't conduct detailed natural resources' surveying so as to say enough about the natural resources in the wereda. However field observations, topographic maps, key informants and secondary data sources enabled us to say the following aspects of natural resources in the wereda. Since over 85% of the wereda's inhabitants

are directly dependent on agricultural economy, soils, landforms, water resources, land cover and major crops grown in the wereda are given due attention for our purpose.

With regard to the soils of the wereda, experts of the WAO and the key informant farmers agree that the soils are not fertile for they have been repeatedly cultivated under high population pressure for long period of time. Thus it is impossible to get enough yield to sustain communities livelihood without the application of chemical fertilizers. Flat plains with a total area of 255.04 km2 (45% of the wereda) are either poorly or imperfectly drained were as the remaining 55% is either well or excessively drained. According to WAO, about 35 % of the wereda's soils are silt clay loam with the remaining 65 % being sandy clay loam in terms of texture. As far as the FAO's soil classification is considered Molic Andosols, Eutric Nitosols, Chromic Luvisols and Lithosols are the dominant ones in Lemo Wereda. No mineral was found being exploited in the wereda during this survey. In fact the bed rocks and sands exposed along the mouth of some rivers are serving as building materials for the inhabitants of the wereda

Water resources are another basic necessities for the agricultural community. In Lemo, there are several intermittent rivers that dry up during dry months. But, there are very few permanent rivers that can serve the inhabitants all year round. These are Bilate also called Weira and Gudar. Their total length is about 165 km as estimated by the WAO. This gives a drainage density of 1 km to 6.2 km^2 for the whole wereda. There is also one Lake with an estimated area of 5700 hectare at Shashogo area. In fact, the key informants indicated that area of this lake fluctuates between dry and wet season. The 1997 Woody Bio Mass study indicated that there is no any significant natural forest in the wereda at present. The key informants also agree that the residual forests existed even in the near past have already been cleared so as to get cultivation land. Except some of the poorly drained flat plains in Shashogo area where the grass lands are preserved due to natural factors, mentionable grass lands are not available in the other part of the wereda. Even the grass- lands available at Shashogo area are not available for grazing during rainy season due to flooding problem. Thus, shortage of grazing land is among the critical problems repeatedly mentioned by the community during this study. According to Woody Bio Mass study, Lemo wereda will exceed its over all carrying capacity after 1999 and it is already overstocked currently.

3.2. Settlement History, Population and Culture

Though written documents are not available to indicate the actual time of the first settlement, current population density and settlement patterns witness that the area was settled since long ago. The absence of natural forests as well as highly depleted soils in the area are another evidences for that the area has been invaded by human being for considerably long years. The 1985 resettlement program that displaced several thousands to the northwestern part of the country namely to Metekel and Gambela was also the result of long settlement history.

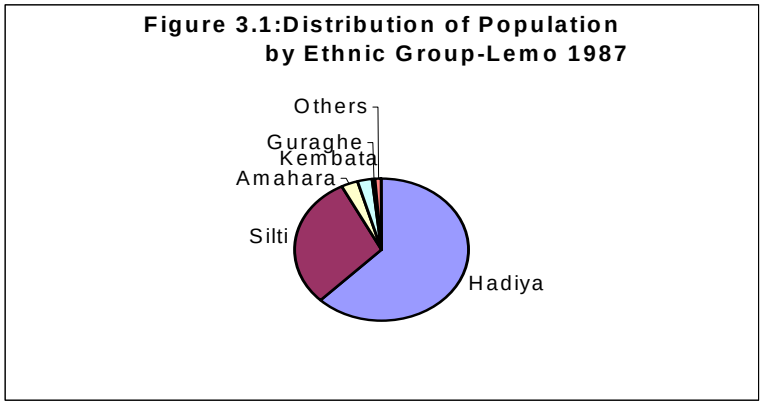
Before introducing Lemo, it may be essential to say something about the Hadiya Zone where Lemo is located. The name Hadiya is derived from the dominant ethnic group residing in the Zone. Hadiya is one of the densely populated zones in the Southern Nations, Nationalities and People's Region. The total zonal population, which was 1,050,151 during the 1987^{th} Census is projected to be 1,235,408 in 1992 during this survey. Compared to its total area of 4043 km^2, the crude population density of

Hadiya is about 306 persons per km^2 in 1992 Ethiopian Calendar. The zonal capital, Hossana is about 230 kilometers to the South of Addis Ababa- the Nation's capital.

According to the 1987th population and housing census result, the population of Lemo was 299166. Compared to its total area i.e. 1030 km^2, crude density at the time was about 298 persons per km^2. Using the CSA's estimated average growth rate of 3.1 % for rural and 5.3 % for urban areas, the wereda's population was projected to reach 354910 during our survey in the year 1992. According to this projection, wereda's crude population density is estimated to be 354 persons per km^2 at the time of our survey in the year 1992. From this one can say that Lemo is one of the extremely dense weredas of the country. This is so since about 85 % of Lemo's inhabitants were residing in the rural areas in the mentioned year. Details in this regard are discussed in chapter 4 of this profile.

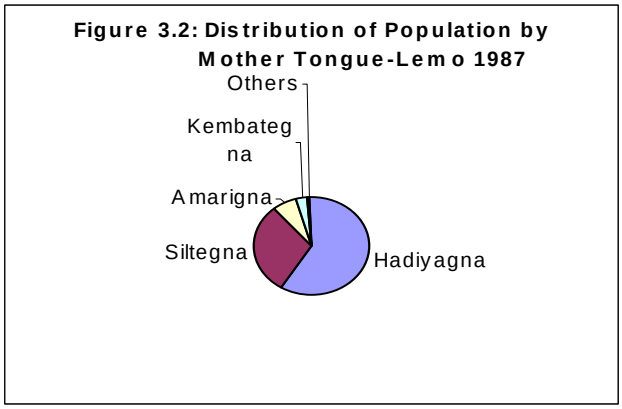
According to the 1987th population and housing census result, about 62 % of Lemo's inhabitants are Hadiya. Silti is the second largest ethnic group in the wereda accounting for about 30 percent of the wereda's population. As indicated in the following chart, the remaining 8 % inhabitants are mainly represented by Amahara and Kembata. Chart 3.1 visualizes the ethnic composition of the wereda.

Figure 3.1 Distribution of Population by Ethnic Group (Lemo 1987)



More or less similar to the ethnic composition, for about 58 % of the inhabitants' mother tongue was hadiyagna in 1987. Siltigna, Amahregna and Kembategna are mother tongue for about 31 %, 6% and 4 % of the wereda's population respectively.

With followers of about 58 % of the wereda's population, Muslim is the largest religion in Lemo. With 22.1 and 18.3 percents of wereda's population, Protestant and Orthodox Christianity are among the major religions of the wereda respectively. Distribution of population in terms of mother tongue and religion are shown in charts 3.2 and 3.3 as follows.



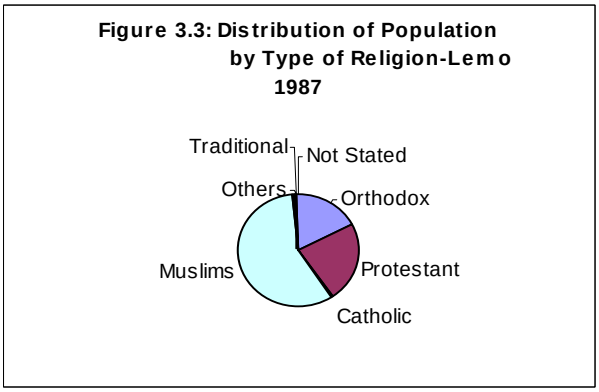


Figure 3.2 and 3.3 Distribution of Population by Mother Tongue and Religion (Lemo 1987)

3.3. Existing Development Policies and Next Five Years' Plans

It is widely known that the Ethiopian government is pursuing the agriculture led development policies. Depending on this overall policy direction, regions, zones and weredas design the five years' indicative development plan. We are not able to get wereda level development plan designed for the next five years. Some of the stated goals believed to have some contribution in reducing rural communities' vulnerability to various risks are discussed sector by sector based on the five years' plan designed at zonal level. Presentation of this section is believed to give hint for interested donors and NGOs identify areas to give support for the government as well.

A. Agricultural Sector

As stated above the wereda is seriously suffering from the scarcity of land besides severe natural resource depletion. Under such situation it is advisable to modernize the agricultural sector so as to get enough from limited land area. In addition, natural resource management programs are must in order to use the natural resource in a more sustainable way. If realized, the objectives stated to be achieved in the next five years (1993-1997) by the agricultural sector can contribute to communities vulnerability reduction. The ones believed to contribute to vulnerability reduction are summarized as follows.

- 1057 development agents will be trained for the whole zone
- 8 vet posts, 4 vet clinics, and 18 livestock vaccination centers will be established.
- Proportion of farmers using fertilizers and improved seeds will be increased from the current 11 % to 58.36 % in the coming 5 years.
- Proportion of farmers using fertilizers and only local seeds will be reduced from the current 11 % to 58.36 % in the coming 5 years
- Proportion of farmers using only local seeds will be reduced from the current 12 % to 5 % in the coming 5 years
- Increasing proportion of land area covered under extension from the level of 39 to 58.36 % and production under extension from the current level of 39 to 73.35 %.
- To cope up with erratic nature of rain about 650 hectare land is planned to be irrigated

- Various programs are also designed to improve productivity in the livestock sectors. Cross breeding and artificial inseminations are to be mentioned in this respect.
- Construction of soil bands, terracing, diversion canals, dikes are planned besides tree planting, grass strips, area closure and development of degraded lands.

B. Health Sector

The zonal five years indicative plan for the health sector indicates that various activities will be accomplished in order to improve the communities' health status. Some of these activities believed to contribute to vulnerability reduction are summarized as follows.

- Family planning beneficiaries will be increased from the current 3.5 to 10 % of the total households.
- Coverage of antenatal care will be increased from the current 72.4 to 80 %.
- Coverage of delivery service will be increased from the current 5.59 % to 10 %
- Coverage of child immunization will be increased from the current 59 % to 90 %
- Coverage of TT2 for pregnant women will be increased from the current 86 % to 90 %
- One district hospital, 3 health centers and 13 health posts are planned to be built besides promoting 7 clinics to the status of health center.
- As part of increasing health personnel, 44 physicians, 18 health officers, 113 nurses, 110 junior nurses, and 32 kebele health attendants will be trained in the coming 5 years.

C. Education

Contribution of education, especially that of the basic education, is considerable in vulnerability reduction. Several activities are planned to be undertaken in the coming five years by the zonal educational department as part of improving quality and coverage of education. Some of these activities believed to contribute to vulnerability reduction are summarized as follows.

- Primary school participation rate for boys and girls will be increased from the current 39.5 to 50 %
- Measures will be taken to reduce both drop out and wastage rates
- Basic literacy program will be arranged for 11000 illiterate adults and children
- 4 Kindergartens and 30 first cycle primary schools will be built
- Efforts will be made to close the existing gap between boys and girls school participation rate
- 768 primary school teachers will be trained through in service and regular programs.

3.4 Brief Disaster History and specific Programs for Disaster Prevention, Food Security and Epidemics

3.4.1 Brief Disaster History

As quoted by the National Guidelines for vulnerability profile from the NPDPM, disaster is defined as "an event in which a society or community undergoes acute deprivation of food and other basic necessities due to natural and man-made calamities to such an extent that the normal function of the society or the community is disrupted and that it can not subsist with out outside intervention." Disaster does not necessarily occur due to the incidence of natural or man made calamities. The actual situation of the community during hazards is an important factor that forces them to face disaster. This actual condition can be considered as vulnerability. For instance the community facing drought should not necessarily face food shortage or shortage of drinking water if they are supplied with irrigation schemes and underground water. It is under the above conceptual understanding that the disaster history of Lemo Wereda is discussed below.

Unfortunately, it was not possible to get adequately written documents that explain about the disaster history of the wereda. Thus, the following presentations are mainly the result of key informant's information. According to the key informant's information the wereda has been facing repeated disasters for several years in the past. However, the years with serious disasters that affected the whole wereda were 1965/66, 1976/77, 1985/86 Ethiopian Calendar. The leading hazards associated with disasters of these years were drought, flooding, epidemic of livestock and human being and pest infestations. In fact hazards like temporary heavy rain, livestock and crop diseases, hailstorm, and water logging have also contributed for minor disasters occurred in the remaining years. Flooding has continuously been occurring for the last ten years in Shashogo area at least once every year during rainy months. Blocked water ways in the major rivers flowing through Shashogo area is the major aggravating factor for flooding. According to the key informants, soils eroded especially from the Guraghe high lands are the major actors in blocking the water ways.

Disasters of the 1965/66 and 1976/77 E.C were the most severe for the people of Lemo. Drought was the major hazard responsible to disasters in those years for majority of the inhabitants in the wereda. It was exacerbated by the vulnerable position the inhabitants of Lemo had during the years. It was the 1977 disaster that contributed for the voluntary resettlement of thousands from Lemo in the North-Western part of the country namely Gambela and Metekel. Some of the factors that made the inhabitants vulnerable to various types of hazards during those years were the absence of drinking water for livestock as well as human being; absence of any irrigation schemes so as to produce with out precipitation; shortage of health institutes; absence of food preservation culture for the bad days; shortage of cultivation land so as to produce preservable amount of food grain before the drought occurs; absence of well organized early warning system; absence of credit giving institutions; shortage of household capital; poor road access; mono culture(dependence on a very limited number of cereals especially in the low land part) and absence of dried feed resources for the livestock.

The key informants' information also indicated about the type of population group highly affected. Accordingly, the poor with out any reserved assets/capital/ food

grain; the low land or "kolla" inhabitants who solely depend on cereals and surface water; the rugged high land part with poor road access; children and old age group who can not easily move out from the affected areas; families with large number of children were highly affected by the disaster of the mentioned years. Contrarily, with *enset* plantation, inhabitants residing closer to springs, households some of whose members had practice of off-farm activities like petty trade, carpentry, weaving & wood work, households some of whose members had practice of temporary out migration, families with reserved capital & food grain, and families with adequate active labor were affected less by the disaster of the years. Families with some level of literacy also reduced the level of dangers resulting from epidemics.

3.4.2. Specific Programs for Disaster Prevention, Food Security and Epidemics

As mentioned above the wereda has been repeatedly exposed to various disasters since 1960. However, still there are no satisfactory programs designed specifically to cope up with disasters. Even, there was no any government organization fully responsible to organize and manage disaster prevention and preparedness activities in the area. Thus, the wereda council, busy with other activities, starts thinking about the problem when reports arrive about the occurrence of various disasters. Besides, there is no capable NGO to address the problem except some relief activities made by some church organizations.

At the moment, some sectors are trying to cope up with the problems in the absence of independently established organization for the purpose. Among these are Wereda Office of Agriculture that tries to address issue of food insecurity and natural resource depletion. WOA is trying to cope up with food insecurity through giving emphasis to the new agricultural extension package. Even though this program is not to be discouraged, attention should also be given to natural resource management. As far as the current price of modern agricultural input is concerned, the present day extension program is the most costly way to cope up with food insecurity. Improving soil's fertility through natural resource conservation should also be given emphasis as a long term or more sustainable alternative.

Availability of health institutes, facilities, personnel and programs are among the major social infrastructures upon which the level of communities' vulnerability to hazards such as sickness, epidemics, and even death depends. However, the wereda health office is not organized in a way that enables it to address for such issues effectively. As discussed in more detail in chapter 4, the number of health personnel and health institutes in the wereda are very low so as to address for such problems effectively. The key informants in the sampled PAs also indicated that important programs such as family planning and health education are rarely available to most parts of the wereda. The only program relatively available at medium quality and coverage was the immunization program. Besides, there were no meaningful health related programs functioning by the very few NGOs working in the wereda during our survey.

Education is among the most important factors that contribute to the reduction of communities' level of vulnerability to various hazards, especially in this era of knowledge/ technology/. The role of basic education linked to awareness creation is much appreciated in this regard. The information obtained from various sources in Lemo indicated that much has to be done to effectively address such issues. For instance, there is no any kindergarten in the rural areas. At the same time no

institutional arrangement is made to substitute the function of kindergarten. This may have contributed its part for delay of primary school starting age for most of the children. Besides adult literacy programs are almost forgotten in the wereda.

As we observed and ratified by the key informants, most of the rural inhabitants in the wereda are still using unclean water from ponds and rivers for drinking purpose. This is especially serious problem in the Shashogo area where there are no or very few springs. Therefore, chances for the spread of water born diseases is very high.

Chapter 4

4. Some Vulnerability Indicators from Secondary Data

4.1. Climate and Physical Environment

Climate refers to the long years' average condition of the major climatic elements such as rainfall, temperature, sunshine and atmospheric pressure. For countries like Ethiopia mainly depending on agriculture, lack of stability in climatic elements can easily make the community vulnerable to various disasters.

4.1.1 Temperature

Crops usually do not grow if the temperature is below 10 degree Celsius. For the whole country is located within the tropics, temperature is not as such an important constraint for the agricultural activities in the wereda. As a result of this and inadequacy of data much emphasis is not given for the analysis of temperature. However, temperature condition of the wereda is briefly discussed using the data obtained from the Woody Bio Mass study of the 1997.

According to this study, the mean annual temperature of Lemo wereda ranges from 12.6 in the extreme high land to 20.1 degree Celsius in the low land. For these ranges

of temperatures are suitable for most tropical crops, the wereda is not as such vulnerable with respect to temperature.

4.1.2 Rainfall

For tropical countries like ours, the amount and distribution of rainfall are rather among the most important vulnerability indicators. The rural inhabitants of Ethiopia have been repeatedly suffering from drought mainly due to the absence, shortage or erratic nature of rain. High evapo-transpiration resulting from the strong sunshine is also known to exacerbate the moisture deficiency in most parts of the country. Similar to most parts of the country, both crop production short fall and loss of livestock are usually associated with shortage or erratic nature of rain in the considered pilot wereda. That is why emphasis is given to the analysis of rainfall pattern in this profile despite the fact that the available data are not reliable in terms of both temporal and spatial coverage.

Before analyzing the rainfall pattern in the pilot wereda it is crucial to broadly divide the wereda in to the traditional agro-ecological zones so as to use the agro- ecological zones as basis of analysis. Accordingly the farmers associations in the wereda are grouped in to lower weina dega, upper weina dega and dega traditional agro-ecological zones. Accordingly, 24 Farmer's Associations are classified in to kolla or lower weina dega, 43 FAs in to upper weina dega and the remaining 7 are classified in to dega depending on their elevation.

After broadly dividing the farmers associations in to traditional agro-ecological zones, rainfalldata from Alaba station is analyzed to represent the lower weina dega or kolla part of the wereda where as rainfall pattern in the remaining intermediate high land and high land parts of the wereda are analyzed by using rainfall data obtained from Hossana station.

The rainfall data is analyzed in two ways. The first is by calculating the coefficient of variation so as to indicate to what extent the rainfall varies from year to year. The implication of this method is that the higher the coefficient of variation the more vulnerable is that community, and vice versa, especially if the community is entirely depending on rain fed agriculture. As indicated in the following table Lemo's intermediate high land or upper weina dega and dega FAs are with less coefficient of variation than its kolla or lower weina dega part.

Table 4.1.1: Rainfall Variability of Lemo Wereda

Station	Elevation (m)	Represented AEZ	No. of FAs Covered	Coefficient of Variation (%)
Hossana	2200	Upper Weina Dega and Dega	50	13.8
Alaba	1750	Kolla/Lower Weina Dega	24	24.3

Source: Raw Data from NMSA and Calculations by Hadiya SERA

The second way we analyzed the rainfall data of the stations is by comparing the actual annual rainfall of each year by the long year average, as stated in the National Guidelines for Vulnerability Profile. According to this guideline the distribution of rainfall is said to be above normal if the ratio of a certain yearly rain to the respective long range average is above 125 %, normal if the ratio is between 75 and 125 % , below normal if the ratio is between 50 and 75 % and much below normal if the ratio is less than 50 %. Using 10 years rainfall data for Hossana stations and 7 years rainfall data for Alaba station, the normality status is presented in the following table. Please be noted that the calendar used in this section is converted from Gregorian to Ethiopian by subtracting 7.

Table 4.1.2: Annual Rainfall Distribution Status of Lemo (1982-1992)

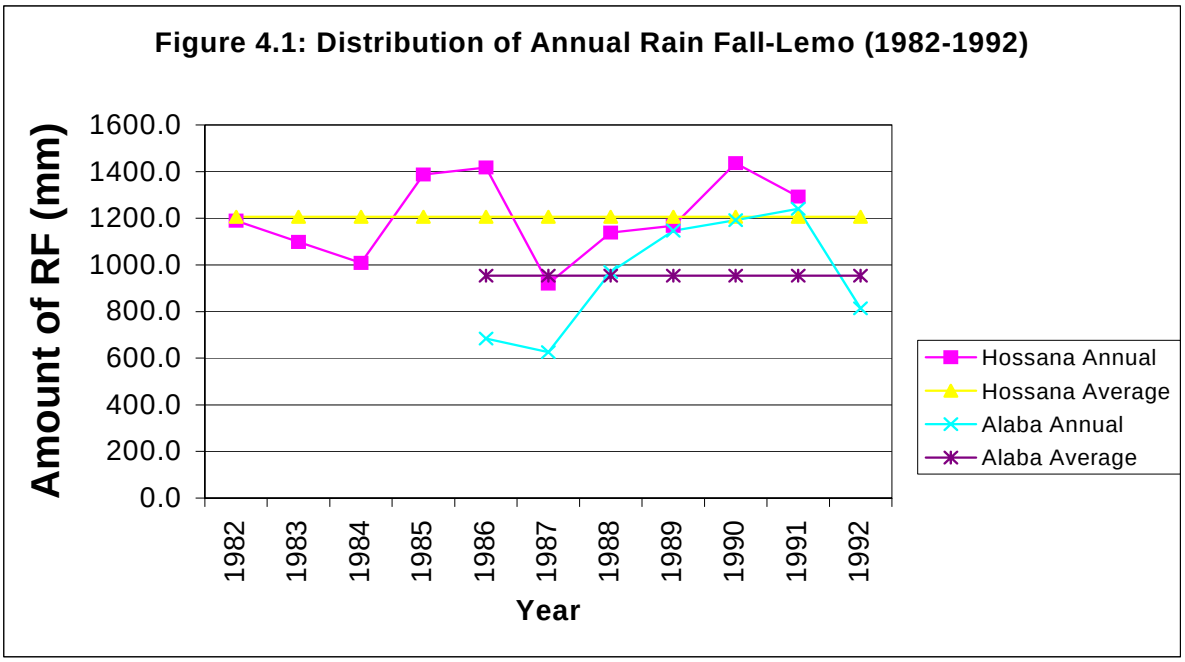
Year	Hossana Station			Alaba Station		
	Yearly Total Rainfall (mm)	Ratio of Annual Rain to Long Term Average	Normality Status	Yearly Total Rainfall (mm)	Ratio of Annual Rain to Long Term Average	Normality Status
1982	1189.4	98.64	Normal			
1983	1098.6	91.11	Normal			
1984	1008.5	83.63	Normal			
1985	1387.9	115.10	Normal			
1986	1418.0	117.59	Normal	683.5	71.69	**Below Normal**
1987	919.9	76.29	Normal	626.0	65.66	**Below Normal**
1988	1138.7	94.43	Normal	969.5	101.69	Normal
1989	1168.0	96.86	Normal	1146.8	120.29	Normal
1990	1436.5	119.13	Normal	1192.4	125.07	**Above Normal**
1991	1292.9	107.22	Normal	1241.0	130.17	**Above Normal**
1992				814.3	85.41	
Mean	1205			953.36		Normal

Source: NMA, Calculations and normality status by Zonal SERA

As you can see from the above table, abnormality was observed only for Alaba station that represented the lower weina dega or kolla part of Lemo. Hossana station that represents most part of the wereda indicates that the temporal distribution of rain fall

is more or less normal. Thus, for more than 50 % of the observed years the distribution of rainfall was not normal in Alaba station while the distribution was normal for all years considered for Hossana. Both approaches indicated that the distribution of rainfall is not as such dependable for rain fed agriculture especially in the lower or dry weina dega part of Lemo. Besides the table that indicates normality status, the following line graph clearly visualizes that the rainfall is highly fluctuating from year to year in that part of the wereda.

Figure 4.1 Distribution of Annual Rainfall (Lemo 1982-1992)



Source: Raw data from NMA

4.1.3. Topography/Relief

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 to 6 percents are usually wel- 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 where as, hazards like severe soil erosion usually affect side slopes of hills, rolling plains and mountains with poor land cover.

Though physical features like topography can better be explained by conducting field surveys supported by topographic maps and aerial photographs, we have to use the estimated figures from the wereda agriculture office in the absence of any alternative. According to the data obtained from the wereda agriculture office, about 34 % of Lemo is flat. These flat plains, mostly located in Shashogo area, are well known for

their repeated flood hazard. On the other hand, the remaining hilly and rugged terrain dominating the intermediate high land and high land are exposed to soil erosion of varrying degree of severity.

Slope angle of the land is highly correlated with the topography of the land. The traditional topographic classifications and the associated slope angle of wereda are indicated in the following table. As shown in the table below, a good proportion of Lemo is within the slope class of gently undulating to steeply slopping.

Table 4.1.3: Traditional Topographic Classifications and Slope Angle of Lemo

Topography Class	Percent of the Wereda Area	Slope Angle (%)	Percent of the Wereda Area
Flat	33.84	Flat (0-2)	39.9
Mountain	1.26	Gently Slopping or Undulating (2-6)	31.3
Gorge	31.07	Slopping or Rolling (6-13)	11.7
Rugged Terrain	31.56	Moderately Steep or Hilly (13-25)	7.8
Water Logged	0.00	Steeply (25-55)	7.8
Marsh Area	2.27	Very steep or mountainous (>55)	1.3
Total	100.00		100.0

Source:Data from Wereda Agriculture Office substantiated by the Topographic Maps

4.1.4. Soils

Soils are the most important resources up on which the farmers' livelihood depends. Their characteristics as well as quality largely depend on the type of topography. Fertility, depth, color, texture and drainage conditions of soils are among the most important interrelated elements of soils need to be considered. Though they retain soil's moisture, heavy clay soils are difficult in terms of workability where as sandy soils are easy to work but they don't retain soil's moisture. Besides, heavy clay soils are poorly drained and usually dark in color while the sandy soils are excessively drained. Silt loam soils are the most preferred for agricultural purposes since they are well drained, workable and moderately retain soil's moisture. Similar to other physical resources, reliable studies were not made regarding the soils of Lemo. Anyhow, we have to use the data obtained from the wereda agriculture office in the absence of proper study.

About 35 % of the wereda's soils are classified as silt clay loam and the remaining 65 % sandy clay loam by the wereda agriculture office in terms of texture. No data was obtained with regard to soil's fertility in Lemo. However one-third of the wereda area may be considered to have either moderately fertile or fertile soils. This is so since silt clay loam soils are usually fertile.

Though it was difficult to get data on soil's drainage, it is possible to derive the drainage condition of the wereda from topographic classification data. Accordingly, about 34 % of Lemo can be considered as either poorly or imperfectly drained, about

31 % well drained and the remaining 35 % of the wereda may be excessively drained based on the above slop angle classes.

4.1.5. Drainage Density and Surface Water Resources

If surveyed and calculated correctly, drainage density indicates to what extent the surface water is available for agricultural purpose. Especially, permanent rivers are the most important in this respect. For areas of the basins are not well delineated, only crude drainage densities are calculated for the wereda. By crude drainage density we mean the ratio of total length of rivers in the wereda to the total area of the wereda. The major permanent rivers considered in the calculation of drainage densities are Bilate also called Weira and Guder. For the intermittent rivers are not as such good indicators of vulnerability, they are not given due attention. As indicated in the following table, the drainage density is very low in Lemo. Thus 1 km^2 land area of Lemo is served by about 0.16 km of permanent rivers. From this one can say that Lemo is in a vulnerable position with respect to availability of water especially in the dry seasons. In fact there are several intermittent tributaries of Guder and Bilate not included in this calculation.

4.2. Demographic Indicators

4.2.1. Population Distribution and Growth

The total population of Lemo, which was 237682 during the first Ethiopian Census was raised to 299166 during the second census in 1987 and projected to reach 354910 during this survey in 1992. This shows that the population of Lemo has grown by about 2.6 percent in between the two census periods in arithmetic term. Thus, the wereda has shown low population growth rate compared to the national average. The major reason behind is the mass out migration that took place just after the first census through resettlement programs to the North Western part of the country. It is partly due to this reason that a big difference was observed between the rural and urban population growth rates in the werada. As indicated in the following table, the urban population growth rate is by far faster than that of the rural. The major reason that could explain this wide gap between urban and rural population growth rates in Lemo is that three towns with a total population of 4371 in 1987 were not considered as urban centers during the first census.

Table 4.2.1: Inter-census (1977-1987) Population Growth Rate of Lemo Wereda

	1977		**1987**		**Growth Rate (1977-87)**
	Number	**%**	**Number**	**%**	**%**
All Ages, Both Sex, Urban +Rural	237682	100.0	299166	100.0	**2.6**
All Ages, Both Sex, Rural	218453	91.9	167736	86.2	**1.8**
All Ages, Both Sex, Urban	19228	8.1	41154	13.8	**11.4**

Source: CSA, 1987

4.2.2. Population Projection

Population of Lemo is projected so as to know the study period's population as well as some years following the study period. The projection is made for rural and urban areas separately using the exponential growth rate method and the estimated growth rates of 3.1 and 5.3 percents for rural and urban areas respectively for the period up to 1992. An average growth rate of 2.8 and 4.8 percents are used for rural and urban areas respectively for the period 1993-1996. These rates are the ones used by the Southern Nations Nationalities and Peoples Regional Population Office. For which, the 1987th Census result is used as a base year population. Accordingly, the projection is made up to 1996 Ethiopian calendar and the wereda's population is expected to reach 395348 for the year 1996.

Table 4.2.2: Projected Population for Lemo Wereda (1988-1996)

Year E.C.	Urban/Rural	Urban	Rural
1987	299166	41154	258012
1988	309528	43393	266136
1989	320270	45755	274515
1990	331403	48245	283158
1991	342944	50870	292074
1992	354910	53640	301270
1993	360103	54891	305212
1994	371465	57587	313879
1995	383209	60418	322791
1996	395348	63390	331958

Source: Population projection by Hadiya SERA

4.2.3. Population Density

Mere population number does not indicate whether there is pressure or not on land resources. For this reason population densities should be calculated. Three types of population densities are commonly calculated. These are :crude density which compares the total population of a given geographical area with its total area; rural population density which compares the total rural population of a certain geographical area with its total area and agricultural density that compares the total rural population of a certain geographical area with the total arable land available with in that geographical unit. In fact, the actual agricultural density is calculated by comparing total rural population to to the total cultivated land at that time. Though the carrying capacity differs from place to place depending on the land characteristics and quality, generally speaking high population density indicates heavy population pressure on land resources. For this purpose we estimated the total area of arable land by using the 1997 Woody Bio- Mass Study result from the total areas of the wereda reported by the wereda agriculture office. According to this study, the total area of arable land in Lemo is about 90 percent of its total area. The three population densities are calculated for the years 1977,1987, 1992 and 1996. Agro-ecological differences in population density are shown in the following map.

Figure 4.2.3 Population density map

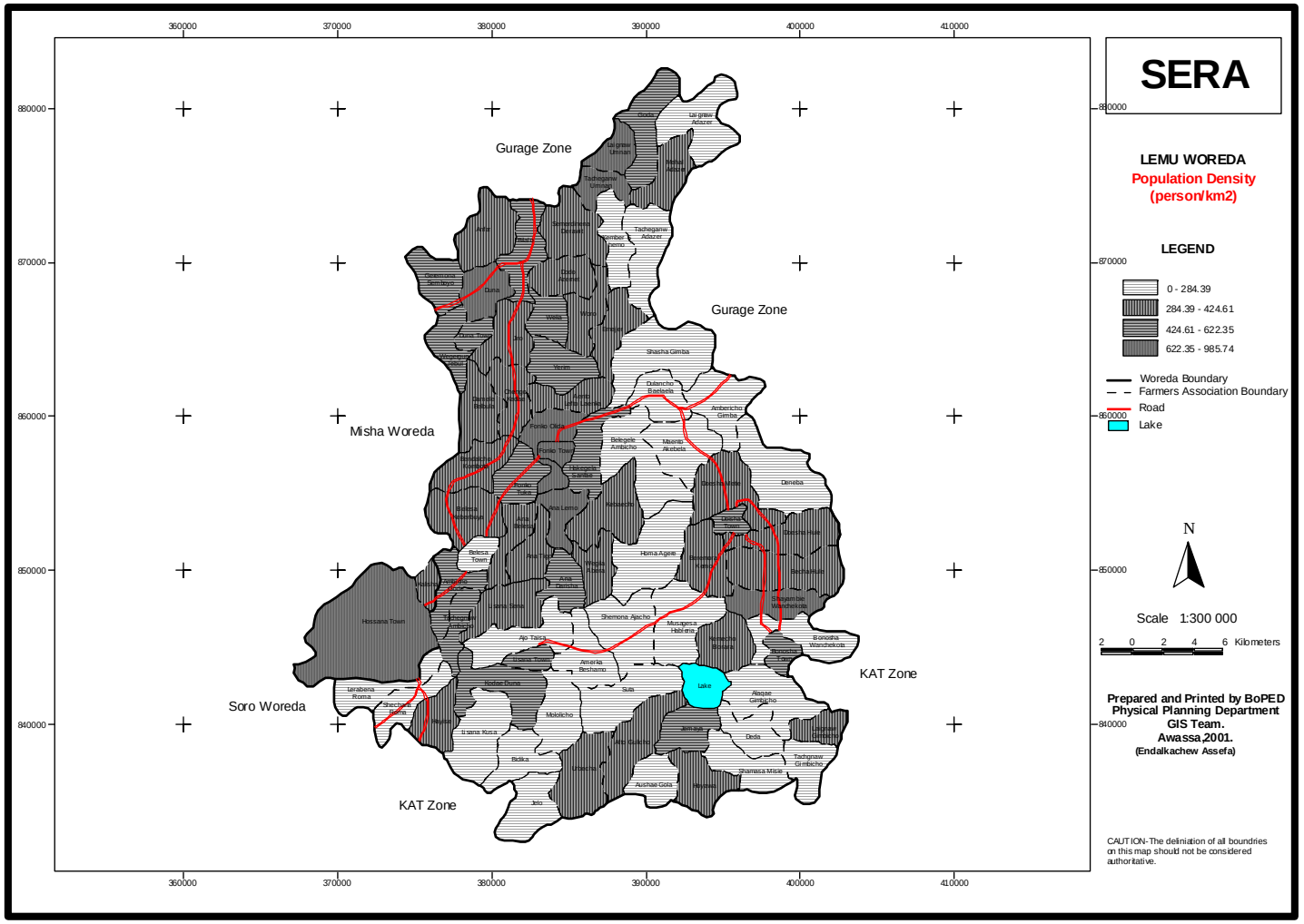


Table 4.2.3: Population Densities of Lemo for the years 1977,1987, 1992 & 1996

Density Categories	1977	1987	1992	1996
Total Population	237682	299166	354910	395348
Total Rural population	218453	258012	301270	331956
Total Area (KM^2)	1030	1030	1030	1030
Total Arable Area (KM^2)	927	927	927	927
Total Cultivated land	**896**	**896**	**896**	**896**
Crude Density (persons/ KM^2)	**231**	**290**	**344**	**384**
Actual agricultural density (persons/ KM^2)	**244**	**288**	**336**	**370**
Potential agricultural density	**236**	**278**	**325**	

Source: Calculations by Hadiya SERA

As indicated in the above table there is no big difference between various density types. The major reasons for this are high proportion of arable land and relatively faster urban population growth rate observed in the wereda. Potential agricultural density for Lemo has jumped from 248 persons per km^2 in 1977 to 293 km^2 in 1987 and expected to reach 377 in 1996. Thus, very high agricultural density is observed in the wereda. Since almost all arable lands are already cultivated in the wereda, scarcity of cultivation land is becoming serious problem in the area.

4.2.4. Population Age-Sex Dependency Ratio

Another demographic factor that indicates the availability of active labor force in the community is the age dependency ratio. Three types of dependency ratios are commonly identified. These are young, old and over all dependency ratios. As the names indicate young dependency ratio indicates the burden of young children on the active members of the community where as the old dependency ratio indicates the burden of old age group on the active age group. Over all is the sum of the two dependency ratios mentioned. As indicated in the following table, very high young dependency ratio is observed in the wereda especially on male. Besides, the dependency ratio was found slightly higher for rural than urban in one hand and male than female on the other hand.

Table 4.2.4: Age-Sex Dependency Ratio of Lemo Wereda (1987)

Population category	Dependency Ratios		
Urban/Rural	**Young**	**Old**	**Overall**
Total	90.5	4.7	95.2
Male	96.1	6.1	102.2
Female	85.5	3.4	88.9
Urban			
Total	82.9	4.5	87.4
Male	83.6	4.4	88.0
Female	82.1	4.6	86.7
Rural			
Total	91.8	4.7	96.5
Male	98.3	6.4	104.7
Female	86.0	3.2	89.2

Source: CSA, 1987 E.C.

4.2.5. Mortality, Fertility and Migration

Wereda level data are not fully available for most of these demographic indicators. Data on under- five- mortality rate and life expectancy at birth are available only for the year 1987. As indicated in the following table, under- five- mortality rate is high for both sexes but not bad especially for males compared to that of the national average for rural areas. Similarly life expectancy at birth was found more or less similar to the national average in Lemo. In fact, the national average itself is not promising.

Table 4.2.5: Under Five Mortality and Life Expectancy at Birth (1987E.C.)

Wereda/Nation	Under Five Mortality		Life Expectancy at Birth	
	Male	Female	Male	Female
Lemo	187	183	48.7	49.5
Ethiopia Rural	186	170	48.8	51.0

Source: CSA, 1987

With regard to migration, about 10 % of Lemo's total population were reported to be migrants in 1987. As indicated in the following table the urban dwellers were found more migrant than the rural. With regard to sex composition of migrants, proportion of male migrants were found slightly larger than that of female in urban areas but the opposite was reported in the rural part of Lemo.

Table 4.2.6: Migration Status of Lemo's Population by Sex and Area (1987)

Migration Status and Sex	% Urban and Rural	% Urban	% Rural
Migrants			
Total	9.78	33.38	6.02
Male	9.45	34.42	5.48
Female	10.10	32.38	6.54
Non Migrants			
Total	89.90	65.85	93.73
Male	90.23	64.83	94.26
Female	89.59	66.84	93.22
Total			
Total	100	100	100
Male	100	100	100
Female	100	100	100

` Source: CSA, 1987 E.C.

4.3. Land Holding, Land Cover and Use

4.3.1. Land Holding

Land is the most important resource on which the livelihood of the rural community highly depends. Therefore its scarcity is among the major factors that could indicate communities vulnerability to famine in general and food insecurity in particular. Physical availability of land does not necessarily show the absence of vulnerability

since its utilization requires active labor, good climate and capital among others. Thus, land holding of the households in terms of size is only crude indicator of families' vulnerability. However, very small land holding of the households obviously makes the farming families vulnerable to various disasters whether the above conditions are satisfied or not.

As indicated in the following table, about 90 % of the households in Lemo had less than or equal to one- hectare land in 1991. Similarly, the 1997/98 surveying result of the CSA indicated that about 80 % of Hadiya's agricultural households had less than or equal to one- hectare land on average. According to the available data for Lemo, proportion of households with under two hectare land holding were found to increase between 1987 and 1991 while those with two hectare and above were found to decline between these years. According to the wereda agriculture office, the household's crop- land has also declined from 1.21 hectare in 1986 to 1.12 hectare in 1991 on average. For agricultural productivity of the wereda is very low similar to any part of the country compared to some world standards, the pilot wereda is seriously suffering from shortage of cultivation land.

Table 4.3.1: Households' Land Holding Size in Lemo

a) Hadiya		**b) Lemo**		
Size of Holding in Hectare	**% of the Households**	**Land Holding Category/Ha**	**Proportion of HHs**	
			1987	**1991**
Under 0.1	4.94	Land Less	0.0	0.0
0.1-0.50	39.44	<0.25	18.4	18.5
0.51-1.00	36.29	0.25-.50	55.2	54.9
1.01-2.00	18.28	0.51-0.75	11.7	10.2
2.01-5.00	0.88	0.76-1.00	3.9	5.5
5.01-10.00	**	1.01-1.50	3.3	5.5
10.01 and over	-	1.51-2.00	2.9	3.0
Total	100.00	2.01-3.00	3.6	1.7
		>3	1.0	0.7
		Total		

Source: a) CSA, Agricultural Sample Survey b) Wereda Agriculture Office

4.3.2. Land Use and Land Cover

Wereda based land use study was not conducted in Lemo. Thus, the data obtained from agriculture office is somewhat difficult to believe. In some cases it seems that wereda office has conceptual problems. For instance, less productive lands are considered as non-productive lands while highly degraded lands are considered as gorges. As a result, we are forced to present the data obtained from the 1997 G.C. Woody Bio Mass Study. According to this study, Lemo's total land area is less by 1968 hectares from the total area officially reported by wereda agriculture office.

Table 4.3.2: Land Use/Land Cover-Lemo Wereda (1997*)

Land Use/Land Cover Category	**Area (Ha)**	**Percent from the Wereda Total Area**
Total Cultivable/Arable Land	91040	90.1
Cultivated Land	88100	87.2
Intensively Cultivated Land	**88100**	**87.2**

Land Use/Land Cover Category	Area (Ha)	Percent from the Wereda Total Area
Moderately Cultivated Land	**0**	**0.0**
Forest Land/Natural	**0**	**0.0**
Forest Land/Man Made	**100**	**0.1**
Wood Land	0	0.0
Shrub Land	0	0.0
Grass Land	6800	6.7
Lakes/Water Bodies	5700	5.6
Total Non-Agricultural Land	**12500**	**12.4**
Other Land (readjusted)	**332**	**0.3**
Total Wereda Area	**101032**	**100.0**

Source: Woody Bio Mass Study, 1997

Note: Only figures with bold are considered to get the total

As indicated in the above table, though the proportion of arable land is considerably high in Lemo almost all of it is intensively cultivated. With regard to land cover, no area was identified to have a natural forest cover. According to our field observation, the 100 hectare land reported to be covered by man made forest is mainly dominated by eucalyptus tree. Thus, no arable land is available for future use besides poor land cover in the wereda.

4.4. Agricultural and Livestock Production

4.4.1. Crop production and Productivity

The major crops grow in the wereda are wheat, barley, maize, teff and sorghum. Considerable area of the wereda is also covered by perennial crops such as enset, chat and banana. However, for it is among the most important food- stuff for majority of the highlanders, we included only enset from the root crops. As indicated in the following table, reported volume of production for the years 1990 and 1991 are highly exaggerated. Compared to 1989, total production was reported to increase by 60 % in 1990 and by 11 % in 1991. This is why available calories are calculated to be very high in the 1990 and 1991. Such exaggerations may be resulting from over ambitious pre-harvest assessment. Any how, taking the figures as they are, available calories per person per day was found by far less than the standard requirement in 1989 and slightly less than the standard in 1990 and higher than the standard in 1991. According to FAO (1997*), 2280 calories per person per day is a standard requirement for an adult person. Available calories are calculated by using wheat equivalent of 3.39 calories per gram of cereals and 2.0 calories per gram of enset.

Table 4.4.1: Volume of major Crops produced in Quintals & wheat equivalent Calories estimated for Lemo Wereda (1989-1991)

Crop/Pop/Calories	Year					
	1989		1990		1991	
	Quintal	%	Quintal	%	Quintal	%
Maize	221350	45.3	317083	40.0	284581	32.2
Teff	29920	6.1	54778	6.9	109306	12.4
Barley	57564	11.8	61286	7.7	90756	10.3

Crop/Pop/Calories	Year					
	1989		1990		1991	
	Quintal	%	Quintal	%	Quintal	%
Wheat	113429	23.2	229476	28.9	306577	34.7
Sorghum		0.0	94205	11.9	53300	6.0
Enset	66256	13.6	36200	4.6	38398	4.3
Total production (KG)	48851900	100.0	79302800	100.0	88291800	100.0
Total population	320270		331403		342944	
Calories/person/day	1337		2181		2348	

Source: Lemo WAO, Calculations by Zonal SERA

As indicated in the above table, accounting for more than 65 % of the total cereals produced in the wereda for the years under consideration, maize and wheat are the major staple food crops in Lemo. If all the production is available for consumption the wheat equivalent calories' calculation indicates that, Lemo is food insecure for the years 1989 and 1990 since an adult person requires about 2280 calories per day on average according to FAO (1997). In reality people do not consume what they have produced all in all. They have to sell part of their production so as to pay for expenses such as agricultural inputs, school fees, land tax, labor rent, clothing, medication, some food- stuffs, etc. Besides, reported volume of production is highly exaggerated for 1990 and 1991. If all these are considered, the available calories will obviously be less than the amount indicated above. Therefore, Lemo is not food secured even at wereda level. In fact, food security assessment at wereda level is not the best alternative since wereda can be food secured despite several individual households are suffering from chronic food insecurity.

Another way to estimate availability of food in a certain area is by assessing the level of productivity. The higher the level of productivity the better is the food security status and vice versa by assuming that what is produced is all in all available for consumption. Though there is significant increase in productivity for those crops included in the new extension package, the level of productivity is still very low compared to some world standards. Besides, as shown in the following table, level of productivity achieved through the new extension package may not be able to compensate for the costs of inputs since price of cereals is not increasing proportional to the price of chemical inputs.

Table 4.4.2: Productivity of Annual Crops (1990 & 1991)

Crop Type		With out Fertilizer		With Fertilizer		With the New Extension Package	
		1990	1991	1990	1991	1990	1991
1.	Maize	22	23	31	35	40	45
2.	Teff	6	ND	8	12	10	13
3.	Barley	12	12	13	18	20	18
4.	Wheat	ND	ND	18	24	23	28
5.	Sorghum	15	16	22	20	ND	ND

Source: Lemo WAO

4.4.2. Livestock production and Productivity

Livestock are another important resources on which communities livelihood depends. Not only their number but also their productivity is an important aspect to be considered. According to the secondary data obtained from WAO, milk yield of the local cow reaches 1.5 litter per day during the first two to three months of lactation. This is still very low compared to the world standard. Livestock data indicated in the following tables are all in all for the local breeds. Though there are some improved breeds, data was not available with the wereda agriculture office.

Table 4.4.3: Livestock population by type and number for Lemo (1987-1991)

Type of Livestock	Year (E.C.)					LLM
	1987	**1988**	**1989**	**1990**	**1991**	
Cattle	95946	101363	158343	162465	183862	
Ox	31575	33537	58221	58719	58803	
Cow	40296	41924	63385	64095	64018	**10-12**
Heifer	19562	20709	20891	23915	21027	
Young Bull	ND	ND	ND	ND	24068	
Calf	4513	5193	15846	15736	15946	
Goat	**31000**	**31372**	**31752**	**33911**	**32069**	**1.5-2.0**
Sheep	**32100**	**33014**	**33411**	**32678**	**33745**	
Equines	**38344**	**42736**	**43112**	**43842**	**43542**	
Horse	9356	11483	11547	11762	11662	
Mule	7155	8139	8220	8402	8302	
Donkey	21833	23114	23345	23678	23578	
Chicken	**165484**	**105484**	**106750**	**107831**	**107817**	
Bee-Hives	**9012**	**10242**	**10902**	**11485**	**11585**	
Traditional	9000	10240	10890	11450	11564	
Modern	12	12	12	35	21	

Source: WAO

Table 4.4.4: Livestock Population by type and Number per household in TLU for Lemo (1987-1991)

Type of Livestock	Year E.C.				
	1987	**1988**	**1989**	**1990**	**1991**
Ox TLU	31375	33537	58221	58719	58803
No. of Ox/household	0.691	0.723	1.231	1.216	1.194
Cow TLU	40296	41924	63385	64095	64018
No. of cow/household	0.887	0.904	1.340	1.328	1.300
Heifer TLU	9781	10355	10446	11958	10514
No.of heifer/household	0.215	0.223	0.221	0.248	0.213
Bull TLU					15644
No. of bull/household					0.318
Calf TLU	2031	2337	7131	7081	7176
No. of calf/household	0.0447	0.0504	0.1507	0.1467	0.1457

Type of Livestock	Year E.C.				
	1987	1988	1989	1990	1991
Goats TLU	3100	3137	3175	3391	3307
No. of goats/household	0.068	0.068	0.067	0.070	0.067
Sheep TLU	3210	3301	3341	3268	3375
No.of sheep/household	0.071	0.071	0.071	0.068	0.069
Horse TLU	8420	10335	10392	10586	10496
No.of horse/household	0.185	0.223	0.220	0.219	0.213
Mule TLU	9302	10581	10686	10923	10793
No. of mule/household	0.205	0.228	0.226	0.226	0.219
Donkey TLU	7642	8090	8171	8287	8252
No.of donkey/household	0.168	0.175	0.173	0.172	0.168
Chicken TLU	4965	3165	3203	3235	3235
No.of chicken/household	0.109	0.068	0.068	0.067	0.066
All Livestock in TLU	120123.4	126763.4	178153.7	181545.9	195614.9
No. of all Livestock/HH	2.644	2.734	3.766	3.761	3.971

Source: Raw data from Lemo WAO and TLU calculations by Hadiya SERA

The above table shows that, each household had about 2.6 livestock on average in 1987 and per capita livestock per household reached 3.9 in 1991. Besides, two households share one ox and each household owns about one cow on average for the recent years. This does not mean that all households have livestock. Obviously, there can be several households with out any livestock. Thus, the user of this profile should be noted that wereda level figures hide disparities among individual households. The TLU unit used for both cow and ox is one. If TLU of 0.8 is used as indicated in some sources, the number of oxen and cows per household could have significantly be lower than the above.

4.5. Market Prices and Wages

Since agricultural products are the major sources of income for the rural community, they should get reasonable price so as to cover the expenses for agricultural inputs, land tax, school fees for children, purchase of food items not produced in their farm, etc. If data is available change in price of the major cereals should be compared with the change in price of chemical fertilizers. It is then that the income from the sale of crops can be more realistic. As indicated in the following table, there is big change in the market prices for most crops from year to year besides considerable seasonal price differences within the year for some crops. From 1986 to 1990, market price has been continuously falling for most crops in Lemo. The main reason behind may be increased supplies following the new extension package. According to the information obtained from wereda agriculture office, the high price period includes some months just before the new harvest while the low price period includes some months just after harvest. This relationship shows correlation of high supply period with low price and low supply period with high price. For the farmers are usually requested to pay all their debts of agricultural inputs and land taxes during the low

price period there is little chance to improve the price of crops by reducing the supplies in the market.

Table 4.5.1: Open market Food Crop Prices of Lemo (1986/87-1990/91)

Major Food Crop	Market prices Birr/quintal									
	1986/87		1987/88		1988/89		1989/90		1990/91	
	a	b	a	b	a	b	a	b	a	b
Maize	116	113	103	95	80	76	108	100	177	161
Sorghum	106	105	100	100	103	90	119	90	152	130
Wheat	162	148	120	105	110	101	140	125	190	166
Teff	230	186	200	183	172	158	286	205	292	270
Barley	143	133	191	155	155	145	140	132	230	196

Source: Lemo WAO

NOTE- 'a' refers to high price (before harvest) and 'b' refers to low price (after harvest). Both show average price level.

As indicated in table 5.1.2 below open market prices for most livestock is below Birr 800. Even though there was no big variation in livestock prices between 1988 and 1990, it was found drastically falling in 1991. For 1991 was a drought year in Lemo, it seems that farmers were forced to sale their livestock so as to purchase food grain in one hand and to convert their livestock in to cash before they die due to drought. As indicated in the above table, price of food grain was very high compared to the previous year in 1991.

Table 4.5.2: Average prices of livestock.

Type	Unit Livestock price, Yearly Average (Birr)			
	1988	1989	1990	1991
Ox	847.50	870.00.	875.00	787.00
Cow	812.50	697.00	797.00	759.00
Sheep	156.00	157.00	254.00	180.00
Goat	160.00	166.00	170.00	185.00
Mule	1076.00	1111.00	1482.00	1020.00
Horse	1011.50	973.50	757.00	562.00
Chicken	11.00	10.00	16.00	13.50

Source: Lemo WAO

Table 4.5.3: Average daily wage rate for Lemo Rural & Urban (1987-1991)

Seasons/time	Average Daily Wage rate									
	Rural					Urban				
	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991
Peak season	ND	ND	3	4	5	ND	ND	5	6	7
Slack season	ND	ND	2	3	4	ND	ND	4	5	6

Source: Lemo WAO

As discussed earlier population pressure is becoming a serious problem in Lemo. This is partly why the wage rate has not been changing from year to year both in peak and slack season as indicated in the above table. Thus, large number of youngsters are competing for limited off/non-farm activities each year. However, the labor was found cheaper in rural area than urban. If no corrective measure is taken, chances of off/non-farm incomes are becoming rare in the wereda.

4.6. Health Infrastructure, Services and Coverage

Availability of health institutes is among the major social infrastructures upon which the level of communities' vulnerability to hazards such as sickness, epidemics, and even death partly depends. According to secondary data obtained from Lemo Wereda Health Office, there is one hospital in the wereda. However, the hospital is located at the southern tip of the wereda that majority of the inhabitants can not be served. As a result, the health personnel in the hospital are excluded from the population health personnel ratio. There is no any health center until 1991. In 1991, there are 4 health centers in the wereda. The number of clinics which were 9 in 1987 were increased to 10 in 1989 and again reduced to 9 in 1991 again due to the fact that one of the clinics was promoted to the level of health center. There was no any health post in the wereda during our survey in 1992. Using topographic maps we calculated proportion of population accessible to various types of health institutes. Accordingly, 14.9 %, 28.5 % and 52.5 % of the wereda's inhabitants were accessible to hospital, health center and clinic within 10 KMs radius in 1991 respectively.

As mentioned above, the physical availability of health institutes are not in a bad status. Especially, the clinics are relatively evenly distributed throughout the wereda. Almost all of the FAs are located in a two hours walking distance to the clinics that are more or less evenly distributed in the wereda.

However, the major problem of Lemo's health institutes is their poor quality of services as repeatedly wetnessed by the key informants as well as our field observation. Thus almost all of the health institutes were not well equipped with the necessary medicinal equipment and medicines. Moreover, almost all of them do not have appropriate and required number of health personals. For instance, the whole of wereda's population about 354,909 in 1992, have to be served by only three physicians and 11 nurses who are available mostly in health institutes closer to Hossana Town. This is excluding health personnel in Hossana Hospital for they were not accessible for most of the rural inhabitants in Lemo wereda.

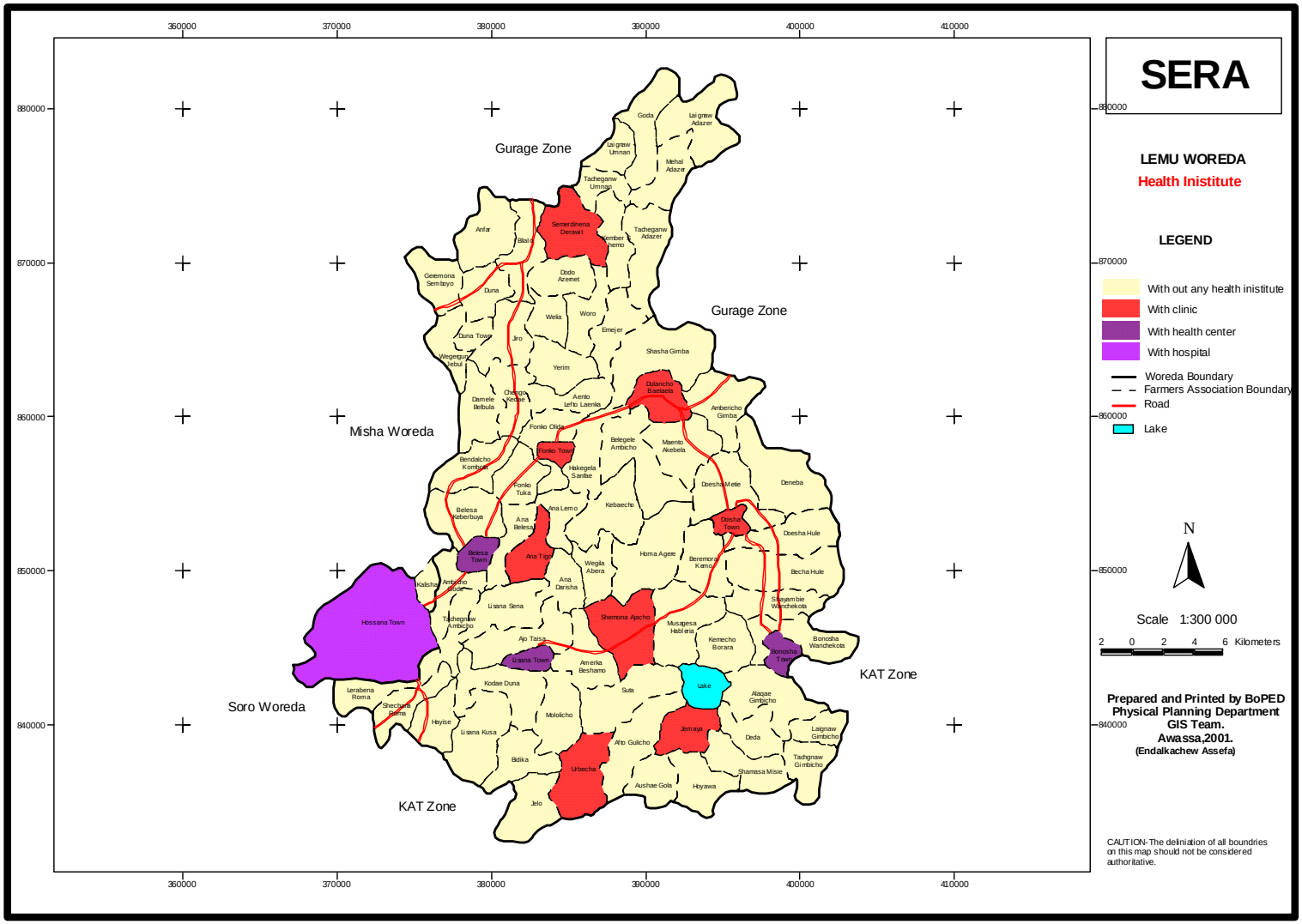
Concerning the health related programs, the wereda health office was found very weak. The key informants in the sampled PAs indicated that important programs such as family planning and health education are rarely available to most parts of the wereda. The only program relatively available at medium quality and coverage was the immunization program. Besides, there were no meaningful health related programs functioning by the very few NGOs working in the wereda during our survey except Mekene Eyesus church working in reproductive health.

Table 4.6.1: Physical Availability of Health Facilities and Trained Personnel

Health Personnel/ Facilities	Number of health facilities/personnel			Population within 10 km radius or 2 Hours walk of facility			Total Population in the Wereda			Percentage of Population Accessible		
	1987	1989	1991	1987	1989	1991	1987	1989	1991	1987	1989	1991
Hospital	1	1	1	42200	46416	51071	299166	320270	342944	14.1	14.5	14.9
Health Centers	0	0	4	0	0	98735	299166	320270	342944	0.0	0.0	28.8
Clinic	9	10	9	161694	183867	180078	299166	320270	342944	54.0	57.4	52.5
Health Posts	0	0	0	0	0	0	299166	320270	342944	0.0	0.0	0.0
Pharmacies/ Drug vendors (private	14	14	18				299166	320270	342944			
Physicians	0	2	3	XXXX	XXX	XXXX	299166	320270	342944	D. Pop./personnel ratio		
										299166:0	160135:1	114314:1
Nurses/midwives	4	15	11				299166	320270	342944	74791:1	21351:1	31177:1
Health Assistants	17	29	27	XXXX	XXX	XXXX	299166	320270	342944	17598:1	11044:1	12702:1
TBAs	5	15	11	XXXX	XXX	XXXX	299166	320270	342944	59833:1	21351:1	31177:1
Other (specify)	2	3	10	XXXX	XXX	XXXX	299166	320270	342944	149583:1	106756:1	34294:1

Sources: Lemo WHO, Population within 2 hours waking distance to facilities is calculated by Zonal SERA using 1:50,000 Topographic and CSA Map

Figure 4.6.1 Map Showing Distribution of Health Institutes



4.7. Educational Infrastructures, Services and School Participation Rates

Education is among the most important factors that contribute to the reduction of communities' level of vulnerability to various hazards, especially in this era of knowledge/ technology/. It is through education that some of the families are able to reduce pressure on the already limited cultivation land by creating chances of off-farm activities else where for their children. Besides, access to basic education contributes to community vulnerability reduction through awareness creation and strengthening preparedness to disaster prevention of the families. It is due to such connections that some of the educational indicators are discussed below.

Enrollment ratio, students- teacher ratio, students- classroom ratio, population school ratio, dropout for boys and girls and some educational quality indicators are briefly discussed for our purpose at primary school level.

32 out of the 74 Farmers Associations have primary schools within the FAs. That is about 44 % coverage. Thus, the remaining 42 FAs have to use primary schools found in the nearest FAs. This shows that small children in these 42 FAs are either attending school with greater difficulty or unable to attend primary education at the right age.

As indicated in the table below enrollment ratio for Lemo is generally low at primary schools. Due to lack of age data for children enrolled in primary schools, we are unable to calculate net enrollment ratio for Lemo. As a result we were limited to the calculation of gross enrollment ratio. By gross enrollment ratio, we mean the ratio of total number of students enrolled in primary schools regardless of their age to the total expected number of children aged 7-14 while net enrollment ratio refers to the ratio of total number of students in primary schools aged 7-14 to the total number of expected children between the age of 7 and 14 in the wereda. The gross enrollment ratio was found higher for boys than girls. Though the enrollment ratio is still low, it is steadily increasing from year to year for both sexes. Unlike the enrollment ratio, there is no big variation between boys and girls in drop out rates. As indicated in table 4.7.1, drop out rates were steadily decreasing for both sexes from year to year in Lemo. On the other hand dropout rates were slightly higher for boys than girls. Boys enrolled better but dropped higher where as girls relatively enrolled less and dropped less in Lemo. Reasons behind dropouts are discussed in chapter five.

Even though the enrollment ratio is not as such bad compared to the zonal average, the associated high dropout rates make the educational participation in the wereda further less. For data are not available for all primary schools with regard to drop out, we are forced to calculate drop out rates by using data available only for 24, 26 and 28 primary schools for the years 1988, 1989, and 1990 onwards respectively. These are about half of the 48 primary schools available in the wereda. Unlike the enrollment ratios, dropout rates are more or less similar for girls and boys. Besides, the dropout rates are found slightly declining from year to year.

Some other ratios such as students school ratio, student classroom ratio and students teacher ratios are also not promising in the wereda. As indicated in the following table, about 94 students should learn in a single room and one teacher has to take care of about 50 students. Besides these ratios, the low educational level of teachers, lack of libraries, shortage of teaching materials like books and poor school furniture are among the major factors repeatedly mentioned by the communities' key informants to have contributed much for the poor quality of education in the primary schools of Lemo wereda.

We have also calculated wastage rates for boys and girls by comparing students who entered grade 1 four years ago with students who completed grade 4 four years after. The assumption is that there will not be significant students' mobility from one wereda to another. Otherwise, the calculation is not affected by intra-wereda mobility. For instance students entered grade one in 1986 are compared with those who have completed grade 4 in 1989. The results indicated that the wastage rates are very high in Lemo especially between 1986 and 1989 as well as between 1987 and 1990. As shown in the following table the wastage rate was found declining recently as calculated for the year 1988 Vs 1991. On the other hand the wastage rates were found slightly higher for boys than girls in Lemo.

Table 4.7.1: Primary School Availability, Enrollment, Dropout & Students' Facility Ratio

Selected indicator	1988		1989		1990		1991	
	Male	Female	Male	Female	Male	Female	Male	Female
Children aged 7-14 in the wereda	41559	40804	43002	42220	44496	43688	46046	45209
Students enrolled in primary school (1-8)	15062	8887	16915	9941	19210	11830	20129	13596
Gross enrollment ratio in primary schools (1-8)	36.2	21.8	39.3	23.5	43.2	27.1	43.7	30.0
Number of students enrolled in 24-28 primary schools out of a total of 48	11209	6718	13589	8135	15867	9986	17076	11245
Number of students dropped in 24-28 primary schools out of a total of 48	2791	1593	2661	1835	3111	1716	3339	2158
Primary school dropout rate in(grades1-8) for a maximum of 28 primary schools	24.9	23.7	19.6	22.6	19.6	17.2	19.5	19.2
Wastage rates with regard to students entered grade 1 four years ago and completed grade 4 after 4 years.			49.0	54.2	53.4	50.0	33.7	32.9
Number of Primary Schools	41		44		45		46	
Students' school ratio (1-4)	585:1		611:1		690:1		734:1	
Student class room ratio (1-4)	80:1		81:1		87:1		94:1	
Student –teacher ratio (1-4)	42:1		44:1		46:1		50:1	

Source: Lemo Wereda Education Office

4.8. Agricultural Extension Coverage and Related Services

Availability of quality extension services is very important in improving the livelihood status of the rural community so as to make them less vulnerable to various disasters. Extension services should be diversified in order to bring more sustainable change for the rural community. Thus, food crop extension should at least be supported by the extension services of livestock development & natural resource management. As indicated in the following table, extension services are not as such diversified in the wereda. Especially, that of the livestock sector is almost ignored.

However, it is encouraging that to see steadily increasing proportion of households included in food crop extension program. Besides, including considerable proportion of households in natural resource management practice, the situation was found promising.

Table 4.8.1: Proportion of HHs Involved in Various Agricultural Extension Services (Lemo 1987-1991)

Year	Total No. of Agricultural Households	No. of households involved in food crop extension	% of HHs involved in food crop extension	Total food crop producing Area (ha)	Area Covered by food crop extension	% of total area (ha) Covered by food crop extension	No. of households involved in livestock extension	% of HHs involved in livestock extension	No. of households involved in natural resource management	% of HHs involved in natural resource management extension
1987	45431	-	-		-	-	-		3991	8.78
1988	46359	149	0.32	92700	74.5	0.08	-		9135	19.70
1989	47306	1314	2.77	92700	657	0.71	14	0.03	9258	19.57
1990	48270	4045	8.38	92700	2022.5	2.18	45	0.09	7868	16.34
1991	49256	22307	45.29	92700	11153.5	12.03	33	0.07	-	-

Source: Lemo WAO

Availability of extension agents closer to the local community are among the most important inputs to make the extension works successful. Not only their presence but also their number should be reasonably proportional to the number of beneficiaries. As indicated in the following table, the number of development agents has shown quiet significant increase between 1987 and 1990. By now one extension agent is serving about 593 households on average. Still, it will not be easy for a single person to properly handle about 593 households. Promotion and transfer to other weredas are among the major reasons stated by WAO for the reduced number of agricultural agents in 1991 despite the ever-increasing participants in the new agricultural extension.

Table 4.8.2: Extension Agents (DAs*)- Lemo 1987-1991 E. C.

Year	Number Of Extension Agents In the Wereda	Total Number of Agricultural HHs	Ratio OF Agricultural HHS Per Extension Agent	Number of Veterinary Personnel	Ratio of Veterinary personnel to Agricultural Households
1987	6	45431	7571:1	7	6490:1
1988	43	46359	1078:1	16	2897:1
1989	93	47306	508:1	15	3154:1
1990	98	48270	492:1	16	3016:1
1991	83	49256	593:1	16	3078:1

* DAs are those living in rural areas with farmers, not those located in towns

4.9. Other Infrastructures (Water, Road, etc.)

Educational and health infrastructures are discussed above. Infrastructures related to road and water are discussed in this section. Obviously, road access is among the crucial elements through which farmers can bring their produce to the market and transport agricultural inputs to their farms. Besides, it is by using road that people can easily get assistance during disasters. Thus, level of road accessibility is among the factors on which status of communities' vulnerability may depend. Obviously, communities with good road access are less vulnerable than those with poor road access.

No asphalt road is built in Lemo. There are gravel roads with a total length of 75 kms and feeder roads with a total length of 77 km at present (in 1992). As indicated in the following table, about 60 % of the total population were accessible to all weather gravel road in 1991 and about 22 % to seasonal feeder road in the same year. Thus, about 18 % of the total population are still with out any access to any type of road. Concerning road density 1 km of gravel and feeder road serve about 13 km ^{2} land area in the wereda. With regard to the spatial coverage, Shashogo area is the most inaccessible mainly due to seasonal flooding problems followed by Duna area mainly due to steep slope. Besides, the feeder roads do not get vehicles regularly even in the dry season as we were informed by the key informants.

Table 4.9.1 Road Network Lemo (1977-1991)

Year	Population accessible to all weather road		Population. accessible to feeder road (wthin 7.5 kms)	% of total population accessible/total to:			d. Total Roads (all asphalt, gravel, feeder roads) Length (kms)			e.Total area of the wereda (km^2)
	Within 15 kms of all weather asphalt road	Within 7.5 kms of all weather gravel road		asphalt road	gravel road	Feeder road	Asphalt road	Gravel road	Feeder road	
1977	0	116939	31804	0.00	49.2	13.3	0	55	46	1030
1987	0	148529	40032	0.00	49.6	13.4	0	55	46	1030
1989	0	186154	59535	0.00	60.2	18.6	0	75	70	1030
1991	0	207012	78466	0.00	60.4	22.9	0	75	77	1030

Source: Hadiya Zone Trade, Industry & Transport Department (update with local authorities/informants)
Proportion of accessible population are calculated by zonal SERA using
Topographic Maps of 1:50 000

4.9.2. Accessibility to Markets

Accessibility to market is another factor up on which vulnerability of communities depends since they need markets to sale out puts and the necessary in puts to be utilized in the production process. Thus, the markets should be located in a reasonable distance in order to fulfill the above purposes. There are six major weekly markets in different parts of the wereda. These are Hossana Market located at Hossana Town, Fonko Market at Fonko Town, Duna Market at Duna Town, Doisha Market at Doisha Town, Bonosha Market at Bonosha Town and Lissana Market at Lissana Town. Compared to these six major weekly markets, about 77 % of Lemo's population are accessible to major markets within one day double trip. In fact some others may use markets available in the neighboring weredas too. Thus accessibility to markets is not as such a serious problem in Lemo

4.9.3 Accessibility to Potable Water Supply

Lack of potable water is among the most important factors associated with risks such as water born diseases. Data is not available to indicate accessibility status potable water for the year 1977. As indicated in the following table, only 13.8 % of the wereda's rural population and 68.48 % of the total urban dwellers were accessible to potable water in 1987. For more than 80 % of the wereda's rural households, the main sources of drinking water were rivers and ponds in 1987. According to Water, Energy and Mines Department of the Zone, only about 27 % of Lemo's inhabitants were accessible to potable water in 1992. Even if we accept this figure, about two-third of the wereda's inhabitants are still suffering from lack of potable water.

Table 4.9.2: Potable Water Supply (Lemo 1987)

Year	Urban/Rural and year	All housing units	Tap	Protected well/spring	Unprotected well/spring	River/ Lake/ pond	% housing units with tap and protected sources
1977	Urban Rural Total						
1987	Urban Rural Total	7693 48172 55865	4362 1171 5533	906 5476 6382	1040 11087 12127	1346 30290 31636	68.48 13.80 21.34

Source: CSA, 1987th Population and Housing Censuses

4.10. Prevalence of Diseases

No data was obtained regarding ten top diseases for the year 1987 for Lemo. Instead of 1987, we used 1990. As indicated in the following consecutive tables, the reported ten top diseases are the same from year to year. Malaria, URTI, fever of unknown origin, intestinal parasites and diarrhea are ranked first to fifth almost in all the years considered. Thus, about 78 % in 1989, 81 % in 1990 and 80 % of the reported cases in 1991 were covered by these diseases. Some of these frequently prevailing diseases may have some relationship with the high proportion of rural population using dirty water. According to the report, the most vulnerable AEZ is Kolla or low land, where as, dega or the high land was found the least vulnerable in this regard.

Table 4.10.1A: Reported Top Ten Diseases in Lemo by Demographic and Environmental Characteristics (1989 E.C.)

No	Top ten diseases in the wereda	Highly affected age group	Months of highest number of cases	Highly Affected AEZ
1	Malaria	15 & above	Sep.to Dec. & April-July	Weina dega
2	URTI	Under 5 children	The first on set of rain	Kolla
3	Fever of unknown origin	No specific age	No specific months	Kolla
4	Intestinal parasites	No specific age	No specific months	Kolla&weina dega
5	Diarrhea	Under 5 children	March, July & October	Kolla
6	Eye disease	No specific age	December-February	Kolla
7	Gastritis	Adults	No specific months	Kolla&weina dega
8	Skin disease	No specific age	No specific months	Kolla&weina dega
9	Eye disease	No specific age	December-February	Kolla
10	Tonsillitis	Children	No specific months	Kolla&weina dega

Table 4.10.1B: Reported Top Ten Diseases in Lemo by Demographic and Environmental Characteristics (1990)

No	Top ten diseases in the wereda	Highly affected age group	Months of highest number of cases	Highly affected AEZ
1	Malaria	15 & above	Sep.to Dec. & April-July	Weina dega
2	URTI	Under 5 children	The first on set of rain	Kolla
3	Fever of unknown origin	No specific age	No specific months	Kolla
4	Diarrhea	Under 5 children	March, July & October	Kolla
5	Intestinal parasites	No specific age	No specific months	Kolla & weina dega
6	Rheumatism	Adults	No specific months	Kolla & weina dega
7	Gastritis	Adults	No specific months	Kolla & weina dega
8	Skin disease	No specific age	No specific months	Kolla & weina dega
9	Eye disease	No specific age	December-February	Kolla
10	Tonsillitis	Children	No specific months	Kolla & weina dega

Table 4.10.1C: Reported Top Ten Diseases in Lemo by Demographic and Environmental Characteristics (1991 E.C.)

No	Top ten diseases in the wereda	Highly affected age group	Months of highest number of cases	Highly Affected AEZ
1	URTI	Under 5 children	The first on set of rain	Kolla
2	Malaria	15 & above	Sept.-Dec.& April-July	Weina dega
3	Fever of unknown origin	No specific age	No specific months	Kolla
4	Intestinal parasites	No specific age	No specific months	Kolla & weina dega
5	Skin disease	No specific age	No specific months	Kolla & weina dega
6	Diarrhea	Under 5 children	March, July & October	Kolla
7	Gastritis	Adults	No specific months	Kolla & weina dega
8	Rheumatism	Adults	No specific months	Kolla & weina dega
9	Kidney infection	Adults	No specific months	**Kolla**
10	Eye disease	No specific age	December-February	Kolla

Source: Wereda Health Office

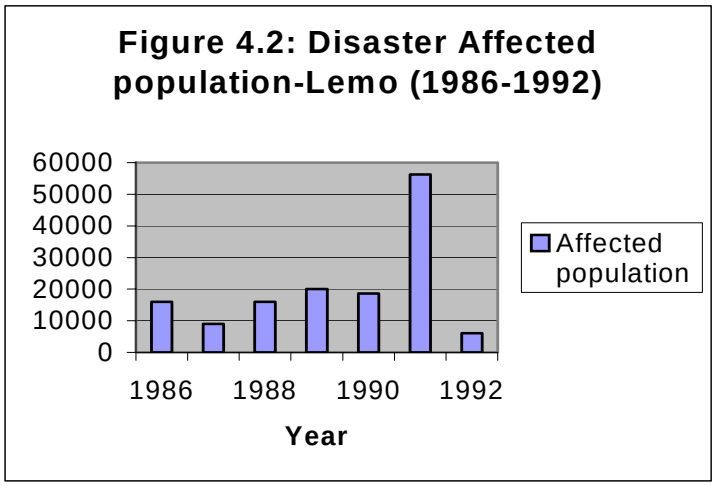
4.11. Disasters and Disaster Affected Population

It is very difficult to get organized secondary data regarding disasters and disaster affected population of the wereda. As a result, we are forced to discuss this section more in chapter five by the help of data obtained through RRA. However, some data obtained from various sources regarding number of population in need of food aid are presented below.

As indicated in the following chart, the numbers of inhabitants in need of food aid were found highly fluctuating from year to year. This is the reflection of usually fluctuating rainfall in the area. The amount of food aid distributed was also found to follow the same pattern. Large number of disaster affected population were reported in the year 1991 mainly due to the impact of drought in that year. Please be noted that the number of

disaster affected population were taken from various sources due to the absence of well-organized data from a single source. Accordingly, some were taken from zonal offices, others from regional DPPO and still some were taken from Federal Early Warning System. The amount of food aid distributed was not shown in the chart for they usually follow pattern of disaster affected population.

Figure 4.2 Disaster-affected Population (Lemo 1986-92)



Source: Zonal Early Warning Unit, Regional DPPO and Federal Early warning System

Chapter 5

5. Intra-Wereda Analysis of Vulnerability from the Key Informants' Opinion Survey

Quality and Reliability of Data

Discussion in this chapter depends on the information carefully selected from knowledgeable key informants in each sample PA. Age, familiarity to the areas as well as the topic and natural talents of the individuals were among the criteria considered on selecting the informants. Selection of the key informants was undertaken by SERA staff together with the local authorities and development agents in each of the locality.

Besides carefully selecting the key informants, skillful and experienced RRA team members were selected to effectively communicate with the key informants. Experts both from Zonal departments and Werda offices were included in the team. In addition to their personal strength, two weeks long training was given in order to help them collect good quality information for the purpose. Most of the RRA team members were selected considering their ability of local language since they had to collect information mainly from farmers who hardly understand Amaharic. In fact, there were some RRA members with out knowledge of the local language. But, they were assigned to collect data from key informants such as school principals, DAs, health workers, influential youth, etc, who understand Amaharic very well. The above are some of the many measures taken to be able to collect good quality and reliable information. Thus, we believed the quality of dada used in this chapter is reliable except the health data poorly organized in the health institutes.

5.1 Descriptive Summaries of the Sample PAs.

A total of 7 PAs were sampled to represent the whole Lemo wereda. Depending on the area coverage and share of population, 1 PA from Dega, 3 PAs from Upper Weina Dega and 3 PAs from Lower Weina Dega AEZs were randomly sampled. The sample PAs are briefly described one by one as follows.

5.1.1 Anfar

Anfar is the only Dega sample PA located to the north of Hossana, the Weredas capital. The PA has a total area of about 12.50 km^2 and its topography is dominated by rugged terrain. As usual to any other PAs of the Wereda, Anfar is dependent on mixed farming, i,e, crop cultivation and animal husbandry. The dominant farming system is Enset planting complex. Enset is principal food crop. Seed crops are produced for earning cash. In Anfar land preparation is carried out by hoeing, not by oxen plough, in fear of sever soil erosion due to steep slope. As a result number of oxen does not signify the state of wealth in the area.

Based on the 1987 census survey, the total population of Anfar was estimated to be 5542 at 1992, of which 2594 are males and 2948 are females. Accordingly, the male to female ratio is 114. On the other hand, the crude population density of the PA is 443 persons per km^2. According to the KI, polygamy is an accepted type of marriage, i.e, a person is legal

to marry more than one wife and the number of children are accepted to be an expression for the state of wealth in the community.

With regard to essential services, the PA has got only primary school with in the PA. The community of the PA fetches water from the unprotected sources, which are the springs located in deep gorges and the 'Dogos' River.

5.1.2 Ambicho Godie

It is one of the Upper Weina Dega sample PAs and located at about 5 kms away from Hossana along Hossan- Addis Abeba road. The total area of Ambicho–Godie is about 8.19 km^2 and its topography is dominated by rolling plains. Ambicho–Godie is dependent on mixed farming i.e, crop cultivation and animal husbandry. As to crop cultivation, Enset Planting complex is the dominant type of farming system in the PA. Even though Enset is the principal food crop, seed crops are produced for both consumption and earning cash. The main cash crop produced in the PA is Chat. Coffee is also grown. Land preparation and sowing are carried out by ox- plough. Thus, the number of oxen per household signifies the state of wealth of the families to some extent.

Based on the1987th census survey, total population of the PA was estimated to be 4493 in 1992, of which 2296 are males and 2197 are females. Accordingly, the male to female ratio is 96. On the other hand, the crude population density of the PA is about 548 persons/km^2.

With regard to essential services the PA has got agricultural development place (DA), two primary schools, all weather road, credit services and grinding mill within the PA. The major sources of drinking water are ponds and rivers, both of which are unprotected. The major rivers are Guder and Batena.

5.1.3 Shesha Gimba

It is one of the three Upper Wiena Dega sample PAs of the Wereda, located at about 30 kms far from Hossan along Hossana –Addis Abeba road. The total area of Shesha – Gimba is estimated to be 18.75 km^2 and has flat to undulating topography. The PA is dependent on mixed farming, crop cultivation and animal husbandry. As to crop cultivation seed farming complex is the major type of farming system in the PA. And Maize is the principal food crop. As a result, seed crops are produced for both consumption and earning of cash. Land preparation and sowing are both carried by oxen ploughing. Thus, the number of oxen signifies the state of wealth of the households to some extent.

Based on the 1987^{th} census survey, total population of the PA was estimated to be 4413 at 1992, of which 2140 are males and 2273 are females. Accordingly, the male to female ratio is about 106. On the other hand, the crude population density of the PA is 235 persons per km^2. Polygamy is an accepted type of marriage in the community.

With regard to essential services, the PA has no any type of services within the PA. The major sources of drinking water are ponds and river, both of which are unprotected. The major river is Wera, which touches the western tip of the PA.

5.1.4 Wogila Abera

It is one of the Upper Weina Dega sample PAs of the Wereda and located at about 18 kms to the East of Hossana. The total area of Wogila Abera is about 7.8 km^2 and its topography is dominated by gorges and rugged terrain. The PA is dependent on mixed farming. As to crop cultivation, Enset planting complex is the usual farming system in the PA. Even though Enset is the principal food crop, seed crops are produced for both consumption and earning of cash. Land preparation and sowing are both carried out by oxen ploughing in the PA. The number of oxen also signifies the state of wealth of the household to some extent.

Based on the 1987^{th} census survey, the total population of the PA was estimated to be 2540 in 1992, of which 1308 were males and 1232 were females. Accordingly, the male to female ratio is 94. On the other hand, the crude population-density of the PA is 326 persons per km^2.

With regard to essential services, the PA has got agricultural development place (DA place) and grinding mill within the PA. The major sources of drinking water are ponds and seasonal rivers, which are not protected. There is no permanent river flowing the whole year in the PA.

5.1.5 Biramora Kemo

Biramora Kemo is one of the Lower Weina Dega sample PAs of the Wereda and located at about 40 kms to the North East of Hossana, along Hossana- Bonosha road. The total area of the PA is about 10.14 km^2, and its topography is dominated by flat plain with rolling terrain to the western part. The PA is dependent on mixed agriculture, crop cultivation and animal husbandry. As to crop cultivation, seed farming complex is the major type of farming system, and maize is the principal food crop. Now a days seed crops are produced for both consumption and earning of cash. Because the production of red pepper, the main cash crop in Lower Weina Dega is hindered by crop disease called 'Sirnekel' since a decade or two. Land preparation, sowing and inter- culturing are carried out by oxen ploughing in the PA. Number of oxen also signifies the state of wealth of the household to some extent.

Based on the 1987^{th} census survey, the total population of the PA was estimated to be 3974 in 1992, of which 1991 are males and 1983 are females. Accordingly, the male to female ratio is almost 100. On the other hand, the crude population-density of the PA is 392 persons per km^2.

With regard to essential services, the PA has got only agricultural development place (DA place) with in the PA. The major source of drinking water is river followed by unprotected springs. The permanent rivers are Ougatie and Wera.

Flooding and water logging are the permanent types of hazards affecting the PA every year since 1971. And selling livestock has become the regular style of life now a days in the PA so as to cope up with problems resulting from flooding.

5.1.6 Mololliche

It is one of the three Lower Weina Dega sample PAs of the Wereda and located at the foot slope of Lisana escarpment, at distance of about 20 kms to the East of Hossana. The total area of the PA is about 9.37 km^2 and the topography is dominated by flat plain with rolling terrain to the western part. The PA is dependent on mixed agriculture-crop cultivation and animal husbandry. As to crop cultivation, seed farming complex is the major type of farming system and maize is the dominant food crop. Now a day, seed crops are produced for both consumption and earning of cash. Because of crop disease called 'Sirnekel' since a decade or two the production of red- pepper, the main cash crop is deteriorating in the PA. Land preparation, sowing and interculturing are carried out by Oxen- ploughing in the PA. Thus, the number of oxen also signifies the state of wealth of the household to some extent.

Based on the 1987th census survey, the total population of the PA was estimated to be 2440 at 1992, of which 1249 are males and 1191 are females. Accordingly, the male to female ratio is 95. On the other hand, the crude population density of the PA is about 260 persons per km^2

With regard to essential services, the PA has got only one primary school within the PA. The major sources of drinking water are spring and river, both of which are unprotected. The permanent river flowing across the PA is Guder. Flooding and water logging problems are the prominent types of disasters affecting the PA every year since 1971. For crop production is damaged by flooding and water logging problems, selling livestock as a source of income has become the regular style of life now a day.

5.1.7 Shamsa Misie

It is one of the Lower Weina Dega sample PAs and located at the eastern tip of the Wereda. The total area of the PA is about 11.70 km^2 and its topography is dominated by rolling to flat plains. Shamsa Misie is dependent on mixed agriculture- crop cultivation and animal husbandry. As to crop cultivation, seed farming complex is the major type of farming system and maize is the principal food crop. Now a days seed crops are produced for both consumption and earning of cash. Similar to the other lower weina dega PAs its cash source is highly deteriorated due to crop disease called 'Sirnekel' known to affect red pepper significantly since a decade or two. Land preparation, sowing and interculturing are carried out by Oxen ploughing in the PA. As a result, the number of oxen also signifies the state of wealth of the household to some extent.

Based on the 1987th census survey, the total population of the PA was estimated to be 3129 in 1992, of which 1555 are males and 1574 are females. Accordingly the male to female ratio is about 101. Polygamy is an accepted type of marriage in the PA. On the other hand, the crude population-density of the PA is 267 persons per km^2.

With regard to essential services, the PA has got only one primary school within the PA. The major sources of drinking water are ponds and river. The permanent river flowing near by the PA is Wera.

5.2 Analysis by Agroecological Zone and Wereda

5.2.1. Access to services and towns.

The level of accessibility to services are discussed based on the following ten essential services. These are health clinic or health post, veterinary clinic, agricultural development place /DA/, primary school, road transport, pharmacy/drug vendor/, weekly market, credit's service, adult literacy program and grinding mill. The level of accessibility to each of these services varry either with the presence of the service center/institution/ with in the PA or with the time spent to get the services available out side the PA. Giving 3,2 or 1 weights according to the level of importance of each service, the situation of accessibility to each of the essential services in each sample PA is presented in the following table.

Table 5.1: Level of Accessibility to Ten Essential Services by PA (Lemo 1992)

Type of Service	1	2	3	4	5	6	7	weight
Health clinic/post	1x3=3	1x3=3	1x3=3	1x3=3	1x3=3	1x3=3	1x3=3	3
Veterinary Clinic	0x3=0	1x3=3	0x3=0	1x3=3	0x3=0	1x3=3	0x3=0	3
Agricultural development/DA/ place	0x3=0	2x3=6	1x3=3	2x3=6	2x3=6	0x3=0	1x3=3	3
Primary School	2x2=4	2x2=4	1x2=2	2x2=4	1x2=2	2x2=4	2x2=4	2
Road/ Transport	1x2=2	2x2=4	1x2=2	1x2=2	1x2=2	0x2=0	1x2=2	2
Pharmacy /drug vendor	0x2=0	1x2=2	1x2=2	1x2=2	1x2=2	1x2=2	1x2=2	2
Weekly market place	1x1=1	1x1=1	0x1=0	1x1=1	1x1=1	1x1=1	1x1=1	1
Credit Service	0x1=0	2x2=4	0x1=0	0x1=0	0x1=0	0x1=0	0x1=0	1
Adult literacy program	0x1=0	0x1=0	0x1=0	0x1=0	0x1=0	0x1=0	0x1=0	1
Grinding mill	1x1=1	2x1=2	1x1=1	2x1=2	1x1=1	1x1=1	1x1=1	1
Total	11	27	13	22	17	14	16	
Rank of inaccessibility	1	7	2	6	5	3	4	

0= For services situated at distance of >2 hours walk (>1 hr walk for school)
1= " " " " " " $\leq$ 2 hours walk ($\leq$ 1 hr walk for school)
2= " " " in the PA.
Sources : KI in sample PAs of Lemo Wereda

As to the presence of the service centers within the PA, the Dega and Lower Weina Dega sample PAs have equal number of service centers only one in each PA regardless of the type. Where as the Upper Weina Dega sample PAs have the polar figures. Shesha Gimba PA does not have any type of essential service center, where as, Ambicho Godie has 5 centers. But Wogila Abera has 3 centers. The average of this AEZ is more than 2 essential service centers per PA. Thus one can say that, the Upper Weina Dega sample PAs are relatively more accessible to essential services than the Dega and Lower Weina Dega sample PAs. This is also seen on the results of ranking of the sample PAs according to the weighted indicators in table 5.1 given above where the two PAs of the Upper Weina Dega AEZ ranked last for the degree of inaccessibility. According to the rank based on the weighted indicators, Anfar is the most inaccessible sample PA to essential services. The second most inaccessible one is Shesha Gimba, one of the sample PAs in

Upper Weina Dega AEZ. With regard to accessibility to urban centers, except Wogila Abera, all the sample PAs are located with in two hours one way walking distance.

5.2.2. Agricultural Extension Coverage.

The new agricultural extension package was introduced to Lemo Wereda in 1987. Thus, the package was emerged as soon as it was designed as a national program. Compared to its age, the coverage is still very low in the Wereda. There are some PAs, where the implementation of the new agricultural extension package is not started yet. Even two of the sample PAs, Anfar and Mololliche, do not have households involved in it, however, the reasons behind do vary between Anfar and Mololliche. In Anfar, the new agricultural extension package itself is not introduced yet. Where as in Mololliche it is because of flooding and water logging problem that the community did not involve. If involved, the crop might have been destroyed by flooding and water logging risk and levy the debt of modern agricultural inputs on the shoulder of participating households with out any return from it. With regard to willingness to participate in it, communities of the Wereda are willing. However, as indicated in the following table in the Upper Weina Dega sample PAs, the involvement in the new agricultural extension program is better in both terms of land area coverage and households' involvement than other two AEZs sample PAs.

Here, the percentage proportion of both households involved and land area covered has been increasing from year to year. The data on households' involvement of Ambicho Godie PA for the year 1990/91 is not indicated in the table because it does not seem appropriate due to double counting.

According to the WAO of Lemo, more emphasis is given to cereals and the package is relatively more fruitful in Wheat than other crops. The major reason behind better participation in Upper Weina Dega part is their heavy dependence on Wheat crop both for earning of cash and satisfying households' consumption need.

Table 5.2: Percentage of Households Involved and Food Crop Area covered in the New Extension Program- (Lemo 1992)

AEZ	Sample PA	% of Households involved			% of food crop area covered		
		1988/89	1989/90	1990/91	1988/89	1989/90	1990/91
Dega	Anfar	-	-	-	-	-	-
	Dega Average	-	-	-	-	-	-
Upper weina Dega	Ambicho Godie	ND	29.2	O	ND	40.1	65.8
	Shesha Gimba	0.42	0.63	2.60	2.08	3.08	13.36
	Wogila Abera	ND	34.75	22.86	ND	8.68	5.71
	U/W/Dega Average	**0.42**	**21.53**	**12.73**	**2.08**	**17.27**	**28.29**
Lower weina Dega	Biramora Kemo	ND	ND	20.0	ND	ND	8.18
	Mololliche	-	-	-	-	-	-
	Shemsa Misie	ND	ND	ND	ND	ND	ND
	L/W/Dega Averag	**ND**	**ND**	**10.0**	**ND**	**ND**	**4.09**

ND: No Data available O: The data is not of appropriate type.

Source: KIs in the Sample PAs of the Wereda.

5.2.3. Water Supply

The key informants in the sample PAs of the Wereda have responded on the situations of drinking water supply in each community. They have estimated the proportion of the community in each PA accessible to potable water, the time spent to fetch water in dry season and changes in water supply and/or quality over time. The mean values are taken to estimate proportion of the community accessible to clean drinking water, and the median values are taken from the perceptions of the key informants to represent the time spent to fetch water during dry season in the respective sample PA. Changes in water supply and/or quality are assessed using the modal responses in each sample PA. Then, the AEZ's averages are calculated for the purpose of comparison. Accordingly, the Upper Weina Dega sample PAs are more accessible than the other two AEZ sample PAs, even though, the supply is rudimentary here. The detail is given in the table 5.3 below.

Table 5.3: Status of water supply -(Lemo 1992)

PA/AEZ	Proportion of the community accessible to clean drinking water	Minutes spent to fetch water in dry season	Changes in water supply/quality	Reason for improvement/deterioration/staying the same
Anfar	O	180	Stayed the same	
Dega	**O**	**180**	**Stayed the same**	
Ambicho Godie	0.5 %	120	Deteriorated	-Ponds dry early at dry season
Shesha-Gimba	O	240	Deteriorated	Ponds drying up early at dry season
Wogila-Abera	12.50%	120	Deteriorated	Ponds and springs drying up early at dry season
Upper Weina-Dega	**3.0**	**180**	**Deteriorated**	
Biramora-Kemo	O	60	Stayed the same	
Mololliche	O	20	Stayed the same	
Shamsa-Misie	O	120	Stayed the same	
Lower Weina-Dega	**O**	**48**	**Stayed the same**	

Source:- KIs in the sample PAs of the Wereda.

As can be seen from the above table, the situation in water supply and/or quality is staying the same in Dega and Lower Weina Dega sample PAs. But in Upper Weina Dega sample PAs, it has been deteriorating because the ponds and springs are drying up early

at dry season now a day. The community is suffering to fetch water even from the unclean sources.

5.2.4. Primary School Drop Out and Wastage

Due to lack of data, we are forced to analyze school drop out and wastage in primary schools for boys and girls using 1991 and 1992 data. Wastage is calculated by comparing those entered grade 1 in 1991 with those completed grade 4 the same year. We are unable to show the trend for we have only one year's data. However, the major reasons for dropouts are given in table 5.4 below.

Table 5.4: Reasons for primary school dropouts by AEZ- Lemo /1992/

AEZ	Reason for dropouts in Boys	Reasons for dropouts in Girls
Dega	- Low level of family income	- Negative attitude of the community to wards girls' education. - Marriage before completing primary school.
Upper Weina Dega	- Low level of family income - Lack of awareness about the benefits of education	- Low level of family income - Lack of awareness about the benefits of education - Fear of abduction - Family enforcement towards early marriage
Lower Weina Dega	- Circumcision during regular education program/time/ - Inadequacy (shortage) of teachers - Over crowdness in a class room - Shortage of school furniture - Low level of family income - Sickness problem of the family.	- Circumcision during regular education program /time/ - Early marriage - Inadequacy of teachers - Over crowdness in a class room - Shortage of school furniture - Low level of family income - Sickness problem of the family. - Fear of abduction - Negative attitude of the community towards girls' education.

Source:- KIs in the sample PAs of the Wereda.

Due to these and other reasons the school dropouts and wastage rates in primary schools for both sexes are calculated for the sample PAs of the Wereda and indicated in Table 5.5 below. Wastage rates of primary schools are increasing from Dega to Upper Weina Dega and from Upper Weina Dega to Lower Weina Dega for boys. But the Dega and Lower Weina Dega are equal and greater than Upper Weina Dega for girls. When primary school dropout out rate is considered, it is increasing following the decrease in elevation for boys and the reverse for girls, i.e. it is decreasing.

Table 5.5 Primary School Dropout and wastage- Lemo /1992/

AEZ	Sample PA	Primary school Drop out in		Primary school wastage /Grade 1-4/	
		Boys	Girls	Boys	Girls
Dega	Anfar	-	34%	50%	84%
	Dega average	**-**	**34%**	**50%**	**84%**
Upper Weina Dega	Anbicho Godie	36%	47%	46%	65%
	Shesha -Gimba	17%	33%	73%	79%
	Wogila Abera	22	-	73%	93
	Upper/Weina Dega	**24%**	**26%**	**67%**	**76%**
Lower Wina Dega	Biramora Kemo	37%	22%	72%	86%
	Mololliche	New	New	New	New
	Shemsa Misie	72%	-	87%	80%
	Lower W/Dega	**57%**	**10%**	**81%**	**84%**

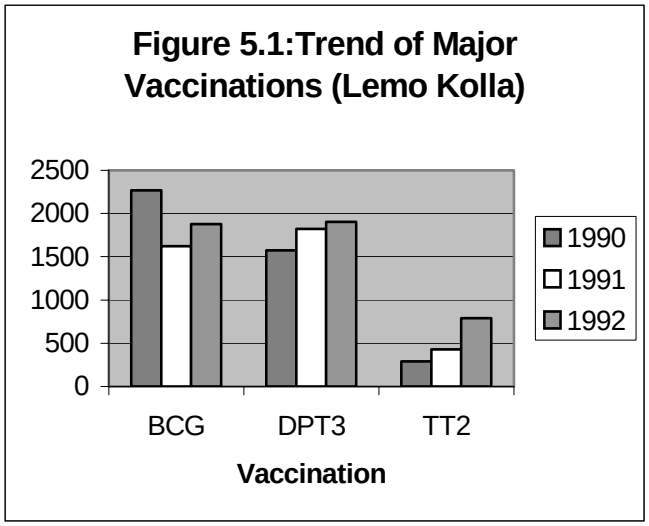
- : - Numerator is greater than the Denominator.

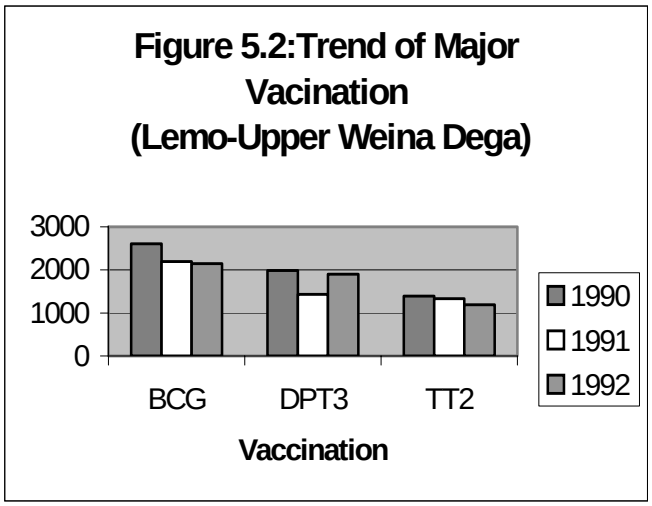
Source :- KIs in the seven sample PAs of the Wereda.

5.2.5. Vaccination Coverage/Immunization Status.

With regard to vaccination, TT_2 for pregnant women and BCG and DPT_3 for children under 1 year are given attention. We tried to present the status of antenatal care and child immunization in the Wereda by using the nationally applied 3 % and 2.65 % of the total population to get the target population of pregnant women and children under 1 year, respectively. Then, the proportion of pregnant women received TT_2 and children with BCG and DPT_3 are used to assess status of antenatal care and child immunization services respectively. However, the calculated proportions were found more than 100 % for some PAs. As a result, we are forced to apply numerator analysis by using the total number of pregnant women with TT_2 and children received BCG and DPT_3 vaccination, for the data which we used the catchment analysis approach. By catchment analysis we mean including the data of all PAs served by each health institute at which the sample PAs are also served in receiving the services from.

As presented in the following charts, both TT_2 and BCG services were found deteriorating in Upper Weina Dega part from year to year, where as, TT_2 and DPT_3 services were found improving in Lower Weina Dega part. The Dega part of the Wereda, including the sample PA, Anfar was not closed under health institutes until 1991, for there was no health institute at the vicinity. But since 1992 two health posts have become operational.





Figures 5.1 and 5.2 Trend of Major Vaccinations (Lemo Kolla and Upper Weina Dega)

Source: Wereda Health Office

5.2.6. Land Holding

Land is the basic resource on which livelihood of the local community heavily depends. Community's perception of land holding size is discussed by using proportion of households perceived to have large, medium, small and very small land holding in various AEZs of the Wereda. Mean value is taken to analyze proportion of households across different land holding categories, where as the medium value is used to assess how they perceive the site of landholding under various categories.

As shown in the following table, the perception of Land holding size to be small and very small are similar in all AEZs of the Wereda. Moreover, the Land holding size perceived as large is similar in Dega and Lower Weina Dega, where as medium is similar in Dega and Upper Weina Dega. But, the difference comes when the Crop Farming System is considered across each AEZ. In Dega AEZ, the major crop grown is enset. Here, enset is produced to cover almost all of the household's consumption need where as the seed crops are produced for the purpose of cash earning.

In Upper Weina Dega, the major crop farming system is also Enset Complex, supplemented by extensive seed crops production. Where as in Lower Weina Dega the sole farming system is the seed crop farming complex. Where seed crops are produced both for consumption and cash earning needs of a household. Accordingly the carrying capacity of land is somewhat better in areas where Enset planting complex is practiced than areas where the seed crops farming complex is practiced since the seed crop farming complex needs larger land holding size than the Enset planting complex. This means with equal land holding size the households practicing seed crop farming complex type of farming system will be more food insecure than the households practicing the Enset planting complex.

As perceived by the key informants, proportion of households perceived to be land less are 12.5 % in Dega 14.2% in Upper Weina Dega and 11.1 % in Lower Weina Dega AEZ on average. Besides, about 75.5 % in Dega, 45 % in Upper Weina Dega and 53 % in Lower Weina Dega of the respective total households are perceived to hold either small or very small category of land holding size. In Dega AEZ sample PAs no households are perceived to hold land size which is categorized to be large. Where as in Upper Weina Dega 14.5 % and in Lower Weina Dega 11.7 % of the total households are perceived to hold land size under large category. As to the proportion of households with medium land holding size category, the Upper and Lower Weina Dega AEZs are more or less similar where as the Dega one is considerably less than the rest two AEZs. Details are given in table 5.6

Table 5.6: Perception of Land Holding Size by Agro-Ecology- Lemo /1992/

PA/AEZ	Land Holding Site/Ha/				Proportion of households				
	Large	Medium	Small	v. small	Large	Medium	Small	V. small	Land less
Anfar	2.0	1.0	0.5	0.3	0	15.0	47.5	25.0	15.5
Dega AEZ	**2.0**	**1.0**	**0.5**	**0.3**	**0**	**15.0**	**47.5**	**25.0**	**12.5**
Ambecho Godie	1.5	0.9	0.5	0.3	13.0	39.4	23.4	8.2	16.1
Shesha Gimba	1.6	1.0	0.5	0.3	14.0	28. 0	30.0	18.0	10. 0
Wogila Abera	1.5	1.3	0.8	0.3	16.1	7.0	18.3	42.3	16.3
Upper Weina Dega	**1.5**	**1.0**	**0.5**	**0.3**	**14.5**	**25.6**	**23.8**	**22.1**	**14.2**
Beramora Kemo	2.0	1.3	0.5	0.3	13.7	30.0	22.5	21.9	11.9
Mololliche	2.0	1.3	0.5	0.3	15.3	20.4	37.7	20.9	5.7
Shemsa Misie	2.1	1.6	0.7	0.3	5.0	21.6	34.7	23.6	16.6
Lower weina Dega	**2.0**	**1.3**	**0.5**	**0.3**	**11.7**	**24.4**	**31.0**	22.0	11.1
Wereda average	**1.8**	**1.1**	**0.5**	**0.3**	**8.7**	**21.7**	**34.1**	**23.0**	**12.6**

Source: KIs in the sample PAs of the Wereda.

5.2.7. Wealth Ranking

According to the data collected from Key Informants in the sample PAs of the Wereda, the bases of characterizing wealth status are the size of land holding, the number of Oxen, cattle, Sheep/Goats, Donkeys, Equine/Horse/ Mule, the amount of cash, the number of beehives, the size of land with Enset and other perennial crops or plantation, attitude towards hard working habits and involvement in business activities in general. In categorizing the status of wealth, the size of ownership of these assets varry with AEZ. The comparison is given in table 5.7 below.

Table 5.7: Characteristics of wealth Ranking by Agro-Ecology –Lemo/1992/

Types of possessions	Dega				Upper Weina Dega				Lower Weina Dega			
	Wealthy	**Middle**	**Poor**	**v. poor**	**wealthy**	**Middle**	**Poor**	**v. poor**	**wealthy**	**Middle**	**Poor**	**v. poor**
Land holding size in Ha	≥1	0.75	0.50	No or very little size	≥1.5	1	1	0-0.25	≥ 2	1	0.5-1	0.25-0.5
Oxen	NS	NS	NS	NS	2	1	1	0	≥ 4	2	0	0
Cattle	5	2-3	≤ 2	0	≥ 10	4	1	0	40	15-20	2-4	0
Sheep/Goat	NS	NS	NS	NS	NS	NS	NS	NS	20	10	4	2
Donkey	NS	NS	NS	NS	2	1	0	Rarely 1	1	1	0	0
Equine/ Horse/Mule	NS	NS	NS	NS	1	0	0	0	1	1	0	0
Cash/Birr	NS	NS	NS	Ns	≥1000	500	50	0	1000	0	0	0
Beehives	NS	NS	NS	NS	NS	NS	Ns	NS	5-10	2-3	0	0
Enset and other perennial crops plantation	Enough size	Mediu m size	Little size	Almost none	0.125 ha	0.0625 ha	Very little or no	0	NS	NS	NS	NS
Hard working attitude	NS	NS	NS	NS	NS	NS	NS	NS	Good	Medium	Poor	Poor
Business in general	Able to conduct at urban centers	Able but petty trade	Unabl e	Unable	NS	NS	NS	NS	Ns	NS	NS	NS

NS = Not stated as a characteristics of wealth ranking

Source: KI s in the sample PAs of the Wereda.

As indicated in table 5.7 above, various wealth classes are differentiated in the three AEZs of the Wereda, especially with regard to oxen and cattle ownership. For instance ownership status of Oxen does not signify any sort of wealth status in Dega. Where as a household with 2 Oxen is considered wealthy in Upper Weina Dega but middle in Lower Weina Dega AEZ. Similarly larger number of livestock per household is stated to characterize various wealth classes in Lower Weina Dega than other two AEZs.

Based on the data collected from each key informant the mean ratio of each wealth class for each sample PA is calculated to formulate the mean ratios of each wealth class for the respective AEZs and the Wereda. The detail is given in the following table.

Table 5.8: Proportion of Households under Various Wealth Strata-Lemo /1992/

PA/AEZ	Wealthy	Middle	Poor	Very Poor
Anfar	6	16	52	26
Dega	**6**	**16**	**52**	**26**
Ambicho Godie	18	23	24	36
Shesha-Gimba	13	22	29	36
Wogila-Abera	7	18	33	43
Upper Weina-Dega	**13**	**21**	**29**	**39**
Biramora-Kemo	14	27	24	35
Mololliche	14	33	31	22
Shamsa-Misie	12	29	33	26
Lower Weina-Dega	**14**	**28**	**29**	**28**
Wereda average	**12**	**24**	**32**	**32**

Source:- KIs in the sample PAs of the Wereda.

As shown in the above table, proportion of households considered wealthy, middle and very poor are slightly higher in Upper and Lower Weina Dega than in Dega. Where as proportion of households considered Poor are considerably higher in Dega than the other two AEZs. Any how presence of 78 %, 68 %, and 57 % very poor and poor population in Dega, Upper Weina Dega and Lower Weina Dega respectively reveals that the wereda's inhabitants are suffering from severe poverty. These very poor and poor population were found mainly dependent on labor sale, temporary out migration, share cropping, petty trade and rearing of animals for share in attempting to withstand the challenges of life.

5.2.8. Nutritional Perception

Based on the data collected from each KI, the median value of each category of nutritional perception was taken to represent each PA in order to avoid the problems of extreme values in perceptions. Then, the meanses are calculated for the respective AEZs and the Wereda to facilitate bases for comparisons.

Table 5.9: Perceived Nutritional status -Lemo /1992/

PA/AEZ	Proportion of children perceived very short	Proportion of mothers perceived very thin	Proportion of population perceived Malnourished
Anfar	83	78	88
Dega Average	**83**	**78**	**88**
Ambicho Godie	66	66	75
Shesha-Gimba	75	75	75
Wogila-Abera	71	78	90
Upper Weina-Dega Average	**75**	**75**	**75**
Biramora-Kemo	66	75	70
Mololliche	50	70	75
Shamsa-Misie	50	70	75
Lower Weina-Dega Average	**50**	**70**	**75**
Wereda Average	**75**	**75**	**75**

Source - KIs in the sample PAs of the Wereda

As indicated in the above table, the Wereda averages were calculated to be 75 %, 75 % and 75 % for children very short by the age of 5 years, mothers very thin and malnourished population respectively. Even though perception can be highly subjective, the above figures show that majority of the inhabitants are suffering from nutritional deficiency. With regard to agro-ecological differences, proportions of malnourished children by the age of 5 years were found greater in dega part than the other two AEZs and the Wereda average. But no big difference was observed concerning proportion of mothers very thin.

The above mentioned high level of malnutrition is partly related to shortage of food for considerable time each year and poor feeding habits in the area. For instance, it was reported by the Key Informants of all the sample PAs that children are fed the same type of food as the adults do. The usual type of food that community feeds on are “Kita”/local bread baked from maize, or sorghum or mixture of sorghum and wheat/or “Kocho” with cabbage or coffee. Thus, the most frequently consumed meal types are dominated by carbohydrate.

The roasted grains with coffee are consumed as regular breakfast even during the normal time. Thus, a frequency of three meals a day is including this as a third meal. Meal frequencies during lean and normal time and months of critical food shortages are presented in the following table. As indicated in this table, months of critical food shortage vary with AEZs - sharing some months in common. In Dega AEZ, the months of critical food shortage lasts from June to November, in Upper Weina Dega it lasts from April to September and in Lower Weina Dega it lasts from March to September. As a result the whole Wereda faces critical food shortage in the months from may to September. Thus, period of critical food shortage coincides with time of heavy labor requirement for the farming community in the Wereda. As far as the number of meals per day is considered, it is more or less the same in all the sample PAs.

Table 5.10: Months of Critical Food Shortage and Meal Frequencies During Normal and Lean Months by AEZ -Lemo /1992/.

PA/AEZ	Months of critical food shortage	Meal frequency during normal time	Meal frequency during lean time
Anfar	June-November	3	2
Dega Average	**June-November**	**3**	**2**
Ambicho Godie	May -September	3	2
Shesha-Gimba	March-September	3	1
Wogila-Abera	April-September	2	1
Upper Weina-Dega average	**April -September**	**3**	**1**
Biramora-Kemo	April-August	2	1
Mololliche	March-August	3	1
Shamsa-Misie	March-September	3	1
Lower Weina-Dega average	**March-September**	**3**	**1**
Wereda average	**May-September**	**3**	**1**

Source:- KIs in the sample PAs of the Wereda.

As shown in the above table, the length of months with critical food shortage is a bit longer in Lower Weina-Daga than the other two AEZs. In Lower Weina Dega, it is about seven months in the year. Whereas in the rest two AEZs it is about six months in the year. Even though, the third time meal is limited to be coffee and roasted grain only, in all the sample PAs except Wogila Abera and Biramora-kemo, the people do eat food three times per day during normal time. But at lean time in all the sample PAs except Anfar (Dega sample PA), the meal frequency is only once per day, which is limited to be kita/kocho with cabbage or coffee regardless of its amount.

5.2.9. Women's Status and Gender

According to the key informants in the sample PAs of the Wereda, the women's workload is harder in comparison to men's. And women do work for longer hours than men. Even though the women's work load is harder and the working hour is longer as compared to men's, majority of the KIs in all the sample PAs agreed that the situation of women has been improved now as compared to the time of parents generation.

Major reasons stated by the majority of KIs in the sample PAs of the Wereda for the improvements in women's situation compared to parents' generation include better access to education, better access to health services, better marriage arrangements, awareness of own rights by women, better understanding by their husbands, religious and cultural changes and better access to water and grinding mill services. Major reasons stated by the key informants regarding improved women's situation compared to parents' time are summarized in the following table

Table 5.11: Major reasons for improvements of women's situation by AEZ (Lemo 1992)

Major reason for improvement in women's situation	Lower Weina Dega	Upper Weina Dega	Dega
Better access to education	3	3	3
Better access to heath services	3	3	5
Better marriage arrangement	3	3	3
Awareness grown rights	3	3	3
Better understanding by their husbands	3	3	5
Religious and cultural changes	3	5	5
Better access to water and grinding mill	3	5	3

3Represents that majority of responded KIs have agreed with the reason to be an expression for the improvement of women's situation compared to the parents' generation.

5 Represents that the majority of responded KIs have not agreed with the reason to be an expression for the improvement of women's situation.

Source: KIs in the sample PAs of the Wereda.

Concerning major problems that usually confront the whole community like poverty, access to income generating activities, quality and amount of food eaten, frequency of illness and malnutrition, attention to health care, chances for education and training and attitude during marriage and divorce are considered; the Wereda's cumulative modal responses of the KIs perception show that more than 60 % of the responded KIs agreed that women are more disadvantaged than men. Anyhow, the KIs are stated that even though the situation does not show complete balance, men and women do share the land holding and other assets of the household at the time of divorce. And also there is slight improvement during marriage arrangement now a day. The details are given in the table 5.12 below.

Table 5.12: Proportion of KIs perceived how women are disadvantaged in comparison to men by AEZ- Lemo 1992

	Reasons for how women are disadvantage as compared to men	Proportion of responded KIs agreed with the reason.			
		L/Weina dega	Upper weina Dega	Dega	Wereda Cumulative
1	Limited access to resources	76.5	84.2	100.0	82.9
2	Less access to income generating activities	76.5	78.9	60.0	75.6
3	Low quality and amount of food eaten	64.7	73.7	80.0	70.7
4	Frequent illness and more malnutrition	58.8	68.4	60.0	63.4
5	Less attention to women's health care	52.9	78.9	60.0	65.9
6	Less chance for education and training	76.5	89.5	80.0	82.9
7	Less favored during marriage and divorce.	47.1	73.7	80.0	63.4

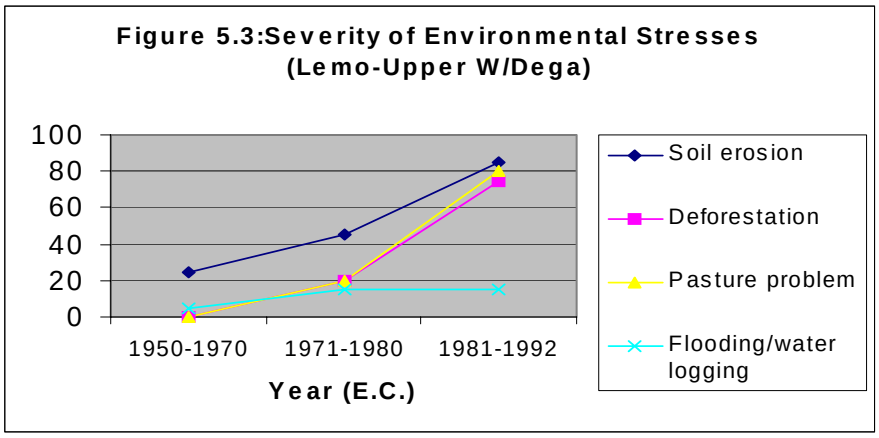
Source: IKs in the sample PAs of the Wereda.

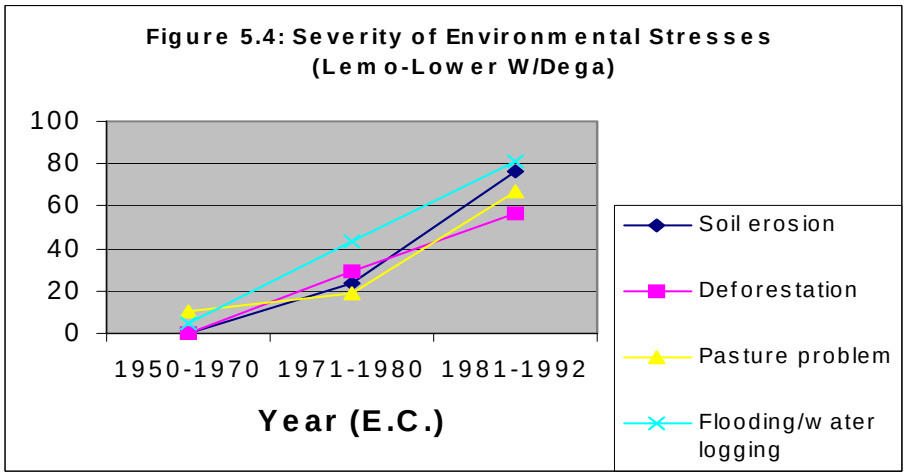
5.2.10. Environmental Stress

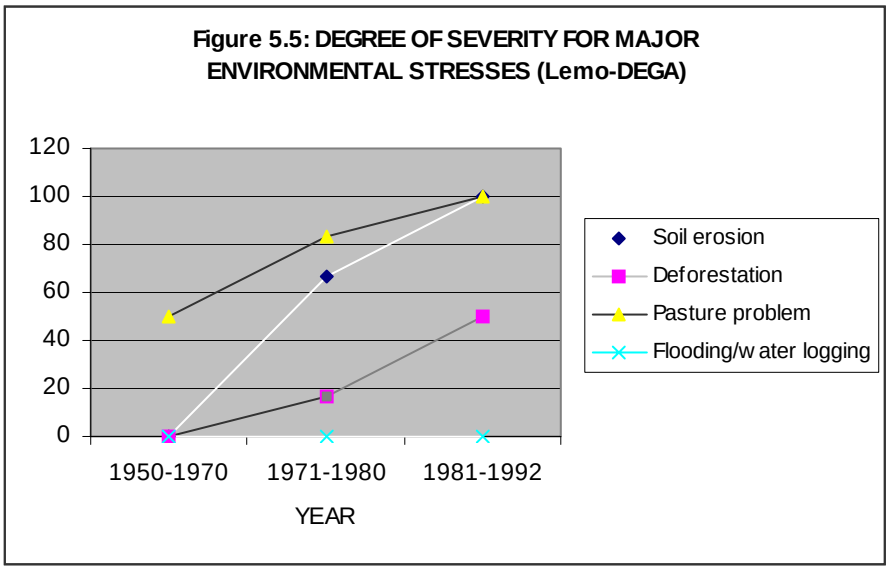
The natural resources such as Soil, Water, and Vegetation are the basic ones on which the agricultural community heavily depends. The occurrence of stress on one of the above also affect others. The Key Informants were asked to compare condition of environmental stress during three periods, namely during Haile Silassie, Dergue and from 1980's to the present. Majority of them agreed on that the rates of soil erosion, deforestation and pasture problem have continuously been increasing in all the AEZs of the Wereda.

The rate of flooding and water logging problem has also been continuously increasing starting Haile Silassie’s time. The increase in human population is the front line reason for this. Most of them also agreed that, it is now almost impossible to grow crops with out chemical fertilizer. In fact the degree of seriousness of the problems of soil erosion, deforestation, pasture problem, and flooding and water logging is increasing since Haile Silassie's time. The details are shown in the following charts.

Figures 5.3-5.5: Trend of Environmental Stresses by AEZ







Source: KIs in the Sample PA Source: KIs in the Sample PAs.

Besides this, the major environmental problems, causes behind the problems, the degree of severity and measures taken to minimize the problems for the period of 1980's to present are summarized in the following table. The modal values of the responses are taken to represent the degree of severity

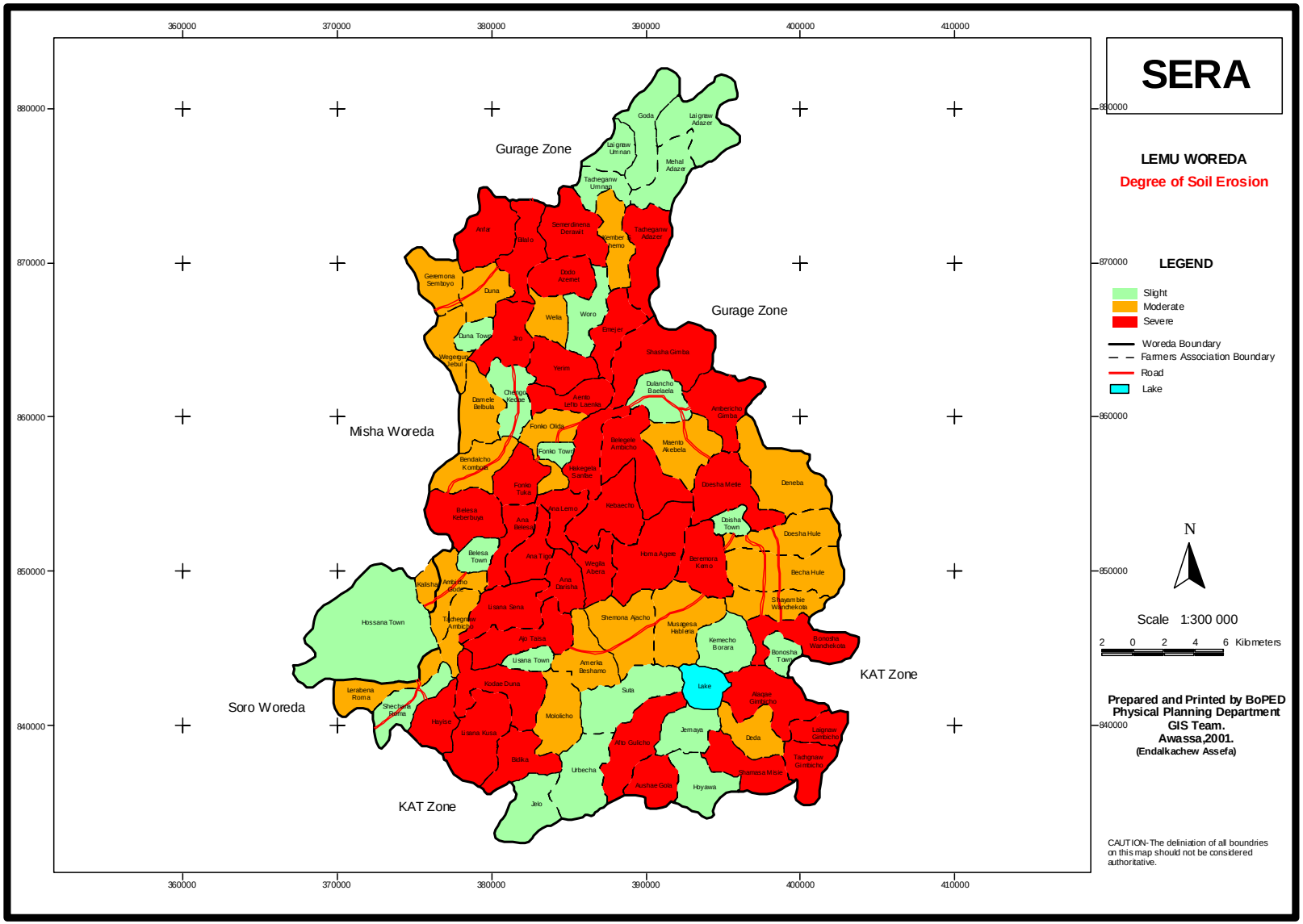
Table 5.13: Status of Environmental Stress 1980's to Present (Lemo 1992)

AEZ	Major Environmental problem	Major Causes	Degree of severity	Measures taken
Dega	Soil erosion	- Steep slope - Intensive rain - Over cultivation	High	- Terracing - Construction of diversion canals
	Deforestation	- Expansion of Cultivation land. - High demand for fuel wood - Construction of residential houses	High	- Planting trees
	Pasture problem	- High livestock density/shortage of land - Increasing demand for crop land	High	- Reducing livestock number/forced to/
Upper Weina Dega	Soil erosion	- Steep slope - Intensive rain - Over cultivation - Deforestation - Over grating - Declining conservation works - Cultivating degraded lands along the mouth of rivers/foot slopes.	High	- Terracing - Afforestation
	Deforestation	- Expansion of cultivation land - High demand for fuel wood - Construction of residential houses - To avoid wild animals ' attack - -Lack of protection for community forests.	High	- Aforestation - Planting trees - Legal protection to community forests resources
	Pasture problems	- High livestock density/shortage of land - Competition of eucalyptus for grazing land - Increasing demand for crop land - Settlement of X-government military members.	High	- Reducing livestock number - Using Enset plants and its residual as feed resources, i.e; stall- feeding.
	Water logging	- Flat topography - Heavy clay soil - Heavy rain	Moderate	- Cut off drain - Shifting crop growing season.

AEZ	Major Environmental problem	Major Causes	Degree of severity	Measures taken
Lower Weina Dega	Soil erosion	- Over cultivation - Deforestation	High	- Terracing - Construction of diversion canals - Afforestation - Construction of dikes
	Deforestation	- Expansion of cultivation land - High demand for fuel wood - Construction of residential houses	High	- Aforestation - Planting trees
	Pasture problems	- Marshes/ wet land - Increasing demand for crop land	High	- Reducing livestock number - Limiting the expansion of cultivation land against pasture land.
	Water logging	- Flat topography - Closed old water way by silt. - Flooding/over flowing of Wera river	High	- Construction of canals /Cut of drain/ - Construction of dikes.

Source: KIs in the sample PAs of the Wereda.

Figure 5.13 Map Showing Degree of Soil Erosion



5.2.11. Disaster History

According to the key informants in the sample PAs of the Wereda, the types of disasters that have been occurring in the Wereda since 1960s are drought, epidemics, flooding, water logging, hail, wind storms, and crop pests and diseases. The times of occurrence, area coverage and the degree of severity of each type of disaster varies from place to place. But, for the analysis, the modal years when the disasters are reported to have been occurring with high degree of severity are considered. Each type of disaster has got similarity in other aspects of their effects in both AEZs.

Drought

Majority of the inhabitants in each of the sample PAs were affected by the occurrence of drought. The occurrence of drought by the community is perceived when 'Belg' and /or 'Meher' rains delay or the Meher rains dry up earlier. In fact heavy rain during harvest of Meher crops was also found to significantly lower the volume of production as well as the quality. Though all are affected by the incidence of drought, children, mothers and old age were more affected by its impact. Besides, the poor without any reserved assets were highly affected by drought. All parts of the PAs were reported to have been affected equally.

Epidemics

Epidemics were reported to have been occurring in all sampled PAs of the Wereda since 1960's. The key informants also revealed that malaria and typhoid were the most frequently occurring diseases at epidemic level. Children, old age, pregnant woman, and mothers were reported to have been highly affected. Besides, the poor with out any reserved asset were also among the highly affected group. Flat plains with occasionally stored water and over crowded settlements with poor environmental sanitation have been among the major causes for the frequent out breaks of epidemics. Besides, the months following the rainy season were also most known for the out break of most epidemics.

Hail-storm, Crop Pests and Diseases

They were also reported to have been affecting the communities' livelihood frequently in upper and Lower Weina- Dega AEZs. The risks of crop pests and diseases were also reported to have been occurred in the years 1967 and 1990 in Dega sample PA. As to the types of crop pests and diseases, the most known ones are ' Alloya' and ' 'Sirnekel' by their local names. 'Alloya' is the type of crop disease affecting Enset plant, which is the staple crop in Upper Weina Dega and Dega AEZs. Where as 'Sirnekel' is the type of crop disease mostly affecting red pepper which is prominent cash crop in Lower Weina Dega AEZ.

Flooding and water logging

These problems were reported to had been affecting about one quarter of the communities residing in each of the Upper Weina-Dega sample PAs in the years 1974,1989, and 1990. On the other hand, especially flooding has been affecting Lower Weina Dega sample PAs every year since 1971. The major reasons behind flooding and water logging in the PAs of Upper Weina Dega are flat topography and heavy clay soil. Where as, in the Lower Weina Dega sample PAs, the major reasons are the overflowing

of Wera River, flat topography, closed old water ways of seasonal rivers and Guder River left its old route and establish and flow in others every year. Even though all are affected by the consequences of flooding, the less mobile group such as children, mothers and old age groups are highly affected. The times of occurrence by AEZ of these disasters are given in the following table.

Table 5.14: Types of disasters and times of occurrence by AEZ- Lemo /1992/

Type of Disaster	Time of occurrence in Dega sample PAs	Time of occurrence in Upper Weina Dega sample PAs	Time of occurrence in Lower Weina Dega sample PAs.
Drought	1960,1977,1985,1991	1965,1976,1977,1986, 1989,1991	1965,1966,1976,1977,1983,1984, 1985,1986,1987,1988, 1989,1990,1991
Epidemic	1986	1964,1969,1974,1976,1977, 1979,1981,1984,1985, 1986,1988,1989,1990, 1991	1964,1969,976,1978,1983-1991
Flooding and water logging	-	1974,1989,1990	Every year since 1971
Hail and wind storm	-	1969,1972,1989,1990, 1991	1961,1968,1974,1975,1976,1977, 1982,1983,1985,1986,1989,1990, 1991
Crop pests and diseases	1967,1990	1966,1974,1978,1980,1982, 1986,1988,1989,1990, 1991	1967,1975,1979-1991

Source: KIs in the sample PAs of the Wereda.

With regard to the three recent events of disaster, 1991 was most frequently mentioned to be associated with most of the disasters occurred in the Wereda. As far as the level of severity is considered drought, epidemics and flooding and water logging in the Lower Weina Dega, drought, epidemics and hailstorms in Upper Weina Dega and drought in Dega AEZ have been perceived to be more severe. The details are given in the table 5.15 below. Spatial distribution of flood hazard and degree of its severity are indicated in the following map.

Figure 5.14 Map showing degree of flood hazard by PA

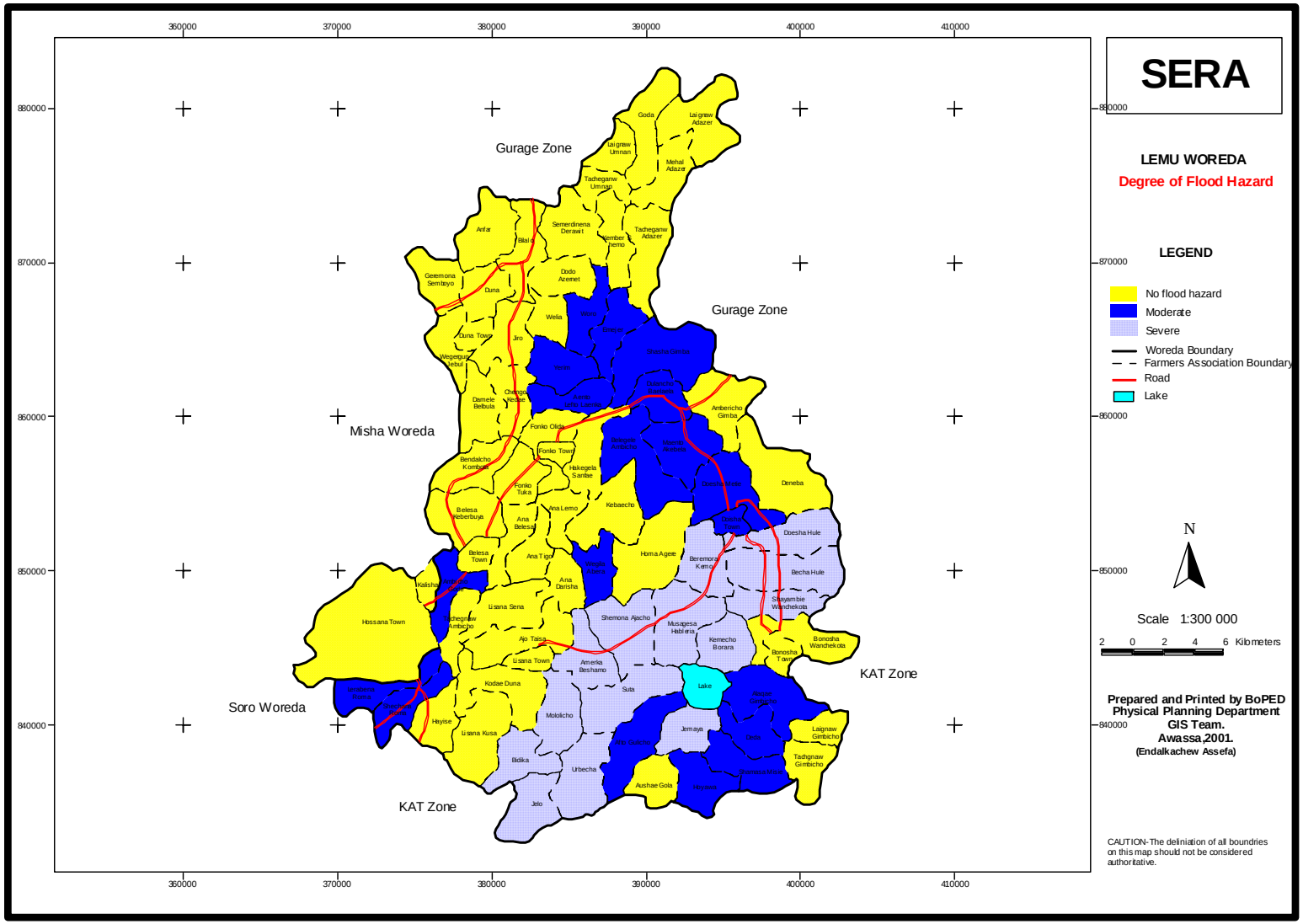


Table 5.15: Status of the three most recent disasters in -Lemo /1992/

Type of disaster	AEZ	PA	Years of most recent events	Level of severity				AEZ average
				Most remote	middle	Most recent	Total	
Drought	Dega	Anfar	1977,1985,1991	3	3	2	8	8
	Upper Weina Dega	Ambicho Godie	1977,1989,1991	3	2	3	8	8.3
		Shesha Gimba	1977,1986,1991	3	2	3	8	
		Wogila Abera	1977,1989,1991	3	3	3	9	
	Lower Weina Dega	Biramora Kemo	1977,1988,1991	3	3	3	9	9.0
		Mololliche	1977,1986,1991	3	3	3	9	
		Shemsa Misie	1989,1990,1991	3	3	3	9	
Epidemics	Dega	Anfar	1986,	0	0	3	3	3
	Upper weina Dega	Ambicho Godie	1989,1990,1991	3	3	3	9	8.0
		Shesha Gimba	1989,1990,1991	2	2	2	6	
		Wogila Abera	1986,1988,1989	3	3	3	9	
	Lower Weina Dega	Biramora Kemo	1989,1990,1991	3	3	3	9	9.0
		Mololliche	1989,1990,1991	3	3	3	9	
		Shemsa Misie	1987,1990,1991	3	3	3	9	
Flooding and water logging	Dega	Anfar	-	0	0	0	0	0
	Upper Weina Dega	Ambicho Godie	-	0	0	0	0	2.0
		Shesha Gimba	-	0	0	0	0	
		Wogila Abera	1974,1989	0	3	3	6	
	Lower Weina Dega	Biramora Kemo	1989,1990,1991	3	3	3	9	9.0
		Mololliche	1989,1990,1991	3	3	3	9	
		Shemsa Misie	1989,1990,1991	3	3	3	9	
Hail and wind	Dega	Anfar	-	0	0	0	0	0
	Upper Weina Dega	Ambicho Godie	1991	0	0	0	3	6.3
		Shesha Gimba	1989,1990,1991	3	3	3	7	

Type of disaster	AEZ	PA	Years of most recent events	Level of severity				AEZ average
				Most remote	middle	Most recent	Total	
storm		Wogila Abera	1969,1972,1990	3	3	3	9	
	Lower Weina Dega	Biramora Kemo	1983,1989,1991	2	3	3	8	8.3
		Mololliche	1986,1989,1990	3	3	3	9	
		Shemsa Misie	1989,1990,1991	2	3	3	8	
Crop pest and diseases	Dega	Anfar	1967,1990,	0	3	3	6	6
	Upper Weina Dega	Ambicho Godie	1978,1988 ,1990	3	2	3	8	7.0
		Shesha Gimba	1986,1989,1991	3	3	3	9	
		Wogila Abera	1980,1986,	0	2	2	4	
	Lower Weina Dega	Biramora Kemo	1988,1989,1991	3	2	2	8	8.7
		Mololliche	1988,1989,1991	3	3	3	9	
		Shemsa Misie	1989,1990,1991	3	3	3	9	

Source: KIs in the sample PAs of the Wereda

When change in over all resilience to disasters is considered as compared to parents' generation, it is deterioration to drought in all AEZ sampled PAs of the wereda. The stated reasons across AEZs are summarized in the table below.

Table 5.16: Reasons for Deteriorating Resilience to Drought/Famine By AEZ- Lemo (1992)

Stated reasons for deteriorated resilience to drought	Lower Weina dega	Upper weina dega	Dega
Low food production.	Yes	Yes	Yes
Lesser land resource per household.	-	Yes	Yes
Lesser livestock resource per household.	Yes	Yes	-
Poor drinking water resources.	Yes	Yes	-
Worse climatic change.	-	Yes	Yes
Poor physical environment.	-	Yes	Yes
Migration/Labor mobility.	-	Yes	-
Poverty in general.	Yes	Yes	Yes
Less copping strategies.	-	Yes	Yes
Less awareness to seek timely helps.	-	-	Yes
The impacts of villagization in the past.	Yes	Yes	-

Source: KIs in the sample PAs of the wereda.

As to the changes in over all resilience to epidemics is concerned, improvement in lower weina dega and deterioration in upper weina dega and dega AEZs are reported. The major reasons stated for how resilience to epidemics has been improving in lower weina dega AEZ include the following

- Better access to health service facilities,
- Better awareness,
- Less cultural/religious expenses,
- Better copping strategies, and
- Better supply of relief food aid.

Where as, in dega and upper weina dega AEZs the major reasons stated for how resilience to epidemics has been deteriorated as compared to parent's generation are summarized in table given below.

Table 5.17: Reasons for Deteriorated Resilience to Epidemics in Dega and Upper Weina Dega AEZs - Lemo (1992)

Stated reasons for deteriorated resilience to epidemics	**Upper weina dega**	**Dega**
Less awareness to seek timely help.	-	Yes
Worse copping strategies.	Yes	Yes
Impoverishment.	Yes	Yes
Limited out migration.	Yes	-
High cultural/religious expenses.	-	Yes
Poor environmental hygiene.	Yes	Yes
Poor access to road markets.	-	Yes
Poor education/awareness	Yes	Yes
Poor health services.	-	Yes
Poor drinking water resources.	Yes	Yes
Less food production.	Yes	Yes

Source: KIs in the sample PAs of the wereda.

With regard to coping strategies to these disasters, the KIs reported that there were some types of responses and coping strategies used to prevent the consequences of disasters at household and community levels. According to the KIs reports, some types of coping strategies such as borrowing cash and/or grain, labor sales depending on the better of and the like have been used in all the sample PAs of the Wereda. The details are given in the table 5.18 below.

Table 5.18: Coping Strategies used by the communities by AEZ- Lemo /1992/

AEZ	**By house holds**	**By community**
Dega	- Borrowing cash and /or grain - Depending on the better off - Reducing amount and/or frequency of meals	- Helping each other - Supply grain for the needy and orphans

AEZ	By house holds	By community
	- Labor sales - Planting trees - Construct cut of drain	
Upper weina Dega	- Borrowing cash and/or grain - Selling household asset - Renting out own land - Participate in petty trade - Labor sales. - Seasonal out migration - Depending on the better off especially relatives - Selling live stock	- Help each other through local self help organization Idir - Reporting to the government in time.
Lower weina Dega	- Borrowing cash and/ or grain - Participate in petty trade - Labor sales - Selling fuel wood - Depending on the better of especially relatives - Selling live stocks - Selling live stock products especially cheese and butter - Renting out own land - Grow drought resistant crops - Grow short maturing crops - Construct cut off drain	- Coordinate the distribution of medicines and preventive vaccines at time of incidence - Coordinate FFW programs - Ask the government and non governmental organizations for relief aid when stress occurs.

Source: KIs in the sample PAs of the Wereda

Besides the households and the communities, there are some formal and informal institutions which have been participating to help protection of the resource poor and highly vulnerable households in the wereda. The organizations participated on such affaires and their main disaster prevention and preparedness activities are given in the following table.

Table 5.19: Organizations participated on Disaster Prevention and Preparedness Activities by AEZ- Lemo /1992/

AEZ	Organization	Main disaster prevention and preparedness activities	Degree of effectiveness
Dega	Idir	- Support the victims family with cash and food - Construct residential houses upon incidence of fire.	High
	EECMY (South central synod)	- Relief food aid - Aid of clothing	Medium

AEZ	Organization	Main disaster prevention and preparedness activities	Degree of effectiveness
Upper Weina Dega	Government	- Relief food aid - Organized FFW Program	Medium
	Grain stocking association /wogila Abera PA)	- Free distribution of grain among the members - Lending food grains- charging interests on- to the non-members of the association.	Low
	Edir	- Support the victim's house hold with cash and food	High
Lower Weina Dega	Government	- Relief food aid - Organize FFW program - Oxen loan	Medium
	Idir	- Support the victim's house hold with cash and food	High

Source: KIs in the sample PAs of the Wereda.

Apart from these, the KIs have suggested the ways to improve the prevention and preparedness for these potential disasters in the future at household, community and level of local and external institutions. In addition to the KIs, the NGOs working among the communities were also asked to suggest ways of intervention to prevent the consequences of potential disasters. In case of Lemo Wereda, South Central Synod of the Ethiopian Evangelical Church Mekana Yesus /EECMY/ has suggested ways of intervention based on its best experiences. The South Central Synod of the Church has been working in the Wereda since long time and its program covers beyond half of the area of Lemo Wereda. The suggestions of South Central Synod have been incorporated to suggestions of the KIs and are summarized in the table 5.20 below.

Table 5.20: Suggested interventions to mitigate Vulnerability to Disasters at three Levels by AEZ- Lemo /1992/

AEZ	Type of disaster	At Household Level	At Community Level	At Institution's Level
Dega	Drought	- Promote hard working habits. - Promote culture of savings - Grow drought resistant crops(Enset) - Planting trees - Diversity sources of family in come.-Build reserve food grain stock.	- Participate in soil and water conservation - Encourage planting trees. - -Develop grain banking system. - -Recognize social institutions appropriate for community mobilization such as Idir, Mosques, Churches and the like.	- Expand soil and water conservation works through FFW schemes. - Supply clean water - Expand employment and income generating schemes. - Promote new agricultural technology. - Promote small scale irrigation. - Introduce and implement Integrated Rural Development Projects. - Family Planning education service provision. - Build psychological make up of both households and the community.

AEZ	Type of disaster	At Household Level	At Community Level	At Institution's Level
	Epidemics	- Improve personal and environmental hygiene. - Be willing to take training on basic health education.	- Improve environmental hygiene.	- Supply clean water - Establish health institutions and supply them with appropriate equipment, medicines and health personnel. - Establish veterinary clinics. - Provide basic health education service. - Train community health agents. - Introduce vegetable production, and develop feeding habits.
	Crop pests and diseases	- Use pesticides. - Fallow the land until it regenerates - Try with traditional methods also. - Avoid application of chemical fertilizers.	-	- Improve supply of pesticides. - Supply disease resistant variety crops. - Practice participatory research on the type of pests/diseases occurred. - Record the climatic situation properly. - Encourage the production and application of natural fertilizers.
	Soil erosion	- Become aware of the effects of soil erosion. - Practice effective grazing system. - Develop appropriate drainage schemes. - Plant trees and take care of them.	- Encourage planting trees. - Prevent overgrazing on communal lands. - Close bad lands and plant on them. - Develop awareness among children about the effect of soil erosion and method of protection.	- Mass education on natural resources conservation methods. - Supply seedlings and encourage planting trees. - Target the youngsters for duty of planting trees and protecting the bad lands. - Create awareness on the uses of the soil and water conservation of the community.
Upper Weina Dega	Drought	- Promote culture of savings - Promote hard working habits. - Grow Enset plants. - Practice family planning - Participate on off farm activities - Grow short maturing - Building up reserve stock grain	- Participate in soil and water conservation - Planting trees - Timely report to the government - Develop grain stock building mechanisms. - Develop faithfulness among the community. - Recognize social institutions appropriate for community mobilization, such as Idir, Mosques, Churches, etc.	- Provide relief food aid - Educate the community on the ways of preventing drought. - Design & implement anti drought effective projects such as Integrated Rural Development Projects. - Encourage growing drought resistant crops - Promote small scale irrigation - Supply clean water - Demonstrate and encourage building up grain banking systems. - Rehabilitate through Oxen, Agricultural implements and the like aids. - Provide Family Planning education and services. - Build the psychological make up of both households and the community. - Introduce credit and savings systems.

AEZ	Type of disaster	At Household Level	At Community Level	At Institution's Level
	Epidemics	- Improve personal and environmental hygiene. - Going to health institution as soon as possible. - Be willing to take training on the basic health education.	- Improve personal and environmental hygiene - Coordinate and participate in establishing Health Institutions - Taking the patients to Health institutes as soon as possible. - Reporting the incidences immediately	- Expand health education - Establish health institutes - Supply medical equipment supplies and medicines - Coordinate the community to improve environmental hygiene schemes. - Supply with clean water. - Train community health agents. - Introduce vegetable production, develop feeding habits.
Lower Wein Dega		- Promote culture of savings - Diversity sources of family in come - Grow drought resistant crops - Promote hard working habits in order to improve productivity. - Petty trade/ Participate/	- Build small scale irrigation - Encourage tree plan ting - Build up common reserve grain stocks systems. - Promote culture of savings - Cooperate governmental and the non-governmental organization on preventing the consequences of drought.	- Supply clean water - Supply relief food aid - Expand employment and income generating schemes - Support the introduction of small scale irrigation program.-Rehabilitation through Oxen, Agricultural implements and the like aids.-Implement Integrated Rural Development Projects.-Introduce Drought Resistant crops.-Provide Family Planning education and services. –Build the psychological make up of both households and the community.
	Epidemics	- Improve personal and environmental hygiene. - Improve surface drainage schemes to prevent flooding and water logging - Taking preventive vaccines in time. - Be willing to take training on basic health education.	- Improve environmental hygiene - Prevent water logging - Taking the patient to health institute.	- Expand basic health education - Establish health institute and supply with medicine. - Supply with clean water. - Supply preventive vaccines. - Train community health agents. - Introduce vegetable production and develop feeding habits.
	Flooding and Water Logging	- Construct soil bunds. - Construct cut of drain. - Be willing to participate in flood and water logging prevention programs. - Planting trees of the appropriate type.	- Construct dikes. - Terracing.	- Prevent silt formation through strengthening soil and water conservation. - Search for the mechanisms to lead water to make flow on specific routes. - Construct surface drainage schemes. - Build reserve food grain stock. - Introduce rice production rather than leaving idle the land.
	Crop Pests and Diseases	- Practice proper land use systems - Apply ant pests & anti diseases chemicals. - Report to the DA about the incidence. - Avoid application of	- Immediately reporting about the prevalence of pests and diseases.	- Supply pesticides at reasonable prices - Educate the community on prevention methods. - Practice participatory research on the types of pests/diseases occurred. - Supply pests/diseases resistant varieties. - Record the climatic situations properly.

AEZ	Type of disaster	At Household Level	At Community Level	At Institution's Level
		chemical fertilizers. - Try with traditional protection methods also.		- Encourage the production and application of natural fertilizers.
	Flooding and Water logging	- Construct cut of drain - Planting trees		- Search for and implement the proper methods of flood prevention mechanisms. - -Build reserve food grain stock.-Introduce Rice production rather than leaving idle the land at rainy seasons.
	Soil erosion	- Become aware of the effect of soil erosion. - Practice effective grazing system. - Develop appropriate drainage schemes. - Plant trees and take care of them.	- Encourage planting trees. - Prevent overgrazing on communal lands. - Close bad lands and plant trees on them. - Develop awareness among children about the effect of soil erosion and methods of protection.	- Mass education on natural resources conservation methods.-Supply seedlings and encourage planting trees.-Target the youngsters for the duty of planting trees and protecting the bad lands.-Select the appropriate types trees.-Create awareness on the uses of soil and water conservation among the community.
	Crop pests and Diseases.	- Using pesticides - Reporting to the DA in time . - Fallow the land until it regenerates. - Avoid application of chemical fertilizers. - Try with traditional protection methods.	- Repot in time to the government - Coordinate the prevention work.	- Supply with appropriate pesticide. - Practice participatory research on the type of diseases/pests occurred. - Supply disease/pest resistant varieties. - Encourage the production and application of natural fertilizers.
	Soil erosion	- Become aware of the effect of soil erosion. - Practice effective grazing system. - Develop appropriate drainage schemes. - Planting trees and take care of them.	- Encourage planting trees. - Prevent overgrazing on communal lands. - Close bad lands and plant trees on them. - Develop awareness among children about the effect of soil erosion and methods of protection.	- Mass education on natural resources conservation methods. - Supply seedlings and encourage planting trees. - Target the youngsters for the duty of planting trees and protecting the bad lands. - Select the appropriate types of trees. - Create awareness on the uses of soil and water conservation of the community.

Source: KIs in the sample PAs of the Wereda

Chapter Six

6. Process of vulnerability from Community Focus Group Discussion

6.1. Basic Issues.

6.1.1. Access to social services

At Lemo Wereda, worth mentioning social services are primary school, health services, agricultural development places /DAs/, veterinary clinics, potable water supply and grinding mills. Among these social services potable water supply, health and veterinary services are of non-existent within all the sample PAs of the Wereda. It is only for agricultural development places/ even though the communities in all the sample PAs perceived as non existent/, primary school and grinding mill services, that the accessibility analysis has been done. Based on CAD reports the situation of each sample PA with respect to accessibility to these social services is explained as follows.

Anfar:

It has only primary school service within the PA, and has access to health, agricultural development place / DA/ and grinding mill services within reasonable distance out side the PA. The community members of Anfar PA are inaccessible to veterinary clinic and potable water supply. Also, they are unevenly accessible to primary school service because of its location at one corner of the PA.

Ambicho Godie:

It is the PA situated at 1 hour walking distance from Hossana Town, has 2 primary schools, agricultural development place /DA/ and grinding mill services with in the PA, and has access to health and veterinary services within reasonable distance out side the PA. The community of Ambicho Godie PA, are in accessibility to potable water supply service.

Shesha Gimba:

Shesha Gimba has no any type of social service with in the PA, and has access to health institute, primary school, grinding mill and agricultural development place/ DA/ with in reasonable distance out side the PA. Shesha Gimba PA is inaccessible to veterinary and potable water supply services.

Wogila Abera:

It has primary school, grinding mill and agricultural development place /DA/ with in the PA, and has access to primary school and health services within reasonable distance out side the PA. Wogila Abera is inaccessible to veterinary and water supply services. Besides this, the primary school is situated at one corner of the PA.

Biramora kemo:

It has only agricultural development place /DA/ with in the PA, and has access to primary school, health, veterinary and grinding mill services within reasonable distance out side

the PA. Biramora Kemo PA is inaccessible to potable water supply service. But the accessibility to all of the social services situated out side the PA are hindered by over flowing rivers, on the roads to those services at rainy seasons.

Mololliche:

It has only primary school within the PA, even though, it is located at one corner. Mololliche PA has access to health, agricultural development place / DA/, veterinary and grinding mill services within reasonable distance out side the PA. But the accessibility to the social services situated outside the PA is hindered by over flowing of rivers around the roads to those services at rainy seasons. The community members of the PA are inaccessible to potable water supply service.

Shemsa Misie:

It has only elementary school with in the PA, and has access to agricultural development place /DA/, health and grinding mill services within reasonable distance out side the PA. Shemsa Misie PA is inaccessible to potable water supply and veterinary services and has got uneven accessibility to the primary school service for the community at large because of its location at one corner of the PA.

Concerning the changes over time of these social services, the reports of CADs comprised the mixes of improvement, staying the same and deterioration. These states of change are expressed in various forms for each type of social services. For elementary school, improvements are expressed in terms of new establishments /Mololliche/, expansions and upgrading /Anfar and Ambicho Godie/ and additional establishment of new school /Ambicho Godia/, whereas, deterioration is expressed in terms of falling or ruining school building / Shemsa Misie/

As to health and veterinary services, improvement is expressed in establishment of new-institutions at near by vicinity of the respective Pas /Anfar, Wogila Abera and Mololliche/. For agricultural development place, improvement is expressed in the appointment of DAs in the respective PA/ Wogila Abera and Birimora kemo/. With regard to DAs Anfar, Shesha Gimba, Mollolicho and Shemsa Mise PAs do not have appointed DAs. The deterioration in potable water supply is expressed in drying up of water sources early in the beginning of dry seasons, where all the water source in all the sample PAs are reported to be unprotected. This problem is reported in CADs held at all sample PAs excluding Biramora Kemo and Mololliche. The reported problems attached with accessibility to each social services are stated as follows.

Primary school:

The front line problems associated with primary schools in all sample PAs are shortage of text books and other school furniture, shortage of class rooms and shortage of teachers in the schools located within and out side the PA. In addition to these, there are some other AEZ specific problems mentioned. In Dega AEZ sample PA/Anfar/ the school is located at one corner. In the Upper Weina Dega sample PAs the mentioned problems include absence of the service in the PAs, school situated at one corner of the PA, learning by vernacular language and considerable distance to schools for children. Where as, in Lower Weina Dega sample PAs, the mentioned problems include the absence of the services in the respective PAs, location of schools at one corner of the respective PAs,

old age school buildings which are currently being fallen in ruins, learning by vernacular language and over flowing of rivers and flooding problems on the ways to the schools.

Health service:

With regard to health service, the major problems in all CADs held at the sample PAs of the Wereda include, the absence of health institutions in all of them, considerable distances to get the service, low quality of the services from the institutes located outside the PAs and occasional over flowing of rivers and flooding problems on the roads to health services during rainy seasons, especially, at Lower Weina Dega sample PAs.

Agricultural Development places:

Three of the seven sample PAs have got agricultural development centers /DA places/ while the other two have no access to DA centers. Anfar and Mololliche are the PAs with out access to DA services. Among those said to have access, Shesha Gimba and Shamsa Misie get the services from the neighboring PAs. However, the services rendered by DA Centers are limited to coordination of extension packages only, i.e., they do not work on supplying modern agricultural inputs, all types of pesticides and herbicides and medicines for diseases like *Alloya*/ disease that spoils Enset/, *Sirnekel* /disease which attacks red pepper/ and others, considering as part of their duties. Rather they do focus only on collecting the down payments and the debts of inputs for agricultural extension services. Other prominent problems attached to agricultural development are inflated prices of modern agricultural inputs, falling prices of grains, shortage of farm lands, occurrence of crop pests and diseases, occurrence of flooding and water logging problems /at Lower Weina Dega AEZ/ which causing destruction of crops and grazing fields and pasture problems.

Veterinary services:

The main problem reported in all CADs held at all sample PAs of the Wereda is the absences of the service in the PAs and occurrence of different types of animal diseases. The poor quality of service because of the absence of well qualified personnel and shortage of drugs and other supplies are also mentioned problems by Biramra Kemo and Mololliche PAs. These PAs have access to the veterinary services at clinics situated outside the PAs.

Potable water supply:

The main problem reported in all CADs held at all sampled PAs is the absence of potable water sources in the PAs. In addition to this, even among the unprotected sources, drying up of ponds and springs early at the beginning of dry seasons is also stated in same sample PAs.

Grinding Mill :

The mentioned problems include the absence of the services in sample PAs of Dega and Lower Weina Dega, the inflated prices charged to the services and poor quality of services rendered.

6.1.2. Population, Natural Resources and Environment.

As revealed in all the CADs, population has been rapidly increasing in the last 30 years as far as Lemo wereda is considered. This rapid increase in population growth had been exerting negative impacts in family welfare and community development situation and the livelihood. This is expressed in terms of decreasing land holding size, increasing probability of epidemic out breaks due to congested settlement, diminishing family welfare, increasing deforestation in search of more farm land and fuel wood, rising prices of food grains, increasing famine and poverty, decreasing grazing fields, increasing soil depletion due to repeated farming on the same plots and mono-cultural practices, decreasing productivity of land, late marriage, and finally darkness of the future development prospect of the communities.

Moreover, the participants of CADs held at all sample PAs have reported that the respective communities perceived the rapid increases in population size as not so good for the development of community and family welfare, except in Mololliche PA. At Mololliche, the CAD participants have reported that, even though the community have identified the negative impacts that rapid population growth had exerted in them, they still claim that the increase in population situation as an asset saying that "man is a medicine for man". This may indicate that they do not want to exercise any sort of population control mechanisms, even if they get an access to such a service.

With regard to the present land holding situation, the perception of land holding size as small and very small are the same in all sample PAs. These are 0.50 hectare and 0.25 hectares respectively. But the land holding sizes which have been perceived as large and medium vary with AEZs. They are 2 and 1 hectares in Dega, 1.50 and 1 hectare in Upper Weina Dega and 2.00 and 1.25 hectare in Lower Weina Dega, respectively. The perception of land holding size is also seen in line to the proportion of households in each category. In Dega AEZ PA/Anfar/ it was reported that 72.5 % of the total households had an average holding of less than or equal to 0.50 hectare and 12.5 % are land less. Where as, in Upper and Lower Weina Dega Pas, proportion of households with half hectare or less households were found 56.0 % and 53.1 % respectively. On the other hand, proportion land less were found 14.1 % and 11.2 % in upper and lower weina dega respectively. This indicates that the land holding size is better in Lower Weina Dega than in the other AEZs.

In all sampled PAs it was reported that every household shares own land with newly established close relatives. These newly established households might be young heads, returnees from resettlement sites, war fronts or others. Due to these social and moral obligations the size of land holding is diminishing from time to time. In reality those reported to have very small land holding size are mainly land less dependants on their relatives.

The major environmental problems reported to have affected the livelihoods in the sample PAs are soil depletion, deforestation, flooding pasture problem, and water logging. The root causes, coverage and their consequences are briefly discussed in the following table

Table 6.1: Environmental Problems and Their Consequences -Lemo (1992)

Type of environmental problem	Root causes of the environmental problems	Area Coverage	Consequences in livelihoods
Soil Depletion	- Deforestation - Soil erosion - Mono cultural practices - Over cultivation - Plantation of Eucalyptus trees near and in the farm lands	- In all sample PAs	- Reduced soil's fertility - Decreased productivity of land
Deforestation	- Expansion of farm lands. - Population growth - Search for fuel and construction wood	- In all sample PAs except in Anfar and Shamsa Misie PAs where there were no forest lands even before	- Exposure of top soils for erosion - Formation of gullies - Loss of biological diversity
Flooding	- Deforestation - Hilly/ sloping/ topography of land - Lack of integrated soil conservation works/ Terraces are not followed by plantations and the like/	- In all sample PAs except Anfar	- Destruction of crops and grazing fields - Re-plantation costs
Pasture problems	- Expansions for farm land - Rapid population growth - Flooding and water logging problem	- In all sample PAs	- Forced reduction of livestock size - Reduced livestock products - Impoverishment
Water logging	- Flat topography of land - Heavy clay type of soils - Over flowing of Weira River - Changed old route Guder River - Diverted routes of seasonal rivers.	- In all sample PAs except in Anfar.	- Destruction of crops and grazing fields - Favored conditions for reproduction of vector insects

Sources: CADs in the sample PAs of the Werda

All the above mentioned environmental problems are increasing in the last 25 years in all the sampled PAs.

6.1.3. Communities' livelihood and food security

In all the sampled PAs of the Wereda, the bases of livelihood for the community are crop production and livestock rearing. But now a days, labor sales, seasonal out migration and petty trade are also getting recognition by the community. As a result, the main sources of income for the community are sale of crops, livestock and labor sale and petty trade.

The bases of differentiation in categorizing wealth strata of the community vary with AEZ. In the following table, both countable and uncountable possessions of the

community have been identified to be the bases for differentiating the wealth strata and presented across agro-ecological zone in the table follows.

Table 6.2: Basics for wealth strata by AEZ- Lemo (1992).

Basics of wealth strata/ possession of/	Dega	Upper Weina-Dega	Lower Weina Dega
- Land	Yes	Yes	Yes
- Subcontracting ability of land	Yes	NS	NS
- Oxen	NS	Yes	Yes
- Cattle	Yes	Yes	Yes
- Sheep/goat/	NS	NS	Yes
Enset and other perennial crops including eucalyptus	Yes	Yes	NS
- Business in general petty trade	Yes	Ns	NS
- Equine / Horse/ Mule	NS	Yes	Yes
- Donkey	NS	Yes	Yes
- Beehives	NS	Ns	Yes
- Cash hoarding	NS	Yes	Yes
- Attitude of hard working and efficient income management	NS	NS	Yes

NS: Not stated. Oxen are not considered as indicator of wealth in Dega AEZ because cultivation is mainly carried out by hoe.

Source: CADs in the sample PAs of the Wereda

Accordingly, the distinguishing criteria for a group to be categorized as wealthy in Dega AEZ are having about 5 cattle, owning more than 1 hectare land, enough size of land with Enset and Eucalyptus plantation, being able to sub contract land from others, and able to undertake some sort of trade at Urban centers. In the middle category are those having 0.75 hectare land, medium size of land with Enset and eucalyptus plantation, and running petty trade. The poor are those having 0.5 hectare of land, small size of land with Enset plantation, and less than 2 cattle. And the very poor are those having no or very small plot of land which is enough only for homestead and are they are daily laborers

.The distinguishing criteria for a group to be wealthy in Upper Weina Dega AEZ are having 1.5 hectare land, more than 2 Oxen, more than 10 cattle, 2 donkeys, 1 Horse/ mule, cash holding of at least 1000 Birr, about o.125 hectare of land with Enset, Chat and Eucalyptus plantation and more than 20 quintals of grain stock. The middle category are those having 1 hectare land , 1 Ox, about 4 cattle, 1 Donkey, Cash holding of about 500 Birr, 0.0625 hectare of land with Enset & Chat plantation and some Eucalyptus trees, and about 12 quintals of grain stock /which might afford a years consumption need of a family. The poor are those having 0.50 hectare of land less than 2 cattle, and small size of land with Enset plantation. And the very poor are those having 0-0.25 hectare of land rarely 1 Donkey and mostly daily laborers.

Where as in Lower Weina Dega AEZ, the wealthy are those having more than 2 hectare land, more than 4 Oxen, about 40 cattle, about 20 sheep/goat, 5-10 bee-hives, 1

donkey/horse/mule, with Cash hoarding of at least 1000 Birr, with hard working attitude, and with efficient knowledge in family income management. The middle are those having 1 hectare land, 2 Oxen, 15-20 cattle, 10 sheep/ Goat, 2-3 beehives, 1 donkey and 1 horse/ mule. The poor are those having 0.50-1 hectare land, 2-4 cattle and 4 sheep/ goat, and the very poor are those having 0.25-0.50 hectare land, 2 sheep/goat, and daily laborers, i.e., seasonal out migrants. However, now a days, value of land has become meaningless due to flooding and water logging problems at Lower Weina Dega AEZ.

Using these criteria for distinguishing wealth strata, 52 % and 26 % of the total households in Dega sample PA/Anfar/ were classified into poor and very poor categories respectively. Where as, the poor and very poor are 29 % and 38 % in Upper Weina Dega sample respectively. And in Lower Weina Dega AEZ sample PAs about 29 % and 28 % of the total households are grouped in to poor and very poor categories respectively. In all sample PAs of the Wereda the proportion of households categorized as poor and very poor are about 60 % and above this reveals that the communities are already suffering from extreme poverty.

In the CADs held at all the sampled PAs, it was reported that specified months at which majority of the community face severe food shortage problem signifies the time range between the end of food grain stock and the next harvest in Dega AEZ where as it signifies the time range between the end of food grain stock and the time of starting up consuming unripe form of maize and/ or haricot beans. The length of this period varies with AEZ. In Dega AEZ, such period usually lasts from August to November during which almost all the inhabitants are forced to eat less quantity of food at two meal times per day.

In Upper Weina Dega AEZ, this period lasts from March to September during which about 74.7 % of the total households are reported to eat less than two meals per day. Where as in Lower Weina Dega AEZ this period lasts from April to August at which 73.3 % of the total households do eat less than two meals per day. Thus inhabitants of the Wereda face critical food shortage for about half of the year in upper and Lower Weina Dega parts and about one- third of a year in Dega part even in a normal year. A normal year is meant by the community to be a year with out significant weather shock. As revealed by CAD, the period from April to September signify the time when majority of the Wereda's inhabitants suffer from severe food shortage problem.

6.1.4. Disaster History and Perception of Risk of Disaster.

The major disasters reported to have been affecting communities of the Wereda since 1950's are drought/famine, epidemics, flooding, water logging, crop pests and diseases, and hail and wind storms.

Drought :

The communities perceive the occurrence of drought when the onset of Belg and/or Meher rain starts so lately, the Meher rain lasts early and/or it becomes heavy on the eve of harvest. Both of these have effects of decreasing agricultural produces and animal feeds. The first two also have effects of decreasing water supply for animals.

When the perception of the occurrence of drought is seen by AEZs of the Wereda, the years 1977 and 1991 E.C. have been reported by the participants of CAD held at Dega

PA /Anfar/ as years when severe drought/famine attack has been occurred. The years 1965, 1976,1977, 1985 and 1991 E.C. in Upper Weina Dega sample PAs and the years 1965, 966, 1976, 1977 and 1991 E.C in Lower Weina Dega sample PAs were reported to had been years of severe drought/famine by CAD participants. According to the same CADs in the sampled PAs, the whole Wereda had been attacked by drought/famine in the years 1977 and 1991 E.C. and the whole Weina Dega part of the Wereda in the years 1965, 1976, 1977 and 1991 E.C. regardless of AEZ difference.

In all of these years, the drought attack had resulted to the death of both human being and livestock. And the degree of severity of drought in all these years was perceived to have been high. The highly affected groups of the community during the mentioned drought years were mothers, children and the old age group living in all parts of the sample PAs of the Wereda.

Epidemics

With regard to human epidemic attacks, the types of diseases occurred at epidemic level were Small pox, Cholera, Meningitis, Diarrhea, Malaria, Typhoid, and other febrile diseases. Occurrence of Smallpox between 1951 and 1959 and occurrence of Cholera as epidemic outbreak between 1963 and 1964 were reported for the whole Wereda. Where as the perception for other types of disease vary with AEZ. At Dega AEZ sample PA /Anfar/ no type of disease had been perceived to occur at epidemic level except Smallpox and Cholera. But at Upper Weina Dega AEZ sample PAs the occurrence of epidemic out breaks had been perceived in 1976 for Meningitis and Diarrhea, in 1984 for malaria, typhoid, and diarrhea, between 1988 & 1991 for typhoid, malaria and other febrile diseases in addition to the above mentioned ones. And at Lower Weina Dega AEZ, the occurrence of epidemic outbreaks had been perceived in 1976 meningitis and diarrhea, between 1984 & 1991 for malaria, typhoid, diarrhea and other febrile diseases in addition to the above mentioned ones.

On the other hand the livestock epidemic out breaks reported to had been occurring in the years 1991 at Dega AEZ, 1976, 1988- 1991 at Upper Weina Dega and 1965, 1976, 1985-1991 at Lower Weina Dega AEZs at various levels of coverage and high degree of severity. These out break of epidemic attacks ended up with a death of large number of livestock. In connection to these, it was very difficult to get livestock products like milk and butter during those years. That is partly why children, mothers and old age group were mostly affected by the disaster. The types of diseases occurred at epidemic level were named ‘ Aftager’ 'Dasta'/ 'Aba Gorba', 'Abasenga', 'Yesar bashita'/refering' to specific type of grass/ locally.

Flooding and water logging

Flooding and water logging problem have been attacking the Lower Weina Dega AEZ sample PAs every year since 1971 at rainy seasons. Since the mentioned year, Wera River is over flowing and Guder River had left its old route and has been changing routes from time to time. This significantly contributed for flooding and water logging problems in the area. Because of the flat topography of the area, the degree of severity of flooding and water logging problems were perceived high. These problems affect almost all parts of the sampled PAs resulting in the destruction of crops and grazing fields. All group of the community were highly affected by this problem.

As far as other AEZs are concerned, it is only in Wogila Abera /one of the sample PAs in upper Weina Dega/, that the problem of flooding and water logging had occurred in the year 1978 at high degree of severity and attacked the people settled in some parts the PA where the type of soil is heavy clay and the topography is flat.

Crop Pests and Diseases

With regard to crop pests and diseases, the occurrence of 'Alloya' the type of crop disease which attacks 'Enset' plant was perceived in the year 1990 and 1991 E.C. at Dega AEZ with high degree of severity covering all parts of the PA. At Dega AEZ, Enset is the staple food crop and principal source of food. But the occurrence of crop pests is not reported.

In the Upper Weina Dega, crop pests as disaster attacked all parts of the sample PAs in the years 1975, 1979, 1980, 1988 and 1991 E.C. And crop disease especially 'Alloya' has been attacking Enset plant since 1971 'Enset' where enset is still the staple crop and principal source of food.

In Lower Weina Dega, crop pests as disaster attacked all parts of the sample PAs in the years 1975, 1976 and 1990 and crop disease called 'Sirnekel' is attacking ' Red pepper' which is the main cash crop in the AEZ since 1979. Due to the problem with 'Sirnekel', the production of red pepper has been stopped in the sample PAs of lower weina dega now a day. Thus, attack of crop pests and diseases reported to have been significantly contributing to the occurrence of famine and poverty. All group of the community were highly affected by crop pests and diseases.

Hail and wind storms

The risk of hail- storms had been occurring in upper and Lower Weina Dega sample PAs in the years 1968,1974,1976, 1989,1990 and 1991 with high degree of severity. The occurrence of this risk was reported to have been affecting all parts of the mentioned PAs. Children, mothers and old age groups were highly affected by the negative consequences of this disaster. Windstorm is not mentioned as a significant problem in the Wereda though it occurs occasionally.

According to CAD report, resilience to disasters was found improving in Dega and Lower weina Dega sample PAs. On the other hand it was perceived to deteriorate in the sample PAs of Upper Weina Dega excluding that of Shesha Gimba. The reasons by Dega sample PA for how the trends in resilience to disaster is improved are the following.

- Existence of essential services such as education and health facilities at near by areas of the community. This generation has become more educated and civilized than the parents' time.

- Improved access to off farm and non- farm job opportunities accompanied with seasonal out migration as a copping strategy.

- Improved opportunity of reporting to the government for relief aid at times of necessity.

In the Upper Weina Dega sample PAs, both improvement and deterioration are reported for the situation of resilience to disasters as compared to parents' time. The situation of resilience to disasters has been reported as improvement in the CAD held at Shesha

Gimba PA appreciating the existence of essential services such as education and health facilities at near by areas of the community and advancing in civilization. Where as CADs held in the remaining Sample PAs of Upper Weina Dega reported deteriorated resilience to disasters. Even though the access to essential services is improved the negative effects of the following situations have retarded the trend in resilience to disaster. These are:

- rapid increase in population growth which in turn affected the culture of helping each other.
- increasing degree of poverty.
- shortage of food and poor state of nutrition resulted in decreased natural immunity
- diminishing size of land holding by households.

On the other hand, in the sample PAs of Lower Weina Dega AEZ, trends of resilience to disaster is stated as improvement. The reasons for this are stated as follow.

- Existence of essential services such as education and health facilities at near by areas of the community.
- Existence of non/off farm job opportunities such as petty trade, daily labor, and the like in addition to agriculture.
- Improved hard working attitudes this days
- Advanced in the state of civilization
- Availability of relief food aid

6.1.5. Local institutional capacity & disaster prevention programs

The common responses to disasters, which had occurred in the last 30 years, are stated as follows. In Dega sample PA or Anfar the CAD report stated that nothing had been done by the households, the community and institutions as a response to the disasters occurred in the last 30 years

In Upper Weina Dega sample PAs, the CAD reports stated that there were institutional responses such as supplying pesticides, relief food aids, and supporting food supply through FFW programs in the years 1968 and 1991 E.C. These responses were perceived unsatisfactory to save the community from the consequences of disasters, because of the deteriorating conditions of living among the community. Beside this, nothing has been done by households and the community.

In Lower Weina Dega sample PAs such as Biramora kemo and Shamsa Misie, the reports of CADs stated that nothing had been done in response to disasters by the households and the community. But in Mololliche PA, both the households and the community have been working on construction of dikes and cut off drains each year as a response to risks of flooding and water logging, even though, the structures were short sustained due to silt formation, flooding and water logging problems. As to the institutional responses, the government of Ethiopia has been supplying relief food aid, arranging Food for Work programs and supplying preventive vaccines each year since 1984 in Biramora Kemo and Shemsa Misie PAs, but in Mololliche no institutional response was reported to have been

instrumental. The impact of the institutional response was perceived as good in Biramora Kemo PA, but as not so good in Shemsa Misie PA. To address the potential disasters in the future, the following practical ways are suggested with identified level of practicability by households, community, and institutions in each AEZ.

Table 6.3: Suggested ways to mitigate potential disasters in the future by AEZ -Lemo (1992)

AEZ	At Household level	At community level	At institutional level
Dega	- Construct terracing, cut off drain, etc - Working on other soil and water conservation structures.	- Coordinate the soil and water conservation works	- Supply medicine of 'Alloya' known to spoil enset - Subsidize the price of the medicine of 'Alloya'. - Educate the community on the ways of soil and water conservation - Design ways of preventing the anti crop wild animals especially Porcupine.
Upper Weina Dega	- Develop culture of using resources economically - Develop hard working attitude - Participate in income generating activities - Expand Enset plant cultivation to secure family food supply - Participate in local self help organizations - Improve personal and environmental hygiene - Terracing, cut-off drains etc - Planting trees	- Planning and working on communities' problem alleviating activities - Encourage cultivation of enset - Encourage participation on other income generating activities - Establish and strengthen self help institutions - Coordinate local development programs - Report to the government body in time - Construct terracing, cut off drains, etc - Cleaning ponds	- Supply clean(potable) water - Construct roads and bridges - Establish health institutes & make them functional - Supply aid of agricultural input when necessary - Supply veterinary service & develop forage - Create employment opportunities - Subsidize the prices of agricultural inputs - Expand soil and water conservation works - Supply with grinding mill services - Construct schools - Arrange immediate responses when risks occur - Supply with relief food aids accordingly
Lower Weina Dega	- Hard working - Supplying locally available materials for development activities - Supply free labor and contribute cash if necessary - Participate in other income generating activities - Improve personal and environmental hygiene	- Coordination and reporting to the government body - Supply free labor and locally available materials - Taking responsibility of development activities - Participate in the implementation of designed programs in the area - Contribute financial shares	- Relief food aid - Construction of roads and bridges - Promoting development initiatives - Establish health institutes - Support food supply through ffw schemes - Coordinate activities that allivate flooding and water logging - Supply potable water - Supply with grinding mill services - Expand integrated soil and water conservation works - Construct school - subsidize the prices of modern agricultural in puts - Lower the amount of land taxes - Diversify the new extension package types - Supply agricultural implements free of charge especially for the poor

Source:- CADs in the sample PAs of the Wereda .

6.2. Summative analysis on trends, vulnerable groups and local capacity to chronic vulnerability.

According to the reports of CADs held at the sample PAs of the Wereda, the most common problems in the sample PAs are famine/ drought, epidemics, and water logging. Communities' vulnerability to these risks are briefly summarized as follows.

6.2.1. Vulnerability to famine/drought:

Usually drought is known to lead to famine in drought prone weredas like Badawacho. The result of the CADs held at all sampled PAs of the Wereda shows that vulnerability to famine/ drought has been increasing. The reasons why vulnerability to famine/drought has been increasing are also reported. The most profound ones are rapid increase in population size, decrease in farm size, increasing soil erosion and depletion, occurrence of crop pests and diseases, erratic rains occurrence of flooding and water logging, and repeated occurrence of drought. The CAD also identified the types of households that are becoming more vulnerable and becoming less vulnerable. In the table B1 below the details of the reasons why vulnerability to famine/ drought is increasing and the types of households which are becoming more and becoming less vulnerable are given.

Table 6.4: The reasons for increasing vulnerability to famine and the types of households by level of vulnerability (Lemo 1992)

Reasons for increasing	Households becoming more vulnerable	Households becoming less vulnerable.
- Increasing soil erosion and deletion - Decreasing farm size - Rapid increase in population size - Long maturation period of Enset plant (15-20 yrs) in Dega area. - Occurrence of crop pests and diseases specially "Alloya" on Enset and "Sirnekel" on red pepper - Rising prices of modern agricultural inputs. - Absence of potable water supply and water points for animals. - Livestock diseases - Erratic rain falls - Increasing poverty due to high expenses moving homes and homesteads from place to place and also destruction of perennial crops such as Chat, " Enset" and Coffee because of villagization and devillagization processes. - Shortage of grazing fields and forage supply problem. - Late onsets of rain and repeated drought attack - Poor household income management. - Late supply of modern agricultural in puts at Belg cultivation times. - Decreasing family income - Flooding and water logging - Poor moisture retaining capacity of soil types.	- Having no assets - With no additional labor (young male) - Having very small plots of Enset plantation - Depend on agriculture only - Have no or very small Chat plots - Poor and very poor house holds - Owning less number of cattle.	- with additional labor - With reserved assets even though it may be few or small - Relatively with large Enset plots - Participating on other duties in addition to agriculture, such as petty trade, daily labor, etc. - Relatively with large Chat plots - Having relatively large number of cattle - With better knowledge in households incomes management.

Source:- CADs in the sample PAs of the Wereda .

As stated in table 6.4 above, the households becoming more vulnerable to famine are those having no assets, no additional labor, young heads, with very small plots of Enset and/or Chat plantation, depending on agriculture only and having less number of cattle. The households becoming less vulnerable to famine/drought are those having additional labor, with reserved assets, relatively with large plots of Enset and / or Chat plantation, participating on other income generating activities, with better knowledge on family incomes management and owning relatively large number cattle. The participants of CADs have also suggested the ways of intervention to mitigate consequences of chronic vulnerability to famine and to prevent them in the future with the level of practicability, i.e., at house hold, community and institutions level. These are given in table 6.5 below

Table 6.5: Local capacities to prevent the consequences of vulnerability to famine at three levels - Lemo (1992)

At household level	At community level	At Institutional level.
- Soil and water conservation works such as terracing and the like - participating on other in come generating activities in addition to agriculture. - Exercise economic usage of resources. - Practice agro- forestry - Expand Enset plant cultivation - Participate in modern forage production and improved cattle breeding - Promote hard working habits. - Construct surface drainage schemes in the farms - Strengthen animal husbandry - Prevent flooding and water logging risks. - Cultivate short maturing crops.	- Preventing anti crop wild animals especially porcupine - Expand soil and water conservation duties. - Participate in supplying clean water. - Encourage participation on other income generating activities also - Encourage cultivation of Enset plant - Coordinate and plan the community problem alleviating projects. - Organize cooperation on communal help. - Preventing flooding and water logging problems. - Encourage culture of using resources economically - Secure peace	- Supply medicine for crop diseases (Enset and red pepper) and crop pests - Encourage the community on the ways of soil and water conservation practices - reduce prices of agricultural inputs - expand education and services of family planning - introduce modern ways of cattle breeding and forage development - Build veterinary clinics, supply with necessary drugs equipment, supplies and professional personnel. - Construct water points for livestock supply community with clean water - Strengthen Enset plant development - Expand soil and water works and support its management - Expand employment and in come generating activities - Supports food security through FFW. - Supply with agricultural inputs in time, especially at 'Belg' season - Immediate response when disaster breaks up. - Constructs roads and bridges - Supply with disease resistant seedlings of “Enset” plant. - construct prevention schemes of flooding and water logging - Searching for ways to prevent flooding and water logging problems. - Lead Guder River to flow in specified route only. - Provide modern extension packages of Wheat, Goats, Chicken, and Honey- Bees, in addition to Maize in Lower Weina Dega AEZ. - Search for poverty reduction mechanisms. - Decrease the amount of land tax.

Source:- CADs in the sample PAs of the Wereda .

6.2.2. Vulnerability to epidemics

Prevalence of a certain disease can be considered as epidemic if the number of victim cases in a certain period exceeds the long term average in that locality in the same time period. The results of the CADs held at the sample PAs shows that vulnerability to epidemics has stayed the same in one PA and increasing in the rest six PAs. The number of communities in which vulnerability to epidemics is staying the same and is increasing, with respective reasons as perceived by the participants of CADs are summarized in the following table.

Table 6.6: The situation of vulnerability to Epidemics by AEZ - Lemo (1992).

AEZ	Number of PAs Sampled	Current Status of Vulnerability to Epidemics	Reasons for Increasing / Decreasing/ staying the same.
Dega	1	Stayed the same	- Absence of clean water supply - Increasing food shortage problem - Health institute built at the vicinity at a distance about 1.30 hrs walk
Upper and Lower Weina Dega	6	Decreased	- Deteriorating water supply and quality. - Repeatedly broken up epidemics of malaria typhoid and other febrile diseases since 1984 - Rising poverty - Rising food shortage problem. - Less personal and environmental hygiene. - The absence of roads to health institutions situated out side the sample PAs. - Flooding, water logging and existence of ponds being suitable for the spread of malaria and other vector diseases - Deteriorating environmental sanitation due to flooding and water logging problems. - Rapid increases in population site and congested settlement.

Source:- CADs in the sample PAs of the Wereda.

As it can be seen from the table 6.6 above, it is in the dega sample PA-Anfar- that vulnerability to epidemic is staying the same. Participants of the CAD held at the PA stated the reasons how they perceived the state of vulnerability stayed the same in the area. Even though the health institute has been built at the near by vicinity out side the PA, rapidly increasing food shortage and unchanged quality of drinking water made vulnerability to epidemic stayed the same in this part of the wereda.

In the rest of the communities it is reported that vulnerability to epidemics is increasing because of deteriorating water quality and supply, rising food shortage, deteriorating

environment sanitation rapid increase in population size and congested settlement, etc. The CAD has also identified the types of households that are becoming more vulnerable and those becoming less vulnerable

Table 6.7: Types of households by level of vulnerability to epidemics -Lemo /1992/

Households Becoming More Vulnerable	Households Becoming Less Vulnerable
- With no additional labor force - Less/very small/ Enset plots - Settled at Guder River escarpment - Depending on agriculture only - Less chat plots - Having no assets - Poor and very poor households - Having less number of cattle - Children and mothers	- Having additional labor force - Relatively having large *enset* plots - Participating on other income generating activities - Settled at undulating & rolling plains - Relatively have large chat plot - Having some assets - Having relatively large number of cattle - The fully grown adults

Source: CADs in the sample PAs of the Wereda

As shown in the table 6.7 above, the households becoming more vulnerable are those with asset deficit, own less number of cattle, with less or very small land plots, with no or little enset / or chat plantation and with no additional labor force. The better-of are those households that own some assets, relatively with large number of cattle, relatively large plots with Enset and /or chat plantation, with diversified sources of income, and have additional labor forces

The participants of CAD have also identified the ways of intervention to mitigate the consequences of chronic vulnerability to epidemics and to prevent them in the future with the level of practicability, i.e. at household, community and institutional levels. These are summarized in the table 6.8 below

Table 6.8: Suggestions to prevent the consequences of vulnerability to Epidemics at three levels (Lemo 1992)

At household level	At community level	At institutional level
- Improving personal and environmental hygiene - Use clean water - Secure family food supply by cultivating Enset plant and participating on other in come generating activities - Preventing flooding and water logging - Use family planning	- Coordinate environmental sanitation activities - Supply clean water - Encourage enset plant cultivation - Construct cut- off drain and other surface drainage schemes to prevent flooding and water logging - Encourage participation on other income generating activities - Strengthen the culture of taking balanced diet - Provide land free of charge for the construction of health institutes	- Supply the community with clean water - Promote basic health education - Build health institutes, supply with drugs equipment and professional personnel - Support food security of the community - Immediate response when ever epidemics breaks out - Supply with preventive vaccines - Strengthen the prevention of malaria and other vector disease - Prevent flooding and water logging problems - Construct roads and bridges - Promote education and services of family planning - Search for poverty reduction mechanisms

Source: CADs in the sample PAs of the Wereda.

6.2.3. Vulnerability to environmental hazards

Vulnerability to flooding and water logging

The result of CADs held at the sample PAs of the Wereda show that vulnerability to flooding and water logging have been increasing in the three Lower Weina Dega Sample PAs. In the rest four sample PAs, flooding and water logging problems are not stated as prominent problems. This might be due to the hilly topography of the areas. The reasons why vulnerability to flooding and water logging have been increasing in the mentioned areas are also reported. The most profound ones are overflowing of Wera River to flash the vicinity, most of the seasonal rivers diverted before entering in to the main routes and leaving the old route of Guder River since 1971 E.C.

The CADs held at these three Sample PAs in Lower Weina Dega, have also identified the types of households that are becoming more vulnerable and that are becoming less vulnerable. The detail is given in the table 6.9 below.

Table 6.9: Reasons for increasing vulnerability to flooding and water logging and the type of households by level of vulnerability - Lemo/1992/

Reasons for increasing	House holds becoming more vulnerable	HHs becoming less vulnerable
- Over flowing of Wera River flashing the vicinity - Seasonal rivers which are flowing down to the area diverted before entering in to the main routes since 1971E.C - Guder River had left the old route since 1971 and it is flowing in different temporary routes each year.	- Settled at areas near to Wera River - Settled at plain areas - Settled at areas near to Guder River	- Settled at sloppy or hilly areas. - Settled at sites away from major rivers

Source. CADs in the sample PAs of the wereda

As shown in the table 6.9 above, the more vulnerable households are those settled at areas near to Wera and Guder rivers and at plain areas whereas the less vulnerable ones are those settled at sloppy or hilly areas. As summarized in the following table, participants of CAD have also suggested the ways of intervention to mitigate the consequences of chronic vulnerability to flooding and water logging and to prevent them in the future with the level of practicability.

Table 6.10: Suggested ways to prevent the consequences of vulnerability to flooding and water logging at three levels- Lemo (1992)

At household's level	At community level	At Institution's level
- Construct cut off drains & ditches - Construct dikes at the bank of wera river - Renew each year the routes of seasonal rivers to help them enter in to the main rivers.	- Renew each year the routes of seasonal rivers to help them enter in to the main rivers - Construct cut- off drain and ditches	- Coordinate and support the constructions of cut off drains - Supply hand tools - Strengthen soil and water conservation works - Construct dike at the bank of Wera River - Construct flooding and water logging prevention schemes - Late Guder River to flow at specific and permanent route only.

Source:- CADs in the sample PAs of the wereda

Chapter Seven

7. Indicators of Vulnerability and Vulnerable Group From the Household Survey

7.1. Demographic & Social Characteristics.

Much has been said about Lemo's population in chapter 4 using secondary data. The aim of this section is to see the recent changes in demographic characteristics besides comparing the results with the findings from secondary sources.

7.1.1. Population Size and Spatial Distribution

Knowledge of population size is very essential in planning provisions for the in habitants. Schools, health institutes, water supplies, etc. should be supplied proportional to the population size and their respective spatial distribution. All of the 700 sampled households were surveyed in Lemo. There were 3966 people living in all the sampled PAs. This gives a mean family size of 6.49 for the whole wereda. The mean family size was found slightly larger in upper Weina Dega than the low land /kolla/ and dega. Accordingly the mean family size was found 6.7 for intermediate high land /upper Weina Dega/, 6.2 for kolla or lower weina dega/ and 6.4 for dega or high land part of the wereda. With regard to spatial coverage about 44.7 % were residing in the intermediate high land, 41.3 % in lower weina dega or kolla and the remaining 14.0 % of the inhabitants were living in the dega or high land in 1992.

7.1.2. Age- Sex structure

Effective planning always requires sound knowledge about the age-sex structure of a given society. For instance, school age population should be well known so as to effectively plan for education. Availability of the labor force and inactive population in the old age are to be identified from the age structure. Unbalanced sex ratios may cause some sort of social disorder in the community.

Table 7.1.1 Distribution of Population by Broad Age & Sex (Lemo1992)

Age Range	Sex						Sex Ratio (Male/Female)
	Male		**Female**		**Both Sexes**		
	No.	**%**	**No.**	**%**	**No.**	**%**	
0-4	272	13.4	257	13.2	529	13.3	105.8
5-9	292	14.4	283	14.6	575	14.5	103.2
10-14	304	15.0	278	14.3	582	14.7	109.3
15-19	275	13.6	254	13.1	529	13.3	108.3
20-24	191	9.4	154	7.9	345	8.7	124.0
25-29	130	6.4	150	7.7	280	7.1	86.7
30-34	91	4.5	102	5.3	193	4.9	89.2
35-39	89	4.4	121	6.2	210	5.3	73.5
40-44	95	4.7	77	4.0	172	4.3	123.4

Age Range	Sex						Sex Ratio (Male/Female)
	Male		Female		Both Sexes		
	No.	%	No.	%	No.	%	
45-49	63	3.1	63	3.2	126	3.2	100.0
50-54	75	3.7	94	4.8	169	4.3	79.8
55-59	28	1.4	23	1.2	51	1.3	121.7
60-64	42	2.1	37	1.9	79	2.0	113.5
65+	79	3.9	47	2.4	126	3.2	168.0
All age	2026	51.1	1940	48.9	3966	100.0	104.4

Source: Household Survey Conducted By SERA February to March, 1992

As you can see in the above table about 42.5 % of Lemo's population were children under the age of 15, 52.3 % were between the age range of 15-59 and the remaining 3.2 % are in the age range of 65 and above in the year 1992. Using the above figures, young, old and over all dependency ratios were calculated to be 78.3, 5.8 and 84.1 respectively. Thus, 100 economically active persons in the wereda are expected to work for themselves besides supporting about 84 inactive members of the community. This shows that the age structure of Lemo's population is more or less consistent to the age structure of Ethiopia in general and the Southern Region in particular.

The same table also indicates that the wereda's inhabitants are evenly distributed across the two sexes. Thus, about 51.1 % of the total population were males and the remaining 48.9 % were females giving a sex ratio of 104.4 in 1992. In fact, there were some age ranges at which the two sexes significantly exceed each other. For instance proportion of male population was found significantly exceeding that of females in the age range of 35-39 and 50-54 while the opposite was the case in the age ranges of 20-24, 40-44 and 55-59. This category is simply made by considering age range with a sex ratio of over 120 as male dominant and those with a sex ratio of below 80 as female dominant.

7.1.3. Sex of Household Heads and Marital Status.

Experiences indicate that female-headed households are the ones usually face shortage of labor in the rural areas. As a result, they may be forced to give their cultivation land to some one else so as to share the benefit in return. In such cases, it is less likely to get enough food for the family. Similarly households where both couples live together are more advantageous compared to the ones where the couples do not live together. If they are together, they can support each other through division of labor and may be able to produce better than the other group. This is so since most Ethiopian families are dominated by young children under the age of 15.

Our survey revealed that about 84.9 % of the total household heads in Lemo were males while the remaining 15.1 % were female headed in 1992. More female-headed households were identified in dega part where business related male out migration is more common. With regard to marital status, about 52.2 %, 42.3 % and 4.7 % of the total population aged 10 and above were never married, currently married and widowed respectively with the remaining 1 % either divorced or separated.

Marital status across the age indicates that proportion of never married starts declining after the age of 19 and currently married starts raising after the age of 20 . On the other hand more than 50 % of widowed persons are concentrated in the age range of 55 and above. Details can be seen from the following table.

Table 7.1.2: Percentage Distribution of Population Aged 10 & Above by Martial Status.

Five Years Age Group	Marital Status										Lemo Total	
	Never married		Currently married		Divorced		Widowed		Separated			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
10 - 14	495	98.2	7	1.4					1	.2	504	100
15 - 19	482	97	14	2.8			1	.2			497	100
20 - 24	266	78.5	71	20.9			2	.6			339	100
25 - 29	120	43.5	147	53.3	8	2.9			1	.4	276	100
30 - 34	23	12.1	160	84.2	1	.5	6	3.2			190	100
35 - 39	10	4.8	193	92.3	2	1.0	4	1.9			209	100
40 - 44	3	1.8	151	89.3	1	.6	12	7.1	1	.6	169	100
45 - 49	4	3.2	105	84			16	12.8			125	100
50 - 54	3	2.5	97	82.2	2	1.7	14	11.9	2	1.7	118	100
55 - 59	3	3.0	73	72.3			25	24.8			101	100
60 +	6	3.2	129	69.7	1	.5	48	25.9	1	.5	185	100
Total	1415	52.2	1147	42.3	15	.6	128	4.7	6	.2	2713	100

Source: Household Survey Conducted By SERA, Feb. & March, 1992

7.1.4. Fertility

Level of fertility for a given community can be measured in different ways. Among these are CBR (crude birth rate which refers to the total number of births occurring in a given year per 1000 mid year population);GFR (general fertility rate which refers to number of births occurring in a given year per 1000 women in a reproductive age); ASFR (which refers to number of births occurring in a given year per women presented in five years age group); and TFR (refers to the number of children a woman may produce at the end of her reproductive period).

In our survey, data regarding number of children ever born per each woman are collected. As indicated in the following table, mean number of children ever born were found increasing with increasing age of a woman in the reproductive age. Accordingly mean number of children ever born, which was less than one for women aged 15-19, was raised to 7.5 for women aged 45-49 years. Since mean number of children ever born in the age range of 45-49 can be taken as the level of completed fertility, the fertility rate can be considered very high in Lemo. Thus, if a woman in Lemo is allowed to give birth throughout all her reproductive age, there is a possibility for each woman to have more than seven children. The result also indicates that fertility rate is highest in dega or high land. According to the survey result, women in kolla was found to have maximum mean number of children ever born in the age range of 40-44 unlike the other agro ecological zones where age range of 45-49 was with maximum number of children ever born. Early

marriage can be the possible reason behind this circumstance in Kolla since the mean number of children ever born corresponding to women aged 15-19 was the highest in kolla. May be due to relative late marriage that mean number of children ever born was the lowest in dega part of Lemo.

Table 7.1.3 Mean Number of Children Ever Born by Five Years Current Age Group Of Women in a Reproductive Age by AEZ –Badawacho

Five Year Age Group	AEZ									Lemo Total		
	Kolla/Lower Weina Dega/			Weina Dega			Dega					
	No	%	Mean	No.	%	Mean	No	%	Mean	No.	%	Mean
15-19	119	31.0	0.02	107	27.2	0.01	25	21.9	0.00	251	28.2	0.01
20-24	65	16.9	0.71	69	17.6	0.55	14	12.3	0.93	148	16.6	0.65
25-29	60	15.6	2.03	58	14.8	1.93	17	14.9	1.47	135	15.2	1.92
30-34	40	10.4	4.90	42	10.70	4.55	17	14.9	3.65	99	11.1	4.53
35-39	45	11.7	6.53	52	13.2	6.21	22	19.3	6.23	119	13.4	6.34
40-44	32	8.3	8.41	35	8.9	7.46	11	9.6	6.36	78	8.8	7.69
45-49	23	6.0	7.48	30	7.6	7.97	8	7.0	6.12	61	6.8	7.54
Total	384	100.0	2.87	393	100.0	2.96	114	100.0	3.12	891	100.0	2.94

Source: CSA, 1998 Analytical Report for the Southern Region

7.1.5. Mortality and Life Expectancy at Birth

Level of mortality at different age range is a proxy indicator of a country's socio-economic status. It is on the level of mortality that life expectancy at birth highly depends. High infant mortality sates may indicate poor health facilities in the community poor nutritional status of mothers and poor economy of the community in general. In our survey, women aged 15 to 49 were asked to give information about the number of children ever born and rate of survival. Based on this information, mortality indicators & life expectancy at birth were indirectly estimated using computer programs such as Mortpak and Qfive.

Table 7.1.4: Mortality Status and Life Expectancy at Birth-Lemo, 1992

Mortality/ Life Expectancy at Birth	Lemo (a)	SNNPR (b)
Infant Mortality	148	128
Child Mortality	84	70
Under 5 mortality	218	189
Life Expectancy at Birth	45.7	48

Source: a). Household Survey Conducted By SERA, Feb. March, 1992

b). CSA (1998)

As you can see in the above table the situation is worse in Lemo. Thus, in every indicator the wereda was found to score very bad compared to the regional average taken from the 1987th census result. According to the data, one out of every six children does not

celebrate his or her first birthday. Similarly one out of every five children dies before celebrating fifth birthday.

7.1.6. Migration

Migration refers to change of residence permanently or temporary. In our survey, household heads were asked to give information about migration status of the households members including themselves. Data were collected concerned immigrants/ those who were born in other wereda/, permanent out migrants, return in- migrants and temporary out migrants

Accordingly, 96.8 % of the total population of Lemo were born with in the wereda where as the remaining 3.2 % were immigrants. Most of the immigrants were females since 84.7 % of the immigrants were female. Larger female immigrants are mainly related to marriage since, men usually do not change their residences due to marriage in the rural areas. The same was indicated in the responses for reasons for immigration. Thus, 93 % of the immigrant females came to the wereda of enumeration due to marriage where as only 10.5 % of the male immigrants came to Lemo wereda due to the same reason.

Three types of out-migrants were surveyed. These are permanent out-migrants who have left the former residence for more than six months, returned out migrants who stayed more than six months outside the wereda before they return and temporary /seasonal out-migrants who leave their residences for less than 6 months and come back. As indicated in the following table, out migration in Lemo is dominated by male population though participants in permanent out migration are more or less balanced across the two sexes. With regard to the major reasons marriage, looking for job and engagement in temporary works are the leading ones to permanent out migrants, return migrants and seasonal migrants respectively.

Table 7.1.5: % Distribution of Different Types of Out Migrants By Reason and Sex.

Major Reasons for Various Types of Out Migration	Male		Female		Both Sexes	
	Count	%	Count	%	Count	%
Reasons for Permanent Out Migrants						
Transfer/Job seeking/Training	72	35.0	10	4.5	82	19.1
Marriage /Divorce/Separation	73	35.4	167	75.2	240	56.1
Resettlement/Land Shortage	6	2.9	2	0.9	8	1.9
Health problem/Religious preaching, etc.	55	26.7	43	19.4	98	22.9
All Reasons	206	100.0	222	100.0	428	100.0
Reasons for Return Migrants						
Transfer/Job seeking/Training	93	92.1	4	30.8	97	85.1
Marriage /Divorce/Separation	1	1.0	**4**	30.8	5	4.4
Resettlement/Land Shortage	3	3.0	2	**15.4**	5	**4.4**
Health problem/Religious preaching, etc.	4	4.0	3	23.1	7	6.1
All Reasons	108	100.0	13	100	121	100.0
Major Reasons for Seasonal Out migration						

Major Reasons for Various Types of Out Migration	Male		Female		Both Sexes	
	Count	%	Count	%	Count	%
Engagement in temporary job	46	52.3	5	16.1	51	42.9
Visit/Rest	4	4.5	5	16.1	9	7.6
Seeking health service	5	5.7	3	9.7	8	6.7
Short term training/education	**17**	19.3	1	3.2	18	15.1
Chigir/Destitution	**2**	2.3	**1**	3.2	3	2.5
Other Reasons	14	15.9	16	51.6	30	25.2
All Reasons	88	100.0	31	100.0	119	100.0

Source: Household Survey Conducted By SERA, Feb. & March, 1992

Relatively speaking, the inhabitants in the high land or Dega part of Lemo were found more permanent out-migrants compared to those in the other parts of the wereda. As far as the seasonal move is considered, inhabitants of the low and high land were found more out-migrants compared to that of the intermediate high land. The underlining reason may be the influence of the Guraghe's moving culture for the Dega inhabitants and risky physical environment for those in the low land.

7.1.7. Literacy and Education

As we have discussed in chapter 4, illiteracy is among the factors that can contribute its part to communities' vulnerability for various disasters. In the population aged seven years and above 60.3 percent were not able to read and write in Lemo while the remaining 39.7 percent were found exposed to various level of education during our survey in 1992. Among the literate ones, more than 80 % were exposed to only primary education including read and write in all AEZs for both sexes. As shown in the following table, it was in dega or the high land that most of the inhabitants were found illiterate. Reflecting its better access to educational Institutes Weina Dega or intermediate high land was found with larger proportion of literate population compared to other AEZs. On the other hand the male population were found more literate than the female across all the AEZs. These results tell that males and females were having different access to benefit from the existing non-formal and formal learning opportunities.

Table 7.1.6: Distribution of Population Aged 10 Years & Above By Literacy Status, Sex & AEZ.

Category	Kolla or Lower Weina Dega			Weina Dega			Dega			Lemo Total		
	M	F	Both	M	F	Both	M	F	Both	M	F	Both
Number of population aged 10 years & above	662	605	1267	674	650	1324	205	224	429	1541	1480	3021
Proportion literate	52.4	23.0	38.4	57.0	30.2	43.8	42.0	21.0	30.0	53.0	25.9	39.7
Proportion illiterate	47.6	77.0	61.6	43.0	69.8	56.2	58.0	79.0	70.0	47.0	74.1	60.3

Source: Household Survey Conducted By SERA, Feb. & March, 1992

The literacy status of the population by age reveals that out of the total persons who were able to read and write, the high proportion (42.7 %) were those belonged to the 10-14

age group, while among those who were note able to read and write the significant proportion (15.4 %) were children in the same age group 10-14 years. This may indicate that there is culture of delaying in sending children to schools in the area.

As shown in the following table, illiterate persons in the wereda are concentrated in the age groups of 7-9 and above 40. This may confirm lack of adult literacy program as well as delayed child education. Even about 50 % of those in the age ranges of 10-39 are illiterate in Lemo. 54 % of the total population with primary education are children in the age range of 10-19. Similarly, most of those who can read and write are concentrated in the same age group.

Table 7.1.7: Percentage Distribution of population Aged 10 & Above By Educational Status

Age Five Group	Educational Status							Total	
	Read and Write	Primary (1-6)	Junior Secondary	Senior Secondary	Above 12	Illiterate	Non-formal		
	Row %	Row %	Row %	Row %	Row %	Row %	Row %	No	%
7-9	14.7	6.0	0.0	0.0	0.5	78.4	0.5	**218**	**100.0**
10-14	12.9	36.3	0.7	0.2	0.2	49.5	0.4	**568**	**100.0**
15-19	6.2	46.0	2.5	1.4	0.0	42.9	1.0	**517**	**100.0**
20-24	3.5	33.5	7.0	6.7	0.0	49.3	0.0	**343**	**100.0**
25-29	1.1	31.4	9.4	6.1	0.4	49.1	2.5	**277**	**100.0**
30-34	3.1	27.7	8.4	4.7	0.5	52.4	3.1	**191**	**100.0**
35-39	0.5	22.5	2.9	4.8	0.0	68.9	0.5	**209**	**100.0**
40-44	1.2	19.0	1.8	3.0	0.0	72.0	3.0	**168**	**100.0**
45-49	0.8	10.4	0.0	0.0	0.0	86.4	2.4	**125**	**100.0**
50-54	0.8	5.9	0.0	0.8	0.0	90.8	1.7	**119**	**100.0**
55-59	4.0	6.9	0.0	0.0	0.0	85.1	4.0	**101**	**100.0**
60-64	1.3	3.9	0.0	0.0	0.0	94.8	0.0	**77**	**100.0**
65+	2.8	0.0	0.0	0.0	0.0	95.4	1.9	**108**	**100.0**
All Age	**5.7**	**27.2**	**3.0**	**2.4**	**0.1**	**60.3**	**1.3**	**3021**	**100.0**

Source: Household Survey Conducted By SERA, Feb. & March, 1992

7.2. Natural resources, household economy and food availability

7.2.1. Land Holding and Land Quality

Obviously the economic base of farmers is land. Size of land holding and quality of land are among the influential factors of rural livelihood. As indicated in the following table, land is the most scarce resource in the wereda. About 1.9 % of Lemo's households were land less in 1992. However as we were informed during the survey those who offered very little land from their parents and relatives were considered landowners. That is partly why about 42 % of the total households were categorized to have less than or equal to half hectare. The situation is even worse in the high land or Dega part of the wereda where about 73 % of the households had less than or equal to half-hectare land in 1992.

Table 7.2.1: Distribution of Households by Land Holding Size and AEZ

Land Holding Size in Hectare	AEZ						Lemo Total		
	Kolla		Weina Dega		Dega				
	No.	%	No.	%	No.	%	No.	%	Cum. %
Land Less	1	0.3	9	3.0	3	3.0	13	1.9	1.9
0.001-0.250	27	9.0	26	8.7	22	22.0	75	10.7	12.6
0.251-0.500	80	26.7	77	25.7	48	48.0	205	29.3	41.9
0.501-1.000	123	41.0	140	46.7	26	26.0	289	41.3	83.2
1.001-1.500	43	14.3	36	12.0	0	0.0	79	11.3	94.5
>1.500	26	8.7	12	4.0	1	1.0	39	5.6	100.0
Total	300	100.0	300	100.0	100	100.0	700	100.0	

Source: Household Survey Conducted by SERA (February and March, 1992.)

Mean land holding sizes were also calculated for the three AEZs as well as the whole wereda. Accordingly, the household's mean land-holding size for the whole wereda was found 0.81 hectare. As shown in the following table the mean land holding size almost similar to wereda's average in intermediate high land, slightly above average in kolla and by far below wereda's average in the extreme high land or dega. Both table 7.2.1 and 7.2.2 indicated that dega is severely suffering from land shortage. The situation is better in lower weina dega or kolla.

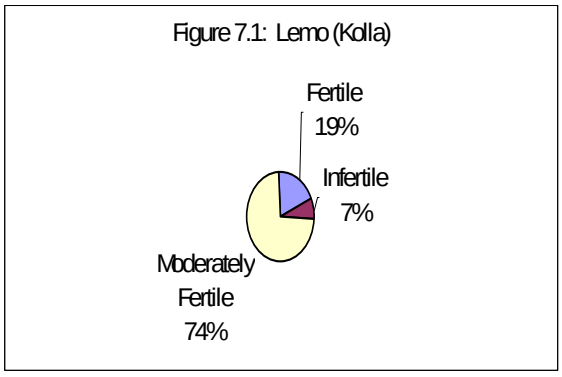
Table 7.2.2: Mean Land Holding Sizes of Households by Agro-Ecological Zone.

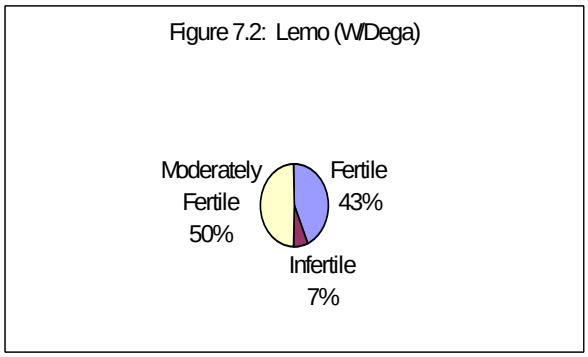
Agro-Ecological Zone	Number of Cases	Households' Mean Land Holding Size in Hectare
Kolla or Lower Weina Dega	300	0.91
Intermediate Highland/Weina Dega	300	0.80
High Land or Dega	100	0.52
Lemo Wereda Total	700	0.81

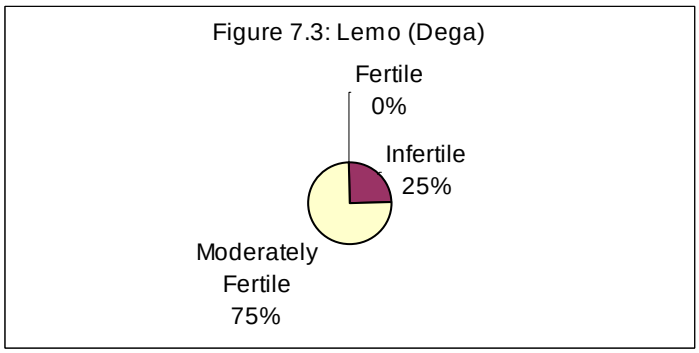
Source: Household Survey Conducted by SERA (February and March, 1992.)

Assessing land quality requires data on several indicators and complex analytical methods. Thus, it is very crude to talk about land quality based on peoples' perception. Therefore, whatever we say about land quality here is based on only farmers' perception about soil's fertility and slope angle. Accordingly, farmers' perception regarding soil's fertility in the area indicated that about 64 % of their land is moderately fertile with the remaining 27 and 9 % respectively infertile and fertile. Proportion of fertile soil is relatively higher in the intermediate high land where as proportion infertile was found higher in the high land where soil erosion is severe due to steep slope.

Figure 7.1 - 7.3: Distribution of Households by Perceived Fertility Status Across AEZ-Lemo (1992)







Slope angle is another land quality indicator since steep slopes can easily loose their fertile top soils due to erosion if they are not covered enough. On the other hand probability of being fertile is higher for plain lands if they are not disturbed by other reasons. The slope classifications perceived by the inhabitants of Lemo indicated that both the intermediate high land and the extreme high land are dominantly steep where as the low land or kolla is either plain or slightly sloping. Thus, chances for soil erosion is high in the high lands while leaving the low lands exposed to flood hazard.

Table 7.2.3 : Distribution of Households By Perceived Slope Classes

Slope Status	Agro-Ecological Zone						Lemo Wereda Total	
	Low Land/Kolla		Intermediate High Land		High land/Dega			
	No.	%	No.	%	No.	%	No.	%
Steeply sloping	5	1.7	125	43.0	58	60.4	188	27.4
Moderately sloping	15	5.0	54	18.6	33	34.4	102	14.9
Slightly sloping	106	35.5	80	27.5	5	5.2	191	27.8
Valley/Escarpments	0	0.0	5	1.7	0	0.0	5	0.7
Plain	161	53.8	26	8.9	0	0.0	187	27.3
Others	12	4.0	1	0.3	0	0.0	13	1.9
Total	299	100.0	291	100.0	96	100.0	686	100.0

Source: Household Survey Conducted by SERA (February and March, 1992.)

7.2.2. Environmental Stresses

Besides scarcity of land Lemo is still suffering from various environmental stresses Degree of soil erosion, water logging, shortage of grazing land, and land fragmentation are the major environmental stresses considered here. As indicted in the following table about 44 % of the total households in Lemo have faced either very severe or severe soil erosion, 22 % faced water logging, about 87 % faced grazing land problem and about 27 % of the total households have fragmented plots. With regard to agro-ecological differences, soil erosion was found more prominent in the high land part reflecting its topography while water logging was found common in the low land due to its flat topography. On the other hand land fragmentation was more common in the low land as well as the intermediate high land where as grazing land shortage is common to all parts of the wereda. In fact, availability of grazing land is better in the low land where land-holding size is also better.

Table 7.2.4: Distribution of Households By Major Perceived Environmental Problems

Type of environmental Stress	Degree of severity/status	AEZ						Lemo Total	
		Kolla		Weina Dega		Dega			
		No.	%	No.	%	No.	%	No.	%
Soil Erosion	Very severe	6	2.0	36	12.4	51	52.6	93	13.5
	Severe	74	24.7	93	32.0	41	42.3	208	30.3
	Minor	156	52.2	97	33.3	5	5.2	258	37.6
	No problem	45	15.1	61	21.0	0	0.0	106	15.4
	Not certain	18	6.0	4	1.4	0	0.0	22	3.2
	Total	299	100.0	291	100.0	97	100.0	687	100.0
Water Logging	Yes	105	35.2	46	15.9	1	1.0	152	22.2
	No	193	64.8	244	84.1	96	99.0	533	77.8
	Total	298	100.0	290	100.0	97	100.0	685	100.0
Grazing land shortage	Yes	215	77.6	248	90.8	97	100.0	560	86.6
	No	62	22.4	25	9.2	0	0.0	87	13.4
	Total	277	100.0	273	100.0	97	100.0	647	100.0
Land Fragmentation	Single plot	175	58.5	175	60.1	84	87.5	434	63.3
	Fragmented plots	124	41.5	116	39.9	12	12.5	252	26.7
	Total	299	100.0	291	100.0	96	100.0	686	100.0

Source: Household Survey Conducted by SERA (February and March, 1992.)

With regard to grazing land about 87 % of the wered's households reported that they have faced critical shortage. There is no significant difference between the three agro-ecological zones in this regard. Concerning season of critical shortage, most (about 80 %) of the households were found facing grazing land problem during rainy months through out the wereda. This is so since the low lands are usually often flooded during rainy months while the high lands mainly covered by meher crops during the same period. In short, rainy months are the most critical with regard to grazing land problem throughout Lemo.

7.2.3 Land Resource Management Practices

Land resources can be managed by various ways so as to sustain the benefits to be obtained from it. Managing methods can be modern, indigenous or combination of both. In fact, indigenous methods supported by modern technology is more advisable in this regard. Our survey assessed some indigenous methods like tree planting, land fallow and crop rotation.

Practice of tree planting can be considered as a positive issue with regard to land resource management. Besides, the type of trees planted and their composition can play an important role in keeping the natural balance. About 70 % in kolla, 78 % in weina dega and 76 % of the total sampled households in dega had practice of planting trees. However the type of planted trees are highly dominated by eucalyptus. Though to have any type of cover is better than no cover, trees should be selectively planted in various types of land. For example, if eucalyptus is selectively planted on degraded lands and road sides that can be more acceptable with regard to sustaining the natural balance. But as we observed in the field eucalyptus is planted in every type of land with out selection.

Crop rotation and land fallow are another important land management practices if they are done intentionally and carefully. May be due to shortage of cultivation land that proportion of households practiced land fallow is very low in Lemo. As indicated in the following table, practice of crop rotation is encouraging in the wereda. This is so since over 70 % of the sampled households in all the agro-ecological zones practiced crop rotation for the purpose of improving soil's fertility. The remaining proportion practiced crop rotation either due to shortage of cultivation land or increase crop production.

Table 7.2.5: Distribution of Households by Various land management Practices

Type of Land management Practice	Responses	AEZ						Lemo Total	
		Kolla		Weina Dega		Dega			
		No.	%	No.	%	No.	%	No.	%
Practiced tree planting	Yes	209	69.9	226	77.7	90	92.8	525	76.4
	No	90	30.1	65	22.3	7	7.2	162	23.6
	Total	299	100.0	291	100.0	97	100.0	687	100.0
Practiced land fallow	Yes	24	8.1	43	14.5	14	14.5	81	12.2
	No	275	91.9	249	85.5	83	85.5	606	100.0
	Total	299	100.0	291	100.0	97	100.0	687	100.0
Practiced crop rotation	Yes	242	80.9	210	72.2	56	57.7	508	73.9
	No	57	19.1	81	27.8	41	42.3	179	26.1
	Total	299	100.0	291	100.0	97	100.0	687	100.0

Source: Household Survey Conducted by SERA (February and March, 1992.)

As we mentioned above composition of trees planted should proportionally include some trees that significantly contribute to soil's fertility. For instance trees like Acacia are known to fix nitrogen content in the soil. *Cardia Africana* is also known to positively contribute to soil's fertility. Thus, trees should be diversified so as to be more useful with

regard to land management. However, as indicated in the following table eucalyptus is by far dominantly planted tree in Lemo.

Table 7.2.6: Percentage Distribution of Households by Type of Trees Planted & AEZ

No.	Type of Tree Planted	AEZ						Lemo Total	
		Kolla		Weina Dega		Dega			
		No.	%	No	%	No.	%	No.	%
1.	Eucalyptus	196	93.8	222	98.2	89	98.9	507	96.6
2	Podocarpo /zigba/	0	0.0	4	1.8	0	0.0	4	0.8
3	Juniper/Tid/	0	0.0	2	0.9	8	8.9	10	1.9
4	Cardia Africana	8	3.8	0	0.0	0	0.0	8	1.5
5	/Wanza/ Acacia/Girar/	1	0.5	0	0.0	0	0.0	1	0.2

Source: Household survey conducted by SERA February to March 2000.

As mentioned above, about 30 % of the sampled households in Kolla, 22 % in Weina Dega and 7 % in dega part of the wereda do not have practice of planting trees. For planting tree is considered as an important practice of land management, it may be essential to assess reasons behind not planting trees. As shown in the following table, all 100 % of the households in dega did not practice planting trees due to inadequacy of land while about 60 % in Kolla and 45 % in intermediate high land did not practice planting trees due to the same reason. Lack of suitable land is the second most important reason for not planting trees in kolla and weina dega.

Table 7.2.7: Percentage Distribution of Households By Reasons for Not Planting Trees Across AEZ.

Reason For Not planting Trees	AEZ						Lemo Total	
	Kolla		Weina Dega		Dega			
	No.	%	No.	%	No.	%	No.	%
Lack of interest	2	2.4	0	0.0			2	1.3
Lack of suitable land	12	14.3	15	23.4			27	17.4
Lack of adequate land	50	59.5	29	45.3	7	100.0	86	55.5
Lack of labor	6	7.1	3	4.7			9	5.8
Ignorance	2	2.4	0	0.0			2	1.3
Absence of land	8	9.5	14	21.9			22	14.2
Other Reasons	4	4.8	3	4.7			7	4.5
Total	84	100.0	64	100.0	7	100.0	155	100.0

Source: Household survey conducted by SERA February to March 2000.

7.2.3. Food Availability

FAO (1997*) states that all people at all time should have both physical and economic access to the basic food they need so as to be food secured. For the rural community, this largely depends on the amount and type of agricultural products. FAO (1997) also states that increase in agricultural growth often results in increase of food production leading to improved food security of the households. In our survey, the households were asked to indicate the amount and type of crops produced for the survey year as well as the year preceding the survey period besides livestock ownership. Production of Meher 1992 and Belg 1991 are combined to estimate the available food production for the year 1991/92 and production of Meher 1991 and Belg 1990 are combined to estimate the households' food availability for the year 190/91. For cash crops are treated together with households' income, only food crops are considered in the estimation of available food.

As realized in the responses, Irish Potato and haricot bean were the major Belg crops while Teff, Wheat and Sorghum appeared to be the major Meher crops for Lemo wereda. On the other hand kocho and maize were produced significantly in both production seasons. Quantity of crops produced in both seasons are combined to get the yearly total. After obtaining the total amount for each crop, available calories from each crop are calculated by using the calorie index obtained from European Local Food Security Unit. In calculating available calories, surveyed population of the survey year was used for the year under consideration as well as the preceding year. The assumption is that there will be no big difference between the two years population size. As indicated in the following consecutive tables. about 33 % in 1991 and 31 % of the total available calories in the, maize was found the largest calorie source in Lemo. Accounting about 21 % of the total available calories. Teff and Wheat were found the second and third largest calorie sources in Lemo respectively.

With regard to agro-ecological variation calorie sources were relatively diversified in weina dega (intermediate high land) and very poor in dega where Kocho accounted more than 50 % of the total available calories. The situation was moderate in Kolla or lower weina dega though about 50 % of the total available calories were obtained from maize. Thus any damage on maize and enset will significantly disturb the livelihood in kolla and dega respectively.

According to FAO (1997*) an adult person requires about 2280 calories per day. But, calculations indicated that only 948 and 957 calories were respectively available on average for the year 1991 and 1992 per person in Lemo. The calculated available calories indicated that only 41.6 % in 1990/91 and 41.9 % in 1991/92 were satisfied compared to the standard calorie requirement. The average available calories per person per day was above wereda average for lower weina dega and intermediate high land but by far below wereda average for the high land or dega. Thus, if production data in dega was not too much underestimated, they had to depend largely on market so as to satisfy their calorie requirement. In fact these levels may rise if available calories from livestock are included. The income to be obtained from cash crops was deliberately left so as to compensate for requirements of various purchases and expenses. We believe that the level of available calories can slightly be better than the calculated amount since farmers usually underestimate their production during reporting. What ever is the case it will not

be easy to compensate for a calorie deficit of about 60 % in the area. Available calories were more or less at the same level for both years we considered.

Table 7.2.8: Reported production and Estimated Available Calories Lemo (1990/91)

Type of crop	calories per KG	Production in KG			Available Calories in '000' and Proportion from Each Crop							
		Kolla	W/dega	Dega	Kolla	%	W/dega	%	Dega	%	Lemo	%
Teff	3390	33156	40600	0	112399	18.5	137634	21.1	0	0.0	250033	18.2
Wheat	3390	5291	56108	4706	17936	2.9	190206	29.2	15953	14.2	224096	16.3
Maize	3560	87184	41561	0	310375	51.0	147957	22.7	0	0.0	458332	33.4
Sorghum	3380	33163	13969	0	112091	18.4	47215	7.2	0	0.0	159306	11.6
Millet	3260	3252	100	0	10602	1.7	326	0.1	0	0.0	10928	0.8
Chickpea	3630	1	0	0	4	0.0	0	0.0	0	0.0	4	0.0
Kocho	2000	0	39653	31200	0	0.0	79306	12.2	62400	55.6	141706	10.3
Barley	3340	0	3999	8712	0	0.0	13357	2.0	29098	25.9	42455	3.1
Haricot Bean	3460	12767	4910	0	44174	7.3	16989	2.6	0	0.0	61162	4.5
Horse bean	3440	150	450	35	516	0.1	1548	0.2	120.4	0.1	2184	0.2
Field pea	3450	0	0	1147	0	0.0	0	0.0	3957	3.5	3957	0.3
Irish Potato	870	800	19597	790	696	0.1	17049	2.6	687	0.6	18433	1.3
Total production					608792	100.0	651587	100.0	112216	100.0	1372596	100.0
Total population					1639		1773		554		3966	
Available calorie /person/day						1018	1007		555		948	

Source: Household survey conducted by SERA (February to March, 2001)

Table 7.2.9: Reported production and Estimated Available Calories Lemo wereda (1991/1992)

Type of crop	calories per KG	Production in KG			Available Calories in '000' and Proportion from Each Crop							
		Kolla	W/dega	Dega	Kolla	%	W/dega	%	Dega	%	Lemo	%
Teff	3390	36642	52611	0	124216	21.3	178351	25.9	0	0.0	302568	21.8
Wheat	3390	10591	61957	4679	35903	6.2	210034	30.5	15862	14.0	261800	18.9
Maize	3560	80980	40249	0	288289	49.4	143286	20.8	0	0.0	431575	31.1
Sorghum	3380	31930	12745	0	107923	18.5	43078	6.3	0	0.0	151002	10.9
Millet	3260	2277	0	0	7423	1.3	0	0.0	0	0.0	7423	0.5
Chickpea	3630	50	0	0	182	0.0	0	0.0	0	0.0	182	0.0
Kocho	2000	0	46549	28720	0	0.0	93098	13.5	57440	50.6	150538	10.9
Barley	3340	200	1585	11752	668	0.1	5294	0.8	39252	34.5	45214	3.3
Haricot Bean	3460	5344	1215	0	18490	3.2	4204	0.6	0	0.0	22694	1.6
Horse bean	3440	0	1317	50	0	0.0	4530	0.7	172	0.2	4702	0.3
Field pea	3450	0	0	125	0	0.0	0	0.0	431	0.4	431	0.0
Irish Potato	870	500	7725	540	435	0.1	6721	1.0	470	0.4	7626	0.6
Total production					583530	100.0	688597	100.0	113627	100.0	1385753	100.0
Total population					1639		1773		554		3966	
Available calories Per/person/day					975		1064		562		957	

Source: Household survey conducted By SERA Feb-March 1992.

The above calculations could indicate wereda level food security status though average per capita calorie available is indicated at individual level. As part of the household's food security assessment, it is still essential to know proportion of the individuals who are able to get the required amount of energy. The following table is aimed to indicate this by taking 2200 calorie per person per day as standard energy requirement. The calculation was done by dividing the wheat equivalent of the total food crop produced at each household to the respective family members. As shown in the table it was only 2 % of Lemo's inhabitants able to get the standard calorie requirement in 1992. About 74 % were able to satisfy only 50 % of their energy requirement. The situation was worse in the extreme high land where no one was found to get the standard amount of energy.

Table 7.2.10: Distribution of Households by Available Per Capita Calorie to Their Family Members

Available Calorie Per Person Per Day	AEZ						Lemo Wereda Total	
	Kolla		Weina Dega		Dega			
	Count	%	Count	%	Count	%	Count	%
0-500	116	38.7	111	37.0	51	51.0	278	39.7
501-1000	100	33.3	102	34.0	38	38.0	240	34.3
1001-1500	44	14.7	53	17.7	8	8.0	105	15.0
1501-2200	29	9.7	30	10.0	3	3.0	62	8.9
2200+	11	3.7	4	1.3	0	0.0	15	2.1
Total	300	100.0	300	100.0	100	100.0	700	100.0

Source: Household survey conducted By SERA Feb-March 1992.

7.2.5. Livestock ownership and composition

Livestock is another basic resource on which the rural households' livelihood largely depends. As discussed in the income section, sale of livestock is the leading income source in Lemo. Thus, families without any livestock are more vulnerable to various risks compared to those with livestock. As indicated in the following table, about 14 % of the total households in Lemo do not have any livestock. The livestock ownership status is better in dega since the proportion with out any livestock were 14 %, 13.4 % and 8 % in kolla, weina dega and dega respectively. About 24 % of the total sampled households in Lemo had only up to one livestock in TLU term.

Table 7.2.11: Distribution of Livestock in TLU Terms By AEZ (Lemo 1992)

Number of Livestock per household in TLU	AEZ						LemoTotal		
	Kolla		Weina Dega		Dega				
	Count	%	Count	%	Count	%	Count	%	Cum. %
No livestock	42	14.0	40	13.4	8	8.0	90	12.9	12.9
0.010-0.250	11	3.7	5	1.7	1	1.0	17	2.4	15.3
0.251-0.500	7	2.3	4	1.3	4	4.0	15	2.1	17.4
0.501-1.000	19	6.3	21	7.0	4	4.0	44	6.3	23.7

Number of Livestock per household in TLU	AEZ						LemoTotal		
	Kolla		Weina Dega		Dega				
	Count	%	Count	%	Count	%	Count	%	Cum. %
1.001-1.500	34	11.3	33	11.0	15	15.0	82	11.7	35.4
1.510-2.000	25	8.3	26	8.7	13	13.0	64	9.2	44.6
2.001-3.000	55	18.3	60	20.1	27	27.0	142	20.3	64.9
Over 3	107	35.7	110	36.8	28	28.0	245	35.1	100.0
All	300	100.0	299	100.0	100	100.0	699	100.0	

Source: Household survey conducted By SERA Feb-March 1992.

Moreover, presence or absence of oxen in the households is another influential factor on which the level of crop production depends. Besides, those with oxen can rent them and get benefit in return either in cash or kind. As summarized in the following table, about 56 % of the sampled households in Lemo do not have any ox during this survey. The situation is relatively better in the intermediate high land since about 50 % had 1 or oxen in 1992. You should not be surprised that 87 % did not have ox in Dega since they are dominated by hoe culture where cereal cultivation is not common.

Table 7.2.12: Distribution of Households By Ownership of Ox Across AEZ

Number of Ox/Bull per Household	AEZ						Lemo Total	
	Kolla		Weina Dega		Dega			
	Count	%	Count	%	Count	%	Count	%
0	153	51.5	149	49.7	87	87.0	389	55.8
1	104	35.0	114	38.0	13	13.0	231	33.1
2	33	11.1	34	11.3			67	9.6
3	1	0.3	2	0.7			3	0.4
4	5	1.7	1	0.3			6	0.9
5	1	0.3					1	0.1
All	297	100.0	300	100.0	100	100.0	597	100.0

Source: Household survey conducted By SERA Feb-March 1992.

7.2.6. Household Income

Adequate household income is one of the necessities that households can have access to various types of food, agricultural inputs medication, education etc. since an income of one dollar a day marks poverty line according to World Bank Study. It is very difficult to get the actual stated income from rural surveys since farmers usually underestimated their income. Besides they don't have regular cash income that they could easily recall. If accurate data is collected household, income can be used to estimate proportion of population living below poverty line.

Rural households do not state/report what they eat and what they have in the form of labor in cash terms. Therefore the income groups indicated in the following table are only to assess status of cash availability for various expenditures such as land tax, agricultural

inputs, medication, school fees, purchase of some food items that they do not produce and clothing. The assumption is that they consume what they produce.

As indicated in the following table, about 47 % of the wereda's population/ households reported that they get less than 250 Birr a year. That means, for about half of the households, monthly household's income was less than or equal to Birr 20 on average. Moreover about 23 % of the households reported that they had no any income. It was only about 14 % of the household heads that reported to have received a monthly income of more than Birr 80 a month. Under such income status it will not be easy for families to cover the expenses mentioned above.

Generally speaking income status of male headed households were found better than female headed in one hand and kolla or low land inhabitants' than the inhabitants of intermediate high land as well as high land on the other hand. Income status of dega looks very bad, however, most of the responses obtained from dega reveals that they usually underestimate elements like income and exaggerate problems.

Table 7.2.13: Percentage Distribution of Households' Income by Sex and Agro-Ecology

Income Range in Birr	AEZ												Lemo Total	
	Kolla				Weina dega				Dega					
	Male		Female		Male		Female Headed		Male Headed		Female Headed			
	No.	%	No.	%	No.	%	No	%	No	%	No	%	No	%
No Income	37	14.3	13	31.0	40	15.5	13	31.0	44	56.4	12	54.5	159	22.7
1-100	14	5.4	2	4.8	19	7.4	4	9.5	11	14.1	3	13.6	53	7.6
101-250	29	11.2	7	16.7	53	20.5	7	16.7	11	14.1	3	13.6	110	15.7
250-500	51	19.8	8	19.0	55	21.3	4	9.5	5	6.4	3	13.6	126	18.0
501-1000	75	29.1	5	11.9	56	21.7	9	21.4	6	7.7	0	0.0	151	21.6
>1000	52	20.2	7	16.7	35	13.6	5	11.9	1	1.3	1	4.5	101	14.4
Total	258	100.0	42	100.0	258	100.0	42	100.0	78	100.0	22	100.0	700	100.0

Source: Household survey conducted By SERA February to March 1992.

We also felt that knowledge of contribution of each income source is important for our purpose since any disaster or even constraint associated major income sources can easily expose inhabitants to various disasters. As indicated in the following table, about 86 % of the household income was obtained from the sale of livestock, off-farm activities and sale of crops in 1992. However, livestock sale was found the leading source of income in Lemo. Though livestock sale was the leading income source in all agro ecological zones, its relative share declines as altitude increases. Contributing for about 19 % of the total income, off-farm activity was found the second largest income source in Lemo. Thus, any disturbance to livestock, off-farm activities and crop production can easily make the community exposed to various disasters since resilience to disasters partly depends on income. As shown in the following table, the average annual income in Lemo was about Birr 500 in 1992, that is about 42 Birr a month. Again may be reflecting their culture of

underestimation, the average annual household income was found only Birr 125, which is about 10 Birr a month.

Table 7.2.14: Households Income By Major Sources (Lemo, 1992)

Source of Reported Income	AEZ						Lemo Total		
	Kolla		Weina Dega		Dega				
	Amount in Birr	%	Amount in Birr	%	Amount in Birr	%	Amount in Birr	%	Birr/ HH
Sale of livestock	107349	57.0	58104	40.6	3940	31.5	169491	49.2	244
Non-farm income	12558	6.7	10589	7.4	2318	18.5	25480	7.4	37
Off- farm income	32102	17.0	29733	20.8	2555	20.4	64428	18.7	93
Remittances	12330	6.5	6182	4.3	3061	24.5	21583	6.3	32
Sale of crops	23988	12.7	38552	26.9	640	5.1	63219	18.4	91
All sources	188327	100.0	143160	100.0	12514	100.0	344200	100.0	497

Source: Household survey conducted By SERA February to March 1992.

7.2.7. Household Assets and Farm Implements

Availability of some household assets could reflect better economic status of the families. Expensive household assets are often owned by the better of. Such families may be able to cope with disasters at least for some times by selling their assets. Besides, families with radio may have better access to information and those with lumps or gas stoves may have better lighting sources compared to those with out. Farm implements are basics to rural households who mainly depend on agriculture. Thus, agricultural households without any farm implements may be considered as the most vulnerable unless and otherwise they are depending on non-farm activities.

As indicated in the following table, considerable proportion of the rural households in Lemo do not own various basic farm implements. For instance, about 54 % do not own hoe. Some important households are rarely available for the inhabitants. For example, only 4.9 % own radios. May be reflecting the effect of mobility, proportion with gas stove is considerably large in dega part of Lemo. The same is true of silver and gold made Jewelers. For the rest status asset ownership is more or less similar in all the agro-ecological zones.

Table 7.2.15: Percentage Distribution of Households Owning Various Household Assets & Basic Farm Implements by AEZ

Type of Farm Implement/Asset	AEZ			Lemo Total
	Kolla	W/dega	Dega	
Proportion with Hoe	51.0	46.3	27.8	45.8
Proportion with Plough	63.0	64.3	76.0	65.4
Proportion with Sickle	86.2	88.6	88.8	87.6
Proportion with Grain Storage	31.6	39.3	29.0	34.6
Proportion with Lumps/Gas/Stove	3.1	2.3	7.1	3.3
Proportion with Tape Players	4.0	3.7	2.0	3.6

Type of Farm Implement/Asset	AEZ			Lemo Total
	Kolla	W/dega	Dega	
Proportion with Radio	4.0	4.5	4.0	4.9
Proportion with Gold or Silver made Jewelers	2.3	3.0	5.0	3.0

Source: Household Survey Conducted by SERA (February to March, 1992)

7.3. Health, nutrition and housing facilities

Obviously, healthy community can better cope with various disasters. Generally speaking, well-nourished people can have better health status compared to the malnourished ones. Health status of children and mothers may be the best indicator of a certain communities' health situation. This is so since children and mothers together account for about 70 % of the total population in poor countries like Ethiopia besides strong relation ship between children and mothers. It will not be easy to correct the health status of human being at the latter age.

Thus, to have healthy children is basic to communities' health. Health of children and mothers are closely linked since it is not common to get healthy child from unhealthy mother. It is due to the above relationships that emphasis was given to health status and health care situation of mothers and children in our survey.

7.3.1. Maternal Care.

As mentioned above, having healthy children in particular and health population in general partly depends on the health care situation of mothers. In our survey, the health status of mothers was analyzed by assessing situation of antenatal care /ANC/, Tetanus Toxoid Immunization /TTI/, delivery care and family planing besides assessing their culture of medical treatment during sickness.

7.3.1A. Antenatal care/ANC/

This is an important care provided to pregnant women until they give birth by a doctor a health professional in a medical facility or at home. Advice on diet correction and provision of iron tablets to pregnant women are included in this care besides medical treatment. If properly followed, antenatal care is believed to contribute to reduction of maternal morbidity as well as mortality besides reducing the incidence of prenatal, neonatal and infant mortality.

In our survey, mothers were asked whether they had received medical care or not during pregnancy of the youngest child. The responses indicated that about 49 % in kolla, 68.9 % in weina dega and 23 % in dega part of the wereda went to medical care during pregnancy. Reflecting the absence of health institutes near by, proportion with antenatal care is relatively very low in dega part of Lemo. Over all about 54 % of the pregnant women in the wereda received antenatal care during pregnancy. Among those who received medical care, most of them went to either hospital or clinic. Similarly, most of them /about 98 %/ received antenatal care from health professionals. However, about 39 % in kolla, 19 % in weina dega and 26 % of the pregnant women who received medical care in dega visited health institutes at or after 8^{th} month of the pregnancy for the first time.

Proportion received antenatal care were very low especially in dega part of the wereda. In fact, the level is still promising compared to the rural average for the whole country as well as the Southern Region. For they were found to begin antenatal care very late to their pregnancy, the health institutes in the wereda has to work hard in awareness creation.

7.3.1B. Delivery Care.

Delivery care is among the essential maternal cares both for the health of mother and survival of child. To be safe, delivery should be conducted by a trained health personnel under proper hygienic condition. With regard to delivery care mothers with live births within 5 years prior to the survey were asked to provide information about where and how they gave birth. As summarized in the following table about 97 % of the applicable women in the wereda gave birth at their own or relatives' home. No difference was observed between the three agro ecological zones in this regard except that all women in dega part of Lemo gave birth at own or relatives' home. Over all, only1.8 % of the women in the wereda were assisted by professional health personnel during delivery. As indicated in the following table, more than two-third the women in Lemo were assisted by traditional birth attendants. On the other hand, about 16 % of the responded women in the wereda were assisted by their own relatives, friends or neighbors during delivery. Weina dega part of the wereda was better in this regard since about 3.4 % of the women were assisted by professional health personnel during delivery.

Table 7.3.1. Distribution of Women by Place of Delivery and Type of Assistance Across AEZ (Lemo, 1992).

Place of Birth/Type of Delivery Assistance Given	Agro Ecological Zone						Lemo WerdaTotal	
	Koll		Weina Dega		Dega			
	No	%	No.	%	No.	%	No	%
- Gave Birth at Own Home or Relative's Home	229	97.4	240	94.9	74	100.0	543	96.6
- Gave Birth at TBA's Home	4	1.7	3	1.2			7	1.2
- Gave Birth at Hospital	0	0.0	9	3.6			9	1.6
- Gave Birth at Clinic	0	0.0	1	0.4			1	0.2
- Gave birth at other places	2	0.9	0	0.0			2	0.4
All	**235**	**100.0**	**253**	**100.0**	**74**	**100.0**	**562**	**100.0**
- Assisted by Doctor, Nurse or Health Assistant	1	0.6	6	3.4	0	0.0	7	1.8
- Assisted by TTBA	11	6.8	8	4.5	12	25.0	31	8.0
- Assisted by TBA	113	70.2	130	73.4	35	72.9	278	72.0
- Assisted by relatives/ Friends	30	18.6	32	18.1	1	2.1	63	16.3
- Assisted by No body.	2	1.2	1	0.6	0	0.0	3	0.8
- Others	4	2.5	0	0.0	0	0.0	4	1.0
All	161	100.0	177	100.0	48	100.0	386	100.0

Source: Household Survey Conducted by SERA, February to March 1992

7.3.1C. Family Planning

As we have discussed earlier, the mean family size for the wereda is very high. Secondary data also indicated that the wereda is already suffering from high population density. Under such situation, family planning is not to be overlooked in the area.

In our survey women of the reproductive age were asked about the knowledge of family planning methods, regarding ever used and currently used family planning methods. As indicated in the Preliminary Demographic and Health Survey of Ethiopia Knowledge about family planning is considerably high in the country. Our survey also indicated that significant proportion of the eligible women do not have problem of knowledge. However, application of family planning is still in its in fancy due to various reasons.

Accordingly only 24.9 % of the eligible women were found to have ever used any family planning method in the wereda. This is very low compared to 17 % of the national achievement. Moreover, about 39 % of the women who have ever used any family planning were found dropped current use during our survey. Thus, there is very high discontinuity in family planning. With regard to agro-ecology, weina dega which is the most closer to Hossana was found better since about 5 % of the eligible women were found using family planning method at least once prior to this survey.

As shown in the following table, the situation was found relatively better in weina dega or in the intermediate high land compared to that of Kolla and extreme dega. With regard to age, proportion with ever use were higher for women aged 25-34 in the wereda.

Eligible women were also asked about their intention to use contraceptives. 16.1 % of them were willing to use in the future. They were also asked about the intended methods. Their responses indicated that pills are the most preferred method followed by injections. In fact, about 10 % of them were not able to fix the intended method. Status of ever and current use of any family planning method is summarized in the following table.

Table 7.3.2: Percentage distribution of ever married women by ever and Current use of any family planning method across AEZ (Lemo 1992)

Users Category	AEZ			Wereda Total
	Kolla	Weina Dega	Dega	
Ever used any family planning methood	1.6	9.1	1.4	4.9
Currently using any family planning methood	0.4	6.3	0.0	3.0

Source: Household Survey Conducted by SERA, Feb-March, 1992

7.3.1D. Tetanus Toxoid Immunization /TTI/

These are injections given to mothers during pregnancy so as to prevent neonatal tetanus which is an important cause of death among infants. These are very important injections for the rural women since the environment they give birth is usually unhygienic. However, only about 32.4 % of the eligible women in the wereda were found to receive at least two doses of TTI in connection to the recent or last pregnancy during our survey. The situation is better in weina dega compared to that of Kolla and dega since women with TT2 were only 21.3 % in kolla and 16 % in dega but over 46 % in weina dega part.

This level is promising compared to both national and regional coverage. According to EDHS/ 2000*/ % of women with TTI were 14.5 % for rural Ethiopia and 18.0 % for the SNNPR in the same year of our survey.

7.3.2. Child Health Care and Health Status

To be healthy, children should be well fed besides properly receiving various vaccinations available to improve their immunity. Accordingly we took anthropometric measures for children aged 6 to 36 months besides assessing immunization coverage during our survey. Status of breast-feeding and illness were also surveyed by using responses of children's mothers.

7.3.2A. Immunization of children

Immunization coverage against Polio, DPT, BCG and Measles were assessed in our survey for children aged 3 to 36 months in Lemo. As you can see in the table, the coverage is very high for Polio and unsatisfactor for others. For children are expected to complete most vaccinations after the age of 12 months, status vacination for children aged 12 to 23 months are separately indicated in the table. The results are summarized in the following table.

Table 7.3.3: Percent Age Distribution of Children With Various Vaccines and Vaccination Cards.

Age of Children	Type of vaccine	Agro-Ecology			Lemo Rural	SNNPR	Ethiopia Rural
		Kolla	Weina Dega	Dega			
3-36 Months	With Vaccination Card	33.5	59.5	40.5	46.1	21.3	24.2
	With Polio	89.2	77.8	53.8	79.2	69.2	81.4
	With BCG	37.8	69.2	23.1	46.1	41.5	42.6
	With DPT	35.1	69.2	38.5	47.4	41.6	41.4
	With Measles	18.8	54.2	33.3	33.8	24.3	22.3
	Fully vaccinated	14.3	40.0	8.3	22.2	10.5	11.0
12-23 Months	Fully Vaccinated	5.9	15.4	7.7	9.6		
	partially vaccinated	82.4	69.2	53.8	72.6		
	Not vaccinated at all	11.8	15.4	38.5	17.8		
	Total	100.0	100.0	100.0	100.0		

Source: Household Survey Conducted by SERA February to March 1992

Figures for SNNPR and Rural Ethiopia from EDHS /2000*/

Only about 46 % of the eligible children were found with vaccination card in the wereda the time of our survey. As indicated in the above table vaccination coverage is high for Polio and low for Measles. The reason for high performance in Polio is obviously the result of national campaign under international pressure. Children with all basic vaccines were very low in Lemo. As shown in the table, only 22.2 % of the youngest children were fully vaccinated. However, the achieved level is still promising compared to both regional and national average.

No big difference was observed across agro-ecological zones. Except for polio, the coverage is relatively higher in weina dega than kolla for all basic vaccines in the wereda. The worst is that proportion of fully vaccinated children was only 8.3 % for dega during the survey. This is by far poor coverage compared to 14.3 % for kolla and 40 % for weina dega part of the wereda. Better immunization coverage in the intermediate high land may the result of better accessibility to health institutes as well as road transport.

7.3.2B. Prevalence of Child Illness and Treatment

Prevalence of child's sickness can be the result of poor nutrition as well as low level of immunization. In fact, background of the mother is also very important aspect to be considered in this regard.

In our survey, eligible women were asked that whether her son or doughtier was sick or not in the last two weeks prior to the survey. Besides, they were also asked for the type of disease that attacked her child. As shown in the following table, considerable proportion of the children aged 5 year or less in Lemo were found experiencing various types of illness within two weeks prior to the survey.

However, only 35.5 % of sick children received treatment or advice in the health institutes in the wereda. May be due better access to health institutes, proportion of children received medical treatment or advice in the health institutes was found significantly higher in kolla and weina dega compared to that of dega. With regard to the age group, relatively higher proportion of children were faced illness in the first and second year of their life-time.

Concerning the type of diseases, fever was found the leading child problem in the area followed by diarrhea. Proportion of children reported to had fever and diarrhea were 30.0 and 19.2 % respectively. Fever and diarrhea didn't show any significant variation between the low land and intermediate high land. Vomiting was found more common in the low land than the intermediate high land. Proportion of children ill was the highest in dega compared to other agro-ecological zones for all diseases considered. The major reason behind may be their culture of exaggeration.

Table 7.3.4: Percentage Distribution of Under 5 Children by Type of Illness and Treatment Across AEZ.

Type of sickness	AEZ						Lemo	
	Kolla		W/Dega		Dega			
	No.	%	No.	%	No.	%	No.	%
Fever	68	29.3	68	29.4	30	40.5	166	30.0
Cough	28	12.1	40	16.0	22	29.7	90	16.2
Difficulty of Breathing	5	2.2	5	2.0	4	5.4	14	2.5
Diarrhea	40	17.2	48	19.2	19	25.7	107	19.2
Vomiting	29	12.5	21	8.4	14	18.9	64	11.5
Got advice or Treatment for the Illness in the Health Institutes	**34**	**40.0**	**43**	**38.4**	**5**	**14.7**	**82**	**35.5**

Source: Household survey conducted by SERA /Feb-March 1992/

7.3.3. Nutritional Status of Children and Women

7.3.3A. Practice of Breast Feeding

Proper breast-feeding is very essential for children's nutrition as well as health. It should also be supplemented by carefully selected food items after the age of six month for all children. As stated in the preliminary report of EDHS /2000*/, the World Health Organization recommends that children should exclusively breast fed during the first 6 months of life and that they should be given solid/mushy supplementary food beginning the seventh month.

Similar to the whole country, practice of breast-feeding is considerably high in Lemo. For instance, about 97 % of the interviewed women reported that they practice breast- feeding. As shown in the following table, about 88 % of children between the age of 0 to 3 months were exclusively breast-fed. Proportion with exclusive breast feeding declines starting age of seventh month. However, it is still disadvantageous to see about 35 % of children aged 7 to 24 months given no supplementary food in Lemo.

Table 7.3.5: % Distribution of Children by Practice of Breast Feeding & Age.

Age Group	Condition of Breast Feeding					
	Exclusive		On demand with supplementary Food		Occasionally with supplementary food	
	No.	%	No.	%	No	%
0-3 months	22	88.0	2	8.0	1	4.0
4-6 months	19	65.5	9	31.0	1	3.4
7-12 months	18	47.4	12	31.6	7	18.4
13-24 month	15	26.8	27	48.2	14	25.0

Source: Household Survey Conducted By SERA / February to March, 1992/

7.3.3B. Nutritional Status of Children

Anthropometry was used as a major tool to assess children's nutritional status. Data on height and weight were collected so as to compute the summary indices of nutritional status namely height- for- age, weight -for –height and weight for-age. According to EDHS (2000*), these three indices determine children's susceptibility to diseases and their chances of survival and are expressed as standardized scores / Z-scores/ or standard deviation units from the median for the international reference population recommended by the World Health organization. According to the same source, children who fall more than two standard deviation below the reference median are regarded as undernourished while those who fall more than three standard deviations below the reference median are considered severely under nourished.

Table 7.3.6: Percentage Distribution of children by stunting, wasting and under weight

Age Group in Months	Stunted % below -2 SD	Wasted % Below -2 SD	Under weight % Below -2 SD
3-5	25.0	0.0	8.3
6-11	35.5	8.1	37.1
12-23	49.0	15.6	52.1
24-36	44.1	15.3	50.8
3-36 (Lemo)	**43.1**	**13.2**	**46.5**
SNNPR	53.9	12.1	52.5
Ethiopia Rural	52.3	11.3	48.6

Source: Household survey conducted by SERA February to March, 1992.

Figures for SNNP and Ethiopia rural from EDHS /2000*/

As indicated in the above table, 21.9 and 43.1 % of Lemo's Children were severely stunted and stunted respectively. Thus, about 43.0 % of the total children in the wereda were short compared to their age. Proportion of stunted children was found increasing with increasing age up to 2 years and starts declining after age 2 for children aged 3 to 36 months. Similar trend was observed for wasting and under weight especially up to the age of 24 months.

On the other hand 0.7 % and 13.2 % of Lemo's children aged 3-36 months were respectively severely wasted and wasted. That means, about 13 % of the wereda's children were thin compared to their height. Proportion of severely wasted children was found closer to that of rural Ethiopia and SNNPR. About 46.5 % of children in Lemo were under weight with 16.3 % severely under weight. The situation is worse compared to the country's rural average as well as that of the Southern Region especially regarding severely under weight proportion.

7.3.3C. Nutritional Status of Mothers

Nutritional Status of children is closely related to the nutritional status of women. This is so since well nourished mothers usually give birth to children of reasonable weight besides having enough breast-milk for the child. In our survey, nutritional status of women aged 15 to 49 were estimated by measuring the mid upper arm circumference of the same. Then, women with mid upper arm circumference of less than or equal to 22.5 centimeter were considered as malnourished and those above the cut off point were considered as well nourished or normal.

The survey result indicated that about 25 % of eligible women in Lemo were malnourished in 1992. Proportion of malnourished women was highly concentrated in the age range of 15-19. Accordingly, about 41 % of the total malnourished women in Lemo were found within the age range of 15-19. With regard to agro-ecological variation, dega was found the most disadvantaged with about 29 % of malnourished women.

7.3.4. Housing, Housing Facilities and Water Supply

Contribution of good housing and housing facilities is not to be over looked for health of the families. Lack of potable water is directly related to water born diseases. Thus, major source of light, type of drinking water, toilet facilities and housing condition of the households are briefly assessed in this section.

7.3.4.A. Housing Condition

Though housing condition includes many aspects such as construction materials, persons per room density, availability of kitchen, source of lighting, toilet facilities, etc, we limited ourselves to presence of window, toilet facilities and materials for construction of roof for the sake of simplicity.

As revealed in our survey, about 95 % of the sampled households in Lemo do not have any type of toilet facility while the remaining 5 % had either pit latrine or other type of toilet during our survey. The Situation was better in dega since about 19 % of the sampled households in had pit latrine. Toilet status was found worse in the intermediate high land since no one had pit latrine during this survey.

Presence of window is believed to provide enough light during daytime and better breathing any time. However, about 51 % of Lemo's inhabitants reported that they do not have any window during this survey. The situation was worse in dega part since about 82 % of the sampled households in this part do not have any window.

Traditionally, roofs with corrugated iron are considered as an indicator of better economic status. In fact, there are some well-built thatch roofs are equally considered as an indictor of wealth. In our survey, about 98 % of the sampled households were found thatch roofed with the remaining 2 % corrugated iron roofed. Distribution of housings by type of roofs almost the same in all the agro-ecological zones.

7.3.4B. Major Source of Drinking Water

As we mentioned earlier, type of drinking water used is closely related to the health status of the inhabitants. As indicated in the following table, about 63 % of the sampled households in the Lemo were found drinking either lakes or rivers while about 27 % were found drinking water from unprotected springs. Thus, for about 90 % of the rural inhabitants in Lemo, source of drinking water was not potable in 1992. The situation was more or less similar in all the agro-ecological zones. Thus, chances for water born diseases are ripe in Lemo.

Table 7.3.7:Percentage Distribution of Households by source of Drinking water & AEZ

Main Source of Drinking Water	AEZ						Lemo	
	Kolla		Weina Dega		Dega			
	No.	%	No.	%	No.	%	No.	%
Piped	4	1.6	6	2.3	2	2.5	12	2.0
Pumped			1	0.4	1	1.2	2	0.3
Protected well			3	1.2			3	0.5

Main Source of Drinking Water	AEZ						Lemo	
	Kolla		Weina Dega		Dega			
	No.	%	No.	%	No.	%	No.	%
Unprotected well	21	8.4					21	3.6
Protected spring	1	0.4	4	1.5	2	2.5	7	1.2
Unprotected spring	4	1.6	81	31.3	75	92.6	160	27.2
Lake/ River/ Pond	219	88.0	150	57.9	1	1.2	370	62.8
Digging sand /chirosh/			13	5.0			13	2.2
Other source			1	0.4			1	0.2
Total	249	100.0	259	100.0	81	100.0	589	100.0

Source: Household survey Conducted by SERA, February to March (1992)

7.3.4C. Source of Fuel for Cooking and Light used at Night

Being used by about 91 % of the sampled households, Dwarf kerosene lamp or Kuraz was the single most important source of lighting at night. This has no any difference b/n the three agro-ecological zones. Serving for about 7 % of the sampled households, firewood is the second important source of light in the wereda. Firewood was also the major source of fuel used for cooking throughout the wereda followed by leaves of trees and dung. Accordingly 59.2 %, 22.9 % and 12.0 % of fuel for cooking was satisfied by firewood, tree leaves and dung respectively. This clearly shows that almost all of the inhabitants in the wereda are depending directly or indirectly on trees. Thus demand for firewood is an important driving force of deforestation. The worst is that considerable proportion of energy requirement for cooking is satisfied by dung, which is the most important natural fertilizer in the rural area.

7.4. Risk Perception and Coping Strategies

7.4.1 Perceived Food Insecurity

According to FAO (1997*), all people at all time should have both physical and economic access to the basic food they need so as to be considered as food secured. Other wise they are not food secured. Since food is basic to survival of human being, food security can be considered as one of the worst vulnerability indicator.

In our survey household heads were asked to indicate their current food security status as well as food security status of the last 10 years. The question regarding the last 10 years revealed that 99.3 % of the sampled households in the wereda faced food insecurity. No big difference was seen between the three agro-ecological zones in this regard. In fact, all of the sampled household heads were found food insecure in dega part of Lemo. Under such situation, it is not helpful to further discuss food insecurity status of the area. Rather, it may be important to see the situation from different angle. Accordingly, assessment of current food security status may be a better alternative.

Concerning the current food security status, only 1.2 % of the sampled households in Lemo said that they have enough food for the whole year. Moreover, about 22 % said that their stock was already empty during the survey. However, no female-headed household was found with sufficient food for the whole year. Similarly no household in Dega part of

the wereda was found with sufficient food for the whole year or until the next harvest. In addition, as shown in the following multivariate cross tabulation table, land holding size of the household, ownership of ox, livestock ownership status and age of the household head were found among the most important causes of food insecurity in Lemo.

Out of those responded to be with insufficient food for the whole year, about 79 % said that the available food is enough only for two more months. For the Belg crops will be ready for food only after July, 79 % of the households are going to be out of stock for at least 4 months in the year.

Table 7.4.1. Distribution of Households by Status of Food Adequacy in Stock and Major Causes of Perceived Food Insecurity.

Probable Indicator of Perceived Food Insecurity	**Sub Categories of The possible Indicators**	**Households' Food Adequacy Status in Stock**					
		Sufficient		**Insufficient**		**Out of Stock**	
		Count	**%**	**Count**	**%**	**Count**	**%**
- AEZ	Kolla	6	2.0	233	78.7	57	19.3
	Lower Weina Dega	2	0.7	205	69.0	90	30.3
	Dega			94	94.0	6	6.0
- Sex of HH Head	Male	8	1.4	463	78.9	116	19.8
	Female			69	65.1	37	34.9
- Age of the household head	10-19			5	100.0		
	20-29			68	72.3	26	27.7
	30-39	3	1.9	121	75.2	37	23.0
	40-49	3	1.8	125	75.3	38	22.9
	50-59			99	78.6	27	21.4
	60+	2	1.4	113	81.9	23	16.7
- Land Holding of the Household in terms of Hectare	Land less			6	46.2	7	53.8
	0.01-0.25 ha			48	64.9	26	35.1
	0.251-0.50 ha			151	74.0	53	26.0
	0.51-1.00 ha	5	1.8	233	81.8	47	16.5
	1.01-1.50 ha	1	1.3	67	84.8	11	13.9
	Over 1.5 ha	2	5.3	27	71.1	9	23.7
- Household Income/year in Birr	No stated income			118	74.2	41	25.8
	1-100	1	1.9	43	81.1	9	17.0
	101-250	1	0.9	80	73.4	28	25.7
	251-500			95	76.0	30	24.0
	501-1000	3	2.0	117	79.1	28	18.9
	Over 1000	3	3.0	79	79.8	17	17.2
- Ownership of ox	With no ox	2	0.5	272	70.1	114	29.4
	At least with one ox	6	2.0	258	85.4	38	12.6
- Number of Livestock Owned per household in terms of TLU -	No livestock	1	1.1	45	50.0	44	48.9
	0.01-0.50			21	65.6	11	34.4
	0.51-1.00			27	62.8	16	37.2
	1.01-1.50			58	70.7	24	29.3
	1.51-3.00	1	0.5	166	80.6	39	18.9
	Over 3	6	2.5	214	89.5	19	7.9

Probable Indicator of Perceived Food Insecurity	Sub Categories of The possible Indicators	Households' Food Adequacy Status in Stock					
		Sufficient		Insufficient		Out of Stock	
		Count	%	Count	%	Count	%
- Soil's fertility status	Fertile	2	1.1	134	72.8	48	26.1
	Moderately fertile	5	1.2	338	78.4	88	20.4
	Infertile	1	1.6	53	84.1	9	14.3
- Households' Family Size	Up to 3	2	1.6	90	72.0	33	26.4
	4-6	1	0.3	252	76.6	76	23.1
	7 and above	5	2.1	190	79.5	44	18.4
Total		8	1.2	532	76.8	153	22.1

Source: Households survey conducted by SERA February to March (1992)

For food security depends both on physical and economic access to basic food, we also tried to assess the food security status in relation to their income. During the survey, the household heads were asked to indicate that how many months food requirement cam be covered by their own yearly income as well as production. The responses indicated that for about 98 % the households, own income and production covers food requirement of only 9 months. Thus, 98 % of the inhabitants have to get their food from source other than own income and production for at least 3 months each year. Similarly, only 0.4 % responded that their own income combined with production can satisfy their yearly food requirement.

7.4.2. Vulnerable group to Food Insecurity as Identified Through Binary Logistic Regression

It is unlikely to derive an objective indicator of food security situation of sample studied households from the gathered household survey data. However, it has been feasible to estimate the degree of household's food security indirectly by perception of respondents on adequacy of household's annual income/production to meet food need of a family. As result, the level of adequacy of household annual income/production to fulfill family's demand for food is considered as a proxy measure for food security status of a household.

In order to identify factors, which contribute to household's food insecurity, a binary logistic regression model has been fitted. The dependent variable is the degree of household annual production/income to satisfy family's food need; it has possible values 1' Too Much Small' and 0' Not Too Much Small'. The predictor variables presupposed to have had impacts on level of household's annual production/income are sex of head, age of head, literacy status of head, agro-ecological zone, land-holding size, soil fertility status of main farm plot, availability of ox/oxen, productivity of livestock net oxen in TLU (Tropical Livestock Unit), amount of income obtained from different sources, and number of individuals within a household (total family size).

Findings of the fitted binary logistic regression are discussed as follows. The general test for the goodness of the fitted multivariate model confirms the statistical significance of the model, at $P<0.0001$. In other words, the fitted model reveals that at least one of the coefficients of the parameters is non-zero, at $P<0.0001$. This means, at least one of the covariates significantly predicts the food insecurity status of a household.

The results of the logistic regression analysis suggest that literacy status of head of household, production of livestock net oxen in TLU, availability of ox/oxen, land-holding size, sex of head of household, and age of head of household are those factors which have significant contributions to affect food security situation of a household.

In the sample covered rural households of Lemo wereda, literacy status of head of household is found to be major predictor of the degree of household's annual production/income to meet family's end demand for food, when all other predictors held constant. The coefficient estimate for literacy status of head of household indicates that for those heads who are illiterate (unable to read and write) the odds of earning too much small annual production/income is 2.289 times greater than the odds for those counterparts who are able to read and write, when other factors remained the same. In other words, those heads who are able to read and write have (1/2.289) 0.437 times lower odds of obtaining too much small annual production/income than their illiterate counterparts; which is statistically significant, at $p<0.0001$. It means that for those heads who are literate the likelihood of exposing to food insecurity due to earning too much small annual production/income reduces by a factor of 0.437. Thus, this finding emphasizes the worth of improving literacy status of farmers so as to ensure food security among agricultural households. As result, it might be realistic to propose that strengthening and/or implementing adult literacy program as one of key strategic elements for lessening problem of food insecurity at rural household level.

The estimate for production of livestock less oxen reveals that every additional unit of production of livestock in TLU decreases the odds of obtaining too much small production/income by a factor of 0.811, when controlling effects of all other variables. This means, increasing production of livestock net oxen by a unit reduces the risk of household's exposure to food insecurity by a factor of 0.811, result is statistically important at $p<0.0001$. It, again, accentuates the advantage of expanding livestock production. This finding enables to draw a recommendation that promoting rearing quality livestock as a key strategic element so as to mitigate problem of food shortage at household level in rural areas of Lemo wereda.

The multiplicative coefficient for availability of ox/oxen depicts that the odds of earning too much small annual production/income for those farming households who have no any ox is 1.698 times the odds for those counterparts who have had at least one ox; which is significant, at $p<0.008$. In other words, the odds of household's annual production/income becomes too much small to meet family's food requirement is (1/1.698) 0.589 times lower for those farmers who have had at least one ox in contrast to their counterparts who have no any ox. This means, rural households who have had at least one ox are less likely to be exposed to food insecurity in comparison with those who have not had any ox. So, it seems reasonable to put forward a suggestion that an intervention program, which aims at easing problem of household's food insecurity, might get benefit from increasing rural household's access to ox/oxen.

The estimated coefficient for land-holding size of a household shows that those households who have owned plots of land greater than 0.5 hectare have 0.458 times lower odds of earning too much small annual production/income than for those counterparts who have had plots with size 0.25 and less hectare; result is statistically important, at $p<0.05$. In other words, the land-less individuals and those owned less than a quarter of a

hectare are twice (2.183 times) likely to be exposed to food insecurity than their counterparts who have owned more than half a hectare. Hence, for reduction of problem of food shortage among land-less households and those who have had very small land-holdings, it may be worthwhile to implement non-farm activities so as to augment family's income.

The statistically significant, at $p<0.05$, result for sex of head of household suggests that the probability of getting too much small annual production/income for those female headed households is 1.915 times higher than for those households headed by male counterparts. It tells that female headed rural households are almost twice at risk of food insecurity in comparison with households headed by male counterparts. This finding supports a proposition that gender consideration in an intervention program is worthy in order to ensure food security in the studied area.

The coefficient estimate for age of head of household discloses that the odds of earning too much small annual production/income for those heads whose ages are between 30 and 45 years is 2.226 times the odds for those whose ages are 46 years and above; which is statistically significant at $p<0.0001$. This means, the chance of getting too much small annual production/income is higher for those households headed by persons aged between 30 and 45 years in contrast to those headed by old persons (aged 46 years and above). However, it is hardly to explain the exposure of adult persons (aged between 30 and 45 years) to high risk of earning too much small annual production/income than old persons (aged 46 years and above). Results of the full binary logistic regression model are presented in the table below.

Table 7.4.2: Binary Logistic Regression Results for Predicting Risk of Food Insecurity Among Rural Households (UN-weighted N= 700), Lemo, 2000.

Predictor Variables	Co-efficient		Significance
	B	Exp (B)	
- Sex of Head			
Female (Vs Male)	0.650	1.915	0.032*
- Age of Head			
(Vs 46 years and Above)			
10 - 29 years	0.067	1.069	0.825
30 – 45 years	0.800	2.226	0.000***
- Literacy Status of Head			
Illiterate (Vs Literate)	0.828	2.289	0.000***
- Agro-ecological zone			
Lowland (Vs Mid high land/Highland)	0.129	1.138	0.495
- Land Holding Size			
(Vs No land or less than 0.25hrs)			
0.251 – 0.50 hectares	-0.515	0.598	0.165
0.501 hectares and more	-0.780	0.458	0.030*
- Soil Fertility Status (Vs Infertile)			
Moderately Fertile	-0.390	0.677	0.244
Fertile	0.219	1.244	0.548
- Availability of Ox/Oxen			
Having No Ox(Vs At least one Ox)	0.530	1.698	0.008*
- Livestock Production in TLU	-0.209	0.811	0.000***
- Income From Different Sources	0.000	1.000	0.048*
- Family size	0.050	1.051	0.305
- Constant	1.290	3.633	0.000***

* $P < 0.05$

** $P < 0.005$

*** $P < 0.0005$

N.B. In the parentheses are reference categories.

7.4.3. Causes of Perceived Food Insecurity

Twenty-four (24) perceived causes of food insecurity were mentioned by the respondents in the study area. Out of this long list shortage of rain, lack of oxen, inadequacy of land, too much rain, poor land quality and pest infestation were found the most frequently mentioned causes of food shortage in the wereda. Though all of them are indicated in the statistical annex, the largest 12 causes at wereda level are summarized in the following table. Except for water logging and steep slop, no big difference was observed between the three agro-ecological zones. Thus, water logging a typical problem of the low land where as steep slope was found an important cause of food shortage only in the high land part. For instance, steep slope indicated to be the 9^{th} most frequently mentioned cause at wereda level was found the second most frequently mentioned problem of the *Dega* inhabitants.

Table 7.4.3: Distribution of Households by perceived causes of food shortage Across AEZ.

No.	Perceived Causes of Food Shortage	AEZ						Lemo Total	
		Kolla		Weina dega		Dega			
		No.	%	No.	%	No.	%	No.	Col. %
1	Shortage of rain	264	88.6	283	95.3	25	25.0	572	82.3
2	Lack of Oxen	230	77.2	239	80.5	72	72.0	541	77.8
3	Inadequacy of land	184	61.7	218	73.4	94	94.0	496	71.4
4	Poor quality land/ infertility	136	45.6	162	54.5	87	87.0	385	55.4
5	Too much rain	143	48.0	110	37.0	24	24.0	277	39.9
6	Infestation of pests & insects	141	47.3	89	30.0	30	30.0	260	37.4
7	Untimely rain	126	42.3	87	29.3	30	30.0	243	35.0
8	Lack of access to fertilizer and other in puts.	98	32.9	78	26.3	42	42.0	218	31.4
9	Too steep land	29	9.7	84	28.3	90	90.0	203	29.2
10	Back ward farm implements	57	19.1	74	24.9	43	43.0	174	25.0
11	In appropriate land management practice.	54	18.1	64	21.5	36	36.0	154	22.2
12	Water logging	44	14.8	4	1.3	1	1.0	49	7.1

Source: Households survey conducted by SERA February to March (1992)

7.4.3. Proposed Solution to Perceived Food Insecurity.

The household heads were also asked to propose possible solutions for the food shortage that they perceived. Though the inhabitants proposed about 12 solutions, availability of ox, improved seeds, credit services are the most frequently proposed solutions besides getting additional land. There is no big difference regarding the most frequently proposed solutions between the three agro-ecological zones except that 90 % of the dega respondents proposed getting additional land as a solution. Participation in off farm activities, proposed by considerable respondents in the low land was never mentioned as a solution in the high land. Food for work program as a solution was proposed only in dega, however, the dega inhabitants with a very steep slope didn't propose soil and water conservation work as a solution. Though inadequacy of land was repeatedly mentioned as a cause of food insecurity through out the wereda, no one was dared to propose resettlement as a solution except insignificant proportion in the intermediate high land.

Table. 7.4.4. Distribution of Households by Proposed Solutions to Perceived Food Shortage Across AEZ

Proposed Solution	AEZ						No.	%
	Kolla		Weina Dega		Dega		Lemo Total	
	Count	%	No.	%	No.	%	No.	%
Availability of Oxen	**233**	**78.2**	**226**	**76.1**	**74**	**74.0**	**533**	**76.7**
Getting additional land	**171**	**57.4**	**204**	**68.7**	**90**	**90.0**	**465**	**66.9**
Availability of improved seeds, fertilizers	**193**	**64.8**	**192**	**64.6**	**63**	**63.0**	**448**	**64.5**
Getting credit services	**181**	**60.7**	**179**	**60.3**	**63**	**63.0**	**423**	**60.9**
Changing back ward land management practice	131	44.0	143	48.1	43	43.0	317	45.6
Participation in off-farm	87	29.2					87	12.5
Using family planning service	18	6.0	36	12.1	24	24.0	78	11.2
Irrigation	6	2.0	3	1.0	4	4.0	13	1.9
Improving market accessibility	3	1.0	1	0.3			4	0.6
Executing food for work program					3	3.0	3	0.4
Resettlement			2	0.7			2	0.3
Enhancing soil and water conservation	1	0.3	1	0.3			1	0.1

Source: Households survey conducted by SERA February to March /1992/

7.4.4: Vulnerability to Epidemics

A certain disease may be considered as epidemic if its prevalence at a specified period of time affects considerably larger population than the long-term average for that specified period of time. As indicated in the following table, about 84 % of the sampled households in Lemo responded that they have faced one or the other type of epidemic within the five years prior to this survey. More proportion of people were found facing epidemics in kolla than the other two agro ecological zones. May be due to cool weather that proportion faced epidemic was the least in dega or the high land part of Lemo. With regard to the type of epidemics, malaria, diarrhea and typhoid were found the most common ones in Lemo.

According to the responses of the sampled households, lack of safe drinking water, poor sanitation, lack of knowledge about disease prevention, lack of health facilities and lack of effective disease control program were the most frequently mentioned causes of epidemics in Lemo. Accordingly, the sampled households largely proposed availability of safe drinking water, improving availability of health facilities and educating the community about improving personal as well as environmental sanitation as the most important solutions to epidemics. Details about major epidemics, their causes and respective solutions are given in the following table.

Table 7.4.5: Distribution of HHs by Type of Epidemics, Causes and Proposed Solutions

Epidemics /cause/solution	Sub Category	AEZ						Lemo Total	
		Kolla		Weina Dega		Dega			
		No.	%	No.	%	No	%	No.	%
Faced Epidemic	No. & Proportion of households faced epidemic	272	90.7	261	87.0	53	53.0	586	83.7
Type of Epidemics Prevailed	Malaria	265	97.4	210	80.5	5	9.4	480	81.9
	Diarrhea	176	64.7	116	44.4	44	83.0	336	57.3
	Meningitis	1	0.4	5	1.9	16	30.2	22	3.8
	Typhus fever	2	0.7	25	9.6			27	4.6
	Measles	31	11.4	19	7.3	35	66.0	85	14.5
	Hepatitis	33	12.1	5	1.9	5	9.4	43	7.3
	Typhoid	89	32.7	124	47.5	25	47.2	238	40.6
	TB	1	0.4	5	1.9	1	1.9	7	1.2
	Influenza			11	4.2	1	1.9	12	2.0
Major Causes of Epidemics	Lack of safe drinking water	297	99.0	299	99.7	90	90.0	686	98.0
	Poor sanitation	270	90.0	287	95.7	75	75.0	632	90.3
	Lack of health facilities	245	81.7	217	72.3	90	90.0	552	78.9
	Lack of knowledge about disease prevention	287	95.7	291	97.0	88	88.0	666	95.1
	Lack of disease control programs	238	79.3	170	56.7	61	61.0	469	67.0
	Starvation/famine/nutritional deficiency	14	4.7	2	0.7	9	9.0	25	3.8
Proposed Solutions	Availability of safe drinking water	299	99.7	299	99.7	89	89.0	687	98.1
	Improving supply of health facilities	267	89.0	224	74.7	90	90.0	581	83.0
	Educating the community about sanitation	298	99.3	299	99.7	85	85.0	682	97.4
	Getting sufficient food	2	0.7	3	1.0	5	5.0	10	1.4
	Others(improving income status, personal hygiene, drainage, disease control, etc)	8	2.7	15	5.0	13	13.0	36	5.1

Source: Households survey conducted by SERA February to March /1992/

7.4.5. Child Malnutrition

As discussed in the previous section about 43.1 %, 13.2 % and 46.5 % of children aged 3 to 36 months were respectively stunted, wasted and under weight in Lemo. As summarized in the following table, age of a child, age of a mother, family size, literacy status of the mother and agro-ecological zone were found the major factors associated with nutritional status of children. Accordingly, children aged 6 to 23 months, children

belonging to mothers aged 20 to 34 years, children of illiterate mothers, and children of the intermediate high land were found more malnourished compared to the other extremes. These relationships are summarized in the following table by considering stunting and underweight. We did this due to the fact that height for age (stunting) and wieght for age (under weight) are more suitable measures of children's long-term nutritional status (Yared 1999).

Table 7.4.6: Distribution of Malnourished Children By Background Chracteristics (Lemo 1992)

Background Chracteristics	**Sub Category**	**Stunted % below – 2SD**		**Severly Stunted % below –3SD**		**Under Weight % below – 2SD**		**Severely Under Weight % below – 3SD**	
		No	%	No	%	No	%	No	%
Age of a child	3-5 months	3	25.0	1	8.3	1	8.3	0	0.0
	6-11 months	22	35.5	10	16.1	23	37.1	6	9.7
	12-23 months	47	49.0	26	27.1	50	52.1	17	17.7
	24-36 months	52	44.1	26	22.0	60	50.8	24	20.3
Age of a Mother	15-19 years	1	20.0	1	20.0	1	20.0		0.0
	20-34 years	86	45.5	42	22.2	87	46.0	31	16.4
	35-49 years	37	39.4	20	21.3	46	48.9	16	17.0
Literacy status of a mother	Illiterate	96	45.5	46	21.8	106	50.2	41	19.4
	Read & write	24	33.3	14	19.4	26	36.1	6	8.3
AEZ	Kolla	42	37.5	29	25.9	41	36.6	13	11.6
	Weina Dega	68	48.2	30	21.3	80	56.7	31	22.0
	Dega	14	40.0	4	11.4	13	37.1	3	8.6

7.4.6. Under Five Mortality

Households' vulnerability to various factors can also be reflected on the level of under 5 mortality. As indicated in chapter four of this profile under 5 mortality is considerably high in Lemo. This fact is also supported by the result of our household survey. As indicated in the following multivariate cross tabulated table, the type of water used at home, age of the mother, status of anti natal care, agro ecological zone and the total number of ever born children were found clearly affecting the mortality level of children aged five years and less in Lemo.

Thus level of under 5 mortality was relatively lower for households with clean water, small number of children ever born, women aged 21 years and above, mothers delivered in the health center or clinic and mothers with antenatal care/TTI/. However, mortality rate was found higher for children delivered in the hospital reflecting that rural families do not visit hospitals for delivery unless they face serious complication. In addition, it was relatively lower for intermediate high land compared to both high land and the low land. In fact, the intemediate high land was with better access to health facilities comared to the remaining.

Table 7.4.7: Distribution of Mothers by Status of Under 5 Mortality for the Last Child & Major Causes Associated

Major Factor Behind Under 5 Mortality	Sub Category of the Causes	Status of Last Child Aged 5 Years or Less			
		Alive		Dead	
		No	%	No	%
- Place of delivery	Her/relatives home	500	92.1	43	7.9
	TBA's home	5	71.4	2	28.6
	Hospital	8	88.9	1	11.1
	Health Center/Clinic	1	100.0		
- Status of antenatal care	With TT Injection	171	92.9	13	7.1
	With out TT Injection	107	92.2	9	7.8
- Type of drinking water used at home	Clean	15	93.8	1	6.3
	Unclean	489	90.4	52	9.6
- Total Number of Children Ever Born	1-2	115	88.5	15	11.5
	3-4	146	92.4	12	7.6
	5-6	91	94.8	5	5.2
	7 and over	160	87.4	23	12.6
- Agro Ecological Zone	Low Land	204	84.0	39	16.0
	Intermediate High Land	242	95.3	12	4.7
	High Land	70	94.6	4	5.4
- Age of the Mother	15-20	131	86.8	20	13.2
	21-35	270	91.2	26	8.8
	Over 35	115	92.7	9	7.3

Source: Households survey conducted by SERA (February to March 1992)

7.4.7 Major Household Problems.

The sampled households mentioned 19 household problems as encountered within 5 years prior to this survey. Though all these problems can be see in the annex, the most frequently mentioned household problems are presented here. Among these are money constraint/poverty/, lack of ox, lack of adequate land, and lack of credit facilities are in the forefront. No big difference was seen between the three agro-ecological zones with regard to the major problems except that inadequacy of land and shortage of grazing land are more serious problem in the high land compared to the low land and intermediate high land. Similarly, shortage of rain or drought was mentioned to be more serious in low land compared to the high land as well as the intermediate high land. The following responses are summarized from 294 respondents in Kolla, 298 respondents in weina dega and 96 sampled respondents in dega part of the wereda.

Table 7.4.8: Distribution of Households by the 7 (Seven) Largest Household Problems Across AEZ.

	Major Household Problem Encountered	AEZ						Lemo Total	
		Kolla		Weina Dega		Dega			
		Count	%	Count	%	Count	%	Count	%
1.	Money constraint	238	79.9	239	81.3	82	85.4	559	81.3
2.	Lack of Ox	216	72.5	238	81.0	76	79.2	530	77.0
3.	Lack of adequate land	185	62.1	195	66.3	87	**90.6**	467	67.9
4.	Lack of credit facilities	192	64.4	152	51.7	65	67.7	409	59.4
5.	Lack of farm implements	152	51.0	173	58.8	57	59.4	382	55.5
6.	Lack of grazing land	97	32.6	83	28.2	70	**72.9**	250	36.3
7.	Lack of rain / drought	93	**31.2**	6	2.0	7	7.3	106	15.4

Source: House holding survey conducted by SERA February to March (1992)

The respondents were also asked about the undesirable consequences that followed the major problems that the households encountered. For it will not be easy to describe all of them, we limited ourselves to the most frequently occurred and the most severe undesirable consequences caused by the major problems that the households encountered. Accordingly, famine and poverty were reported to be the most frequently occurring and the most severe undesirable consequences of the major problems that the households encountered in Lemo.

Thus, about 78 % and 11 % of the sampled households in the wereda respectively reported that famine and poverty to be the most frequently occurred undesirable consequences of the household problems. On the other hand famine, poverty and health problems were found the most severe undesirable consequences of the household problems in the area. Accordingly, about 65, 17 and 14 % of the sampled households responded famine, poverty and health problem as the most severe undesirable consequences of their household problems respectively.

7.4.8. Households' Coping Strategies

For it was considered the worst of all disasters, households' coping strategies were assessed mainly with emphasis to food insecurity. The survey result indicated that the inhabitants took various measures so as to cope with disasters. Reducing number and quantity of meal, skipping eating the whole day, eating less preferred food and selling livestock were the major copping strategies by considerably large proportion of the inhabitants throughout the wereda. May reflecting the Guraghe's mobility to business, out migrationas strategy was mainly taken in dega part of Lemo while selling charcoal was widely practiced in the intermediate high land i.e. the most accessible part to towns. Besides coping strategies described in the following table, household heads were also responded about the mechanisms of feeding the household members until next harvest if their stock is empty or the food grain in their stock is not sufficient to feed the family until the next harvest. Some of the responses given to this question are similar to those mentioned in table 6.4. However, purchasing from the market in general, engagement in labor work, depending up on close relatives, selling livestock, labor sale, generating

income through petty trade, begging and borrowing either cash or grain were mentioned as coping mechanisms other than the ones mentioned in the following table.

Table 7.4.9: Distribution of Households By Type of Coping Strategies Across AEZ

No.	Major coping Strategy	AEZ						Lemo Total	
		Kolla		Weina Dega		Dega			
		No.	Col. %	No.	Col. %	No.	Col. %	No.	Col. %
1.	**Reducing number of meals per day**	**281**	**96.6**	**294**	**99.7**	**79**	**95.2**	**654**	**75.3**
2.	**Reducing quantity of meal**	**278**	**95.5**	**294**	**99.7**	**82**	**98.8**	**654**	**75.3**
3.	Eating wild fruit, toxic or taboo food.	20	6.9	43	14.6	1	1.2	63	7.2
4.	**Eating less preferred food or foul food**	**185**	**63.6**	**217**	**73.6**	**39**	**47.0**	**441**	**50.7**
5.	Household members seeking work within the PA	40	13.7	59	20.0	18	21.7	117	13.5
6.	Households members seeking work out side the PA	50	17.2	36	12.2	26	**31.3**	112	12.9
7.	Borrowing food grain or cash to purchase food	102	35.1	140	47.5	28	33.7	270	31.1
8.	Out migration to find food, work , etc,	54	18.6	39	13.2	24	28.9	117	13.5
9.	**Selling livestock**	**181**	**62.2**	**139**	**47.1**	**28**	**33.7**	**348**	**40.0**
10.	Selling productive assets other than livestock	7	2.4	1	0.3		0.0	8	0.9
11.	Selling personal household effects	1	0.3	7	2.4	1	1.2	9	1.0
12.	Selling firewood dung charcoal, etc	19	6.5	42	**14.2**	4	4.8	65	7.5
13.	Participating in food for work and EGS programs.	84	28.9	73	24.7	2	2.4	159	18.3
14.	**Skipping eating the whole day**	**198**	**68.0**	**163**	**55.3**	**50**	**60.2**	**411**	**47.3**
15	With drawing children from schools	1	0.3	1	0.3	1	1.2	3	0.3
16	Renting land or other productive assets.		0.0		0.0	1	1.2	1	0.1

Source: Household survey conducted by SERA February to March (1992).

Obviously some of these coping mechanisms are very essential and need to be encouraged. But the problem is with time of using them. To be effective, they should take such measures while the problem starts. However the responses indicated that majority of the in habitants use the coping strategies either at the middle of the problem or only when the problem becomes so severe. Thus, the country's early warning system has to work hard so as to improve timing of coping strategies used by the community. However, some of the coping strategies mainly taken when the problem becomes severe could indicate some thing for the future preparedness. For instance renting land, skipping eating the whole day, selling personal household effects, eating taboo or toxic food, withdrawing children from schools and borrowing food grain or cash to purchase food were mainly

taken when the problem became so severe in Lemo. Such measures can be considered as symptoms of severity of risks like hunger.

Table 7.4.10: Distribution of Households by Type of Copping Strategy and Time of Application

Type of Copping Strategy	Time –the mentioned copping strategy used					
	At the beginning of the problem		At the middle of the problem		When the problem becomes severe	
	Count	Col. %	Count	Col. %	Count	Col. %
Reducing number of meals per day	246	37.6	173	26.5	235	35.9
Reducing quantity of meal	227	34.7	210	32.1	217	33.2
Eating wild fruit, toxic or taboo food.	3	4.8	6	9.5	**54**	**85.7**
Eating less preferred food or foul food	40	9.1	181	41.2	218	49.7
Household members seeking work within the PA	35	29.9	34	29.1	48	41.0
Households members seeking work out side the PA	26	23.2	26	23.2	60	53.6
Borrowing food grain or cash to purchase food	3	1.1	22	8.1	**245**	**90.7**
Out migration to find food, work , etc,	15	12.9	16	13.8	**85**	**73.3**
Selling livestock	7	2.0	36	10.4	**304**	**87.6**
Selling productive assets other than livestock			1	12.5	**7**	**87.5**
Selling personal household effects	1	11.1			**8**	**88.9**
Selling firewood dung charcoal, etc	14	21.5	4	6.2	47	72.3
Participating in food for work and EGS programs.	15	9.5	40	25.3	103	65.2
Skipping eating the whole day	8	1.9	20	4.9	**382**	**93.2**
With drawing children from schools			1	33.3	2	66.7
Renting land or other productive assets.					**1**	**100.0**

Source: Household survey conducted by SERA February to March (1992).

7.5. Policy environment, institutional support and local response capacity.

Effective institutional support is must so as to make the community at least less vulnerable to various disasters. The rural community members need both technical and financial assistance in order to improve their crop as well as livestock production besides demanding credit facilities and proper health related assistance.

7.5.1. Assistance to improve agricultural production

If the rural inhabitants are given effective assistance in this regard, they can produce better and may be less vulnerable to various risks or they can better cope with disasters. In the case of Lemo, proportion of households who received assistance to improve both crop production and livestock rearing were only 14.7 % in 1992. Relatively, higher proportion of households received assistance in weina dega than kolla and dega.

Accordingly 2 %, 4 % and 31 % of kolla, weina dega and dega inhabitants respectively received various assistance to improve agricultural production. The weak status of assistance in both kolla and dega is mainly the result of limited accesses to extension services besides inaccessibility to road transport. In fact, production of cereals with better government attention is to a limited extent in dega part of the wereda. The most commonly given types of assistance were provision of fertilizer and improved seeds. Assistance like vet service, soil and water conservation as ell as pest management were very weak in Lemo. As summarized in the following table, absence of institution to provide assistance, lack of interest, absence or shortage of land, fear of debt and lack information were the major reasons for not receiving any type of assistance in the area.

Table 7.5.1: Distribution of Households by Reasons for Not Receiving Assistance Across AEZ.

Reason for not receiving assistance.	AEZ						Lemo Total	
	Kolla		Weina dega		Dega			
	Count	Col. %	Count	Col. %		Col. %	No.	Col. %
No need to receive	49	16.7	40	19.2	3	3.1	92	15.4
No institute that provides assistance	233	79.3	137	65.9	92	95.8	462	77.3
Fear of debt	7	2.4	3	1.4			10	1.7
Lack of opportunity /access to services	1	0.3	1	0.5			2	0.3
Lack of information	2	0.7	5	2.4			7	1.2
Not allowed to get	1	0.3	6	2.9			7	1.2
Absence or shortage of cultivation land	1	0.3	11	5.3			12	2.0
Biased decision of local authorities			2	1.0	1	1.0	3	0.5
Other reasons			3	1.4			3	0.5
All	294	100.0	208	100.0	96	100.0	598	100.0

Source: Household survey conducted By SERA February to March(1992)

7.5.2 Credit Services

Another important assistance that the rural communities require is credit service. Credit facilities are very essential for the households to improve their production besides participation in off farm activities like petty trade, woodwork, etc. Moreover, credit is very essential for the farmers to purchase various agricultural inputs since their cash sources are seasonal.

The survey result indicated that only 27.9 % of Lemo's inhabitants received credit from various institutions within 5 years prior to this survey. Thus, about 72 % did not receive any credit with in the 5 years. The situation was better in the intermediate high land or weina dega part of the wereda since about 40 % of the sampled households received credit in the years under consideration. Though the inhabitants heavily depend on cereals, households who received credit were very low in the low land or kolla.

Government through its Ministry of Agriculture was the largest credit giving institution in the area followed by Omo-Micro Finance. For instance, about 96 % of the sampled households reported that they have received credit from MOA where as about 1.6 % reported that they have received credit from OMO Micro Finance. Thus, it can be said that Ministry of Agriculture was the sole credit giving institution in Lemo.

As mentioned above majority (about 72 %) didn't receive credit within the 5 years prior to this survey. We found it valuable to assess the reasons why majority of Lemo's inhabitants did not receive credit. As summarized in the following table lack of institution to provide credit, no need to take credit, absence or shortage of cultivation land, fear of debt, and neediness or lack of collateral were the most frequently mentioned reasons for not receiving any credit. Absence of credit giving institution was the only reason stated by the high land or dega inhabitants. If institutions are interested to promote credit in the area, they should pay attention to the reasons stated in the following table.

Table 7.5.2: Percentage Distribution of Households by Reasons for Not Receiving Credit Across AEZ.

No	Reason for not receiving credit	AEZ			Lemo Total
		Kolla	Weina Dega	Dega	
1	No need to take	24.6	24.9		21.2
2	Lack of institution to provide credit	58.3	63.8	100.0	66.3
3	Fear of debt	5.2	2.8		3.6
4	Lack of information		1.1		0.4
5	Absence/ shortage of cultivation land	6.3	3.4		4.4
7	Unable to pay down payment	2.0			1.0
8	Lack of skill/ knowledge to profitable activities.		0.6		0.2
9	Neediness/ lack of collateral	1.2	2.3		1.4
10	Shortage of labor/ time	0.4			0.2
11	Lack of Ox		0.6		0.2
12	Other reasons	2.0	0.6		1.2
*	All reasons	100.0	100.0	100.0	100.0

Source: Household Survey Conducted By SERA February to March (1992)

7.5.3. Health Assistance

As mentioned above effective health related assistance should be given so as to minimize the negative impacts of diseases and epidemics. As indicated in the following table, over half of the sampled households in Lemo did not receive any type of health assistance from any organization within the five years prior to this survey. The situation was the worst in Dega where about 85 % did not receive any health assistance mainly due to the absence of health institutes near by. The intermediate high with better access to health facilities was found better in this regard.

Vaccination or immunization was the most important health assistance provided for large number of inhabitants. Medical examination or treatment was the second largest health

assistance given to the inhabitants in Lemo. With regard to the organization provided health assistance, government was the only significant one in Lemo.

Table 7.5.3: Distribution of Households by Type of Health Assistance Received and Organization Provided health Assistance

Type of Health Assistance and Organization Provided It	Sub Category	AEZ						Lemo Total	
		Kolla		Weina Dega		Dega			
		No	%	No	%	No	%	No	%
Did you receive health assistance?	Yes	139	46.3	187	62.5	15	15.0	341	48.8
	No	161	53.7	112	37.5	85	85.0	358	51.2
	Total	300	100.0	299	100.0	100	100.0	699	100.0
Type of Health Assistance provided	Medical exam/treatment	26	18.7	107	57.2	5	33.3	138	40.5
	Vaccination/ Immunization	121	87.1	163	87.2	13	86.7	297	87.1
	Birth delivery	1	0.7	6	3.2			7	2.1
	Medicine/drug	10	7.2	15	8.0			25	7.3
	Health information/education	1	0.7	12	6.4			13	3.8
	Nourishing food			1	0.5			1	0.3
Type of Organization Provided Health Assistance	MOH	127	93.4	174	93.0	13	100.0	314	93.5
	Mekene Yesus			7	3.7			7	2.1

Source: Household Survey Conducted By SERA February to March (1992)

Chapter Eight

8. Integration and Summary of the Findings

Introduction

In the previous chapters, the same issues were treated using data from various sources. The major data for this multilevel analysis were mainly obtained from secondary sources, key informant's interview, community focus group discussion, and structured household survey. For instance chapters four, five, six and seven are results obtained from secondary data, key informants' interview, community focus group discussion and household survey respectively. The major objective of this chapter is to integrate findings discussed in the preceding chapters.

For several issues are discussed in detail in the preceding chapters, we have limited ourselves to the key issues in this integration chapter. Accordingly, results on population pressure and environmental stresses; access to basic services and their quality; malnutrition and mortality; food insecurity and poverty; disasters and institutional responses to disasters; and resilience and household's coping strategies were briefly summarized and triangulated.

8.1. Population pressure, natural resources and environmental stresses.

Not only Lemo wereda but also all the remaining weredas of Hadiya Zone are well known for their high population densities. According to Yohannes (1997), high population density is very often accompanied by high livestock density in the Southern Region. As a result, areas with high population density may be both over cultivated and overgrazed. Besides, land clearing is common in such areas so as to satisfy the ever-increasing demand for cultivation land as well as fuel wood. On the other hand, dung from the livestock can be used for fuel wood instead of using it for land fertilization. Obviously, such relationships can easily deplete the natural resources of the areas and impoverish the inhabitants residing in the area by reducing the natural productive capacity. The impact is more painful for communities at low level of agricultural technologies as well as low productivity.

As partly indicated in the following table both qualitative perceptions and quantitative figures are complementing each other with regard to population-environment relationship in the wereda. In fact there are some gaps between secondary sources and household survey result. Such gaps are mainly resulting from poor quality of some secondary data.

With regard to population and livestock density, secondary sources are to be trusted. Accordingly the crude population density of Lemo was estimated to be 344 persons per square kilometer while the agricultural density was found 325 persons per square kilometer. For Hossana Town, with about 40,000 population is located within Lemo, agricultural density was found less than the crude density due to exclusion of urban population from the calculation of the agricultural density. The population in Lemo is not only dense but also heavily dominated by young dependents similar to any developing nation. The livestock density was calculated to be 190 TLU per square kilometer for the same year. The livestock are entirely local breeds known for their low productivity.

Though it is very difficult to calculate densities based on the household survey results, the estimations indicated that the high land or *Dega* was found the most densely populated compared to both the intermediate high land and the low land.

With regard to the average land holding size of the households, all sources were found closer to one another. Accordingly, the average land holding size, which was reported to be 1.1 hectare was found 0.81 hectare in the household survey result for the whole wereda. The situation was better in kolla or the low land since the average land holding size was 0.9 for kolla and only 0.52 hectare for *Dega* and 0.80 hectare for intermediate high land according to the result obtained from the household survey. In addition, proportion of households with average land holding of 0.5 hectare or less were found more or less similar in all the sources. Accordingly, these proportions were found 73.4, 57.1 and 40.0 according to secondary data, key informants and household survey respectively.

Generally, land is the most-scarce resource throughout Lemo, but most scarce in the high land and more-scarce in the intermediate high land or weina dega. In fact, dega's and weina dega's carrying capacity is better than that of kolla since wide variety of crops grow besides better land cover.

As a result of this population pressure, land resources are highly depleted. All sources agree that about 88 % of the total land area are already cultivated in Lemo. Secondary sources as well as the household survey indicated that practices such as land fallow are almost impossible due to shortage of land. Similarly, area of land with natural forest is almost none existent at present. Rather, every field is invaded by eucalyptus tree. Due to repeated cultivation, soils are exposed to both visible erosion and invisible depletion. The 1997th * Woody Bio Mass study also indicated that the livestock carrying capacity of Lemo will be at capacity only up to 2000 Ethiopian Calendar. Thus, land holding is not only small but also less productive in the wereda. Both the key informants and community focus group loudly stated that it is almost becoming impossible to produce with out the application of chemical fertilizers. Table 8.1A provides data from selected sources at wereda level with trend and table 8.1B provides current level of some selected indicators mainly from household survey result across the three agro-ecological zones.

Table 8.1A: Selected Indicators Showing Population-Environment Relationship with Trend

Wereda Level Indicators with Trend	Year (Ethiopian Calendar)			
	1977	1987	1992	
	SS	SS	Secondary Source	Household Survey Result
Crude population density	231	290	344	
Agricultural density	236	278	325	
Crude livestock density			190	
Average family size				6.5
Dependency ratio		95.2		87

Wereda Level Indicators with Trend	Year (Ethiopian Calendar)			
	1977	1987	1992	
	SS	SS	Secondary Source	Household Survey Result
Average land holding size		1.2	1.1	
Proportion households land less			12.6	1.9
Proportion of households with average land holding size of 0.5 ha or less			73.4	40.0
Proportion of total land already cultivated			87.2	88.0

Table 8.1B: Selected Indicators Showing Current Level of Population-Environment Relationship by AEZ

Current Level of Indicators from Selected Source	AEZ			Wereda Total
	Kolla	W/Dega	Dega	
Proportion of households with perceived fertile soil	9	16	0	9
Proportion of households with perceived severe and very severe soil erosion	26.7	34.4	94.9	44.0
Proportion of households perceived water logging	35.2	15.9	1.0	22.0
Proportion of households perceived grazing land shortage	77.6	90.8	100.0	87.0
Proportion of households with fragmented plots	41.5	39.9	12.5	27.0
Average land holding size of the household in hectare	0.9	0.8	0.5	0.8

8.2: Access to Basic Services and Their Quality

Basic services in the wereda are mainly assessed using data obtained from secondary sources, key informants', and community focus group discussion. Very little information was gathered through the household survey in this regard. Using these sources, we have summarized adequacy and quality of basic services as follows.

Primary schools are among the most important socio-economic infrastructures up on which communities' vulnerability to various risks partly depends. According to the secondary sources, about 56 % of the rural PAs in Lemo do not have primary schools within the PAs. The current gross and net enrollment ratios in these primary schools are about 43.2 % and 27.1 % respectively for boys and girls. Boys are better enrolled than girls in Lemo. The current dropout rates are 19.5 for boys and 19.2 for girls. Thus, boys are better enrolled but dropped worse while girls are enrolled less and dropped less in Lemo. The data obtained from primary schools located in the sample PAs also indicate that dropout rates are higher for girls than boys.

As summarized in chapter five, the major reasons for boys' drop out from primary schools are mainly related to poor economic background of their families whereas cultural reasons like abductions, early marriage, less attitude towards girls' education, and circumcisions during study period were frequently stated as reasons for dropout in girls from primary schools besides the economic ones. According to the key informants

as well as communities' focus group discussion, quality of education is deteriorating in the wereda due to very high students-class room ratio, shortage of qualified teachers, shortage of books, absence of libraries, absence of pedagogical centers for both teachers and students, and absence of school compound fences. All sources also indicated that absence of adult literacy programs in most rural PAs are contributing for the increasing rate of illiteracy of the inhabitants in Lemo````.

Another basic service closely related to the livelihood of the inhabitants is health service. Currently, 1 hospital, 4 health center and 9 clinics are shared by the total inhabitants of Lemo estimated to be 354910 in 1992. There was no any health post functioning in Lemo during our survey in 1992. In fact, the hospital is located at the southern margin of the wereda and serves other weredas more than Lemo. It is also the only hospital serves inhabitants from Guraghe and K.A.T Zones besides Hadiya. According to our calculation based on topographic maps, about 14.9 % of the wereda's population is accessible to Hossana Hospital within two hours single trip. Applying the same method, it was found that about 29 % and 53 % of the inhabitants in Lemo are respectively accessible to health centers and clinics within 2 hours walking distance. Thus, about half of the inhabitants are still inaccessible to health institutes within reasonable distance. Besides, as stated by almost all sources, the quality of the services rendered by all the existing health institutes is very poor due to shortage of professional health personnel, lack of necessary medical equipment, lack of drugs/medicines, and lack of vehicles to provide mobile health services.

Immunization programs are among the most essential health services up on which the health status of the community largely depends. Figures obtained from secondary data in this regard are very high and difficult to believe. Moreover, our household survey found that the coverage is very low for various immunization services, except for polio. Accordingly proportion of eligible children received Polio, BCG, DPT3 and Measles vaccinations are 79.2, 46.1, 47.4, and 33.8 % respectively. Moreover, only 22.2 % of the wereda's children were found fully vaccinated according to the household survey. Thus, the health offices at various levels should give attention so as to improve quality of their data.

Agricultural extension services are among the most important ones needed by the rural inhabitants for mainly they are depending on crop production and livestock rearing. As revealed in the secondary data about 45.3 % of the total households in Lemo are involved in food crop extension. As realized in the key informants' information, proportion of households involved in food crop extension program are higher in the intermediate high land compared to that of the low land and no household was found involved in the high land part. According to the same source only 0.07 % of the total households are currently involved in the livestock extension. What is encouraging in Lemo is that about 16 % of the total rural households are reported to be involved in natural resource management extension program.

As we were informed during CAD, ever rising prices of agricultural inputs and shortage of land were the major causes for the low level of participation in the food crop extension program. Occasional flooding is among the factors that impede agricultural extension programs in the low land or Shashogo area. The key informants both at wereda and PA level did not deny that the agricultural extension program in the wereda is with great

emphasis to cereals. Extension programs like livestock improvement are almost forgotten. In addition, the veterinary clinics are almost non existent in the rural areas where the livestock are. The focus group discussion was also found criticizing the agricultural extension agents for their great emphasis to distribution of inputs and collecting debts rather than teaching the farmers.

Access to potable water is among the most essential services that any community requires. According to the 1987th Population and Housing Census result, only about 13.8 % of the total rural households in Lemo were accessible to potable water. Bot the key informant and household survey result indicated very low proportion of households accessible to potable water compared to the CSA figure. By taking piped, pumped, protected spring and protected wells as clean sources, only 4 % of the sampled households were accessible to potable water in Lemo.

According to the calculation made using the 1:50,000 Topographic maps, about 60.4 % and 23 % of the inhabitants are respectively accessible to gravel and feeder roads within 7.5 kilometers radius. Since the feeder roads are seasonal, it is only 60 % of the total inhabitants who are accessible to all weather roads. However, almost all the PAs are accessible with vehicle during the dry months. About 77 % of the total population in Lemo are currently accessible to major-weekly markets within one-day trip by considering the six major weekly markets located within the wereda. As discussed in the previous chapters all, sources indicate that the wereda has no as such serious problem with regard to both roads and weekly markets.

Table 8.2A: Selected Indicators Showing Accessibility to Basic Services with Trend

Wereda Level Indicators with Trend	Year (Ethiopian Calendar)		
	1977	1987	1992
Gross enrollment ratio for boys in primary schools			43.7
Gross enrollment ratio for girls in primary schools			8.0
Net enrollment ratio for boys in primary schools			
Net enrollment ratio for girls in primary schools			
Primary school dropout rate for boys			19.5
Primary school dropout rate for girls			19.2
Literacy rate for population aged 7 years and above			39.7
Population-Health Center ratio			1:88727
Population-Clinic ratio		1:29917	1:39434
Population-Physician ratio		1:149583	1:118303
Population-Nurse ratio		1:19944	1:32265
Proportion of rural population inaccessible to potable water		86.2	90.0
Proportion of households involved in the new extension program			45.29
Ratio DAs to agricultural households		1:7571	1:593
Proportion of total food crop area included in the new extension program		0.0	12.0

Wereda Level Indicators with Trend	Year (Ethiopian Calendar)		
	1977	1987	1992
Ratio of veterinary clinic to livestock population		1:197190	1:146596
Ratio of veterinary personnel to livestock population		1:28170	1:18325
Proportion of population accessible to all weather road within 15 KM radius	49.2	60.32	60.4
Road density (Length in KM to area in KM^2)	0.03	0.03	0.08
Proportion of population accessible to major weekly market within a distance of 2 hours single trip	77.0	77.0	77.0

Table 8.2B: Selected Indicators Showing Current Level of Access to Basic Services by AEZ

Current Level of Indicators from Selected Source by AEZ	AEZ			Wereda Total
	Kolla	W/Dega	Dega	
Proportion of PAs with out primary school	67.0	55.0	29.0	56.0
Proportion of PAs with out any health institute	88.0	93.0	100.0	92.0
Literacy rate for population aged 7 years and above	38.3	43.7	31.0	39.6
Proportion of PAs with out potable water supply	75.0	81.0	100.0	81.0
Average double way walking distance to fetch water during dry season in minutes in terms of minutes	48	180	180	136

8.3. Food Insecurity and Poverty

These are more or less interrelated concepts affecting each other since poor people are usually food insecure and vise versa. Defining the poor requires calculating the poverty line which is about 1 US dollar per person per day according to the World Bank and about 3 Birr per an adult person per day according to Ethiopia's Ministry of Economic Development and Cooperation. Calculating such figures requires a lot of data besides accurate reporting by the family members regarding their income. For most of the rural households' income sources are intangible and unrecorded, it is very difficult to define the poverty line in this surveying. As a result, we are forced to depend on indirect figures and qualitative information so as to estimate the level of poverty. Such indirect indicators of poverty include absence of or very small cultivable land, absence of livestock, absence of ox, very low or absence of reported cash income, etc.

About 12.6 % of the total households in Lemo are land less according to secondary sources. Even for those with land, the average land holding size is very small. Accordingly, the average land holding size of the household was 1.1 hectare in 1991 as shown by the secondary sources while our survey in 1992 indicated an average land holding size of 0.80 hectare. As realized by the key informants and community focus group discussion, land is not only scarce in Lemo but also infertile and less productive. However, land-holding size is relatively larger in the low land than the high land and intermediate high land. As indicated in the following summary table, land the most scarce resource in the high land or *Dega*. Accordingly, the current average land holding size of the households are 0.91, 0.80 and 0.52 hectare in the kolla, weina dega and dega part of the wereda respectively.

With regard to ownership of other assets, about 12.9 % of the total households in the wereda do not own any livestock; about 22.7 % do not have any reported cash income and about 56 % of the sampled households do not have ox. Scarcity of all these basic resources may indicate that considerable proportion of the households in Lemo are already living below the poverty line. This fact is also strengthened by the key informant's information. Thus, about 64 % of the total households in the wereda are perceived to be either poor or very poor.

Obviously, food security status of the households is mainly the reflection of their resource base. Accordingly, majority of the households in the wereda were found either temporarily or permanently food insecure. For instance, as calculated from the household survey result, average available calorie from the reported production was only 957 calorie per person per day in 1992. The data obtained from the secondary data for the 1991 indicated somewhat higher figure than this mainly due to over ambitious pre harvest assessment reports. Trusting the household survey result, only about 42 % of the individual daily energy requirement is satisfied in the wereda. The same survey also indicated that about 98 % of the family members in the wereda get less than the recommended daily energy intake. This is based on FAO's standard recommendation of 2280 calorie per an adult person per day.

Besides, about 86.1 % of the households responded that their total annual income and production is either too small or much too small to satisfy families food requirement. And only 1.2 % of the total sampled households responded that their total annual income and production is sufficient for the same purpose where as for the remaining 12.7 %, their total yearly income as well as production is barely sufficient. The situation in this regard was found better in the low land and worse in the high land part of the wereda. Some of the major indicators from selected sources are summarized in the following table. As summarized in chapter 7 through cross tabbed tables; female headed households, inhabitants of the intermediate high land and high land, households with out any land as well as small land holding size, households with old age heads, households without ox, households without any livestock, and households with perceived infertile soil were found more food insecure than the other extremes in Lemo. Some of the selected food insecurity and poverty indicators are summarized in the following table.

Table 8.3: Selected Indicators Showing Current Status of Food Insecurity and Poverty by AEZ

Current Level of Indicators from Selected Source by AEZ	**AEZ**			**Wereda Total**
	Kolla	**W/Dega**	**Dega**	
- Proportion of households with land holding size of less or equal to 0.25 hectare	22.0	22.1	25.0	23.0
- Average land holding size of the household	0.91	0.80	0.52	0.81
- Proportion households with out any livestock	14.0	13.4	8.0	12.9
- Proportion of households with out ox	51.5	49.7	87.0	55.8
- Proportion of households with less than or equal to 1 TLU	12.3	10.0	9.0	10.8

Current Level of Indicators from Selected Source by AEZ	AEZ			Wereda Total
	Kolla	W/Dega	Dega	
- Proportion of households with out any reported cash income	16.7	17.7	56.0	22.7
- Proportion of households with reported annual cash income of less than or equal to 600 Birr	60.3	70.0	96.0	69.0
- Average per capita available calorie per person per day	975	1064	562	957
- Proportion of persons getting below the recommended calorie per day	96.4	98.7	100.0	97.9
- Proportion of households already out of stock during this survey in February	19.0	30.0	6.0	22.1
Months of critical food shortage even at a normal year	**March-September**	**April-September**	**June-November**	**May-September**
- Proportion of households perceived their total income and food production to be much too small to satisfy their annual food requirement	84.1	86.5	90.9	86.1
- Proportion of households perceived poor	**29.0**	**29.0**	**52.0**	**32.0**
- Proportion of households perceived very poor	**28.0**	**39.0**	**26.0**	**32.0**

Note: All selected figures are from the household survey result except those with bold taken key informants' opinion survey.

8.4. Malnutrition, Illness and Mortality

Malnutrition can be the result of various interrelated factors that affect the community. Higher level of malnutrition could lead to increased mortality rate in a certain society. Status of both malnutrition and mortality rates in the wereda were assessed by using secondary data, key informants' opinion and more realistically by conducting sampled household survey.

According to the key informants' opinion, about 75 % of Lemo's population are malnourished, the same 75% of the children are very short compared to their age and still the same 75% of the total mothers are perceived to be very thin. However, according to the result of our household survey, 43.1 %, 13.2 %, and 46.5 % of Lemo's children aged 3 to 36 months were respectively stunted, wasted and underweight. The same household survey also indicated that about 25 % of Lemo's mothers in the age range of 15-49 were found malnourished in 1992 using the mid upper arm circumference measure. For the results are more- closer to the country's most recent Demographic and Health Survey results, it is our inclination to trust the household survey result in this regard.

The above high level of malnutrition obviously indicates that the livelihood status of the inhabitants is deteriorated. Thus no surprise to expect high mortality rate as well as short life expectancy at birth in the wereda. According to our household survey, under five mortality rate in Lemo is about 218 and life expectancy at birth is only 45.7 in 1992. These rates were respectively about 185 and 49.1 for the wereda according to the 1987th population and Housing Census result. Even though we were not able to show these

results for male and female separately due to less number of cases, the census result indicated that under five mortality rate was relatively higher for males than females while life expectancy at birth was relatively longer for females than males in the wereda.

With regard to illnesses and occurrence of disease, data were collected both from secondary and primary sources. According to secondary sources, malaria, intestinal parasites, diarrhea, URTI, fever of unknown origin, eye disease and skin infection were among the repeatedly prevailing ten top diseases in the Wereda. As revealed in the household survey, fever, diarrhea, and vomiting were among the most frequently occurring child illness in Lemo. According to the key informants, malaria is more severe in the low land or kolla than the intermediate high land or weina Dega and the high land or dega. Some of the selected indicators regarding malnutrition, illness and mortality are summarized in the following table.

Table 8.4: Selected Indicators Showing Current Status of Health Care, Child Illness, Nutritional Status and Mortality Rate by AEZ

Current Level of Indicators from Selected Source	AEZ			Wereda Total
	Kolla	W/Dega	Dega	
- Proportion of Children 3 to 36 months with out Vaccination card	66.5	40.5	59.5	53.9
- Proportion of Children 3 to 36 months with polio Vaccination	89.2	77.8	53.8	79.2
- Proportion of Children 3 to 36 months with BCG Vaccination	37.8	69.2	23.1	46.1
- Proportion of Children 3 to 36 months DPT Vaccination	35.1	69.2	38.5	47.4
- Proportion of Children 3 to 36 months Measles Vaccination	18.8	54.2	33.3	33.8
- Proportion of women aged 15 to 49 years TT2 Vaccination	14.6	34.3	16.0	24.1
- Proportion of eligible women delivered in the health institutes	0.0	4.0	0.0	1.8
- Proportion of eligible women assisted by health personnel during deli	0.6	3.4	0.0	1.8
- Proportion of eligible women ever used any family planning method	0.5	4.1	2.6	2.4
- Proportion of eligible women currently using any family planning method	0.0		0.0	1.1
- Proportion of Children 3 to 36 months stunted				43.1
- Proportion of Children 3 to 36 months severely stunted				27.8
- Proportion of Children 3 to 36 months wasted				13.2
- Proportion of Children 3 to 36 months severely wasted				0.8
- Proportion of Children 3 to 36 months under weight				46.5
- Proportion of Children 3 to 36 months severely under weight				23.4
- Proportion of women aged 15 to 49 years malnourished				25.0
- Proportion of children aged 5 years or less with diarrhea within two weeks prior to this survey	17.2	19.2	25.7	19.2
- Proportion of children aged 5 years or less with vomiting within two weeks prior to this survey	12.5	8.4	18.9	11.5
- Infant mortality rate				148
- Child mortality rate				84
- Under five mortality rate				218
- Life expectancy at birth				45.7

8.5. Disasters, proneness to disaster & institutional responces to disaster

Data are not available regarding the type, time of occurrence, and magnitude of various disasters. Thus, we are forced to present what was obtained from the key informants. The key informants were asked to tell about major types of disasters occurred since 1960. Their responses indicated that drought, epidemic, flooding and pest infestations have been repeatedly occurring in the wereda. 1965, 1977, 1985, 1986 and 1991 were the most frequently mentioned years of disasters especially for drought and epidemic in Lemo.

As revealed in the CAD's discussion and the key informants' information, drought of the 1965, 1977 and 1991 had caused death of both human being and livestock. Children, pregnant women, old age group and generally the poor were highly affected by the occurrence of drought. The occurrence of epidemics were often associated with drought and also ended up with the death of considerable number of livestock and human being. Similar group of the community were more affected to that of drought besides those in flat plains and overcrowded settlements. Areas with poor infrastructures like road net work and health institutes were affected more especially by the epidemics of the 1960s. According to the RRA information, Malaria, Cholera, Small pox, Meningitis, and Typhoid were the most common diseases occurred at epidemic level in the mentioned years.

Flooding and water logging as disasters have also been affected Peasant Associations with flat topography. Flood has been more severe to PAs with flat topography along the mouth of big rivers where as water logging has been more serious to PAs with flat plain and heavy clay soils. Both were problems during the heavy rains. Specifically, about 20 PAs in the low land called Shashogo have been continuously affected by flooding since 1971. According to the key informants, siltation on the major rivers such as Werea and Guder is the major cause that usually forces them overflow during heavy rains.

Crop diseases and pest infestations were reported to have been affecting all the sampled PAs equally. According to the information we gathered, their occurrence did not coincide much with the occurrence of drought and epidemic. The discussions with community focus group revealed that improved seeds supplied by the extension agents were found less resistant to most crop pests and diseases.

All households were not equally vulnerable to various disasters in the wereda. Some were more vulnerable than others. The information obtained from CADs held in the sampled PAs concerning the more vulnerable group to the major disasters is summarized in the following table.

Table 8.5A: Type of Households More Vulnerable to Major Disasters

Type of Disaster	Type of Households Becoming More Vulnerable
Drought/Famine	- Households with out any reserved assets - Newly formed households with out adequate labor - Households with very small plots of enset plant - The poor and very poor - Households with no or little chat plantation - Households depending only on agriculture - Households with no or little number of cattle

Type of Disaster	Type of Households Becoming More Vulnerable
Epidemic	- Households with out any reserved assets - Households settled near Guder River - Newly formed households or aged ones with out adequate labor - Households with very small plots of enset plant - The poor and very poor - Households with no or little chat plantation - Households depending only on agriculture - Households with no or little number of cattle
Flooding and Water Logging	- Households residing along the mouth of the rivers like - Guder and Wera which are occasionally flooded - Households residing on flat plains with heavy clay soils

Proportion of disaster affected population indicated in the following table is obtained from DPPC offices at various levels. It was not possible to get number of disaster affected population for the most severe drought years in the area such as 1965 and 1977. As indicated in the table, proportion of disaster affected population in the area ranged from 2 % of the total in 1992 to 19.3 % in 1991. Excluding the figure for 1992, proportion of disaster affected population was found steadily increasing between 1987 and 1991 in Lemo. Some of the selected indicators in this regard are summarized in the following table.

Table 8.5B: Selected Indicators Showing Current Status of Disaster Proneness by AEZ

Current Level of Indicators from Selected Source by AEZ	AEZ			Total
	Kolla	W/Dega	Dega	
Years of severe drought	1965/66, 1976/77, 1991	1965,1976, 1977, 1985, 1991	1977, 1991	
Frequency of drought occurrence	7	7	14	
Years of severe epidemic	1976,1984 1985,1986,1987, 1988,1989, 1990,1991	1964,1976,1987, 1989,1990,1991		
Frequency of epidemic occurrence	2	3		
Years of severe flood occurrence and water logging	Every year since 1971	1976,1984,1988, 1989, 1990,1991		
Frequency of flood occurrence	1	3		
Years of severe pest infestation	1975, 1976, 1990	1975, 1979, 1980, 1988, 1991	1990, 1991	
Frequency of pest infestation	7	4	1	
Proportion of disaster affected population 1987				**3.5**
Proportion of disaster affected population 1988				**6.0**
Proportion of disaster affected population 1989				**7.3**

Current Level of Indicators from Selected Source by AEZ	AEZ			Total
	Kolla	W/Dega	Dega	
Proportion of disaster affected population 1990				**6.6**
Proportion of disaster affected population 1991				**19.3**
Proportion of disaster affected population 1992				**2.0**

Note: Bold ones are taken from secondary sources while others are from the CAD results

8.6. Resilience to disaster and local coping strategies

Resilience refers to households recovering capacity to shocks of disaster. Some households are more resilient and others are less due to various interrelated factors. Households' resilience status partly depends on their coping strategies as well as the degree of effectiveness of the local institutional support. Such issues are briefly summarized in this section based on the qualitative information obtained from the key informants and community focus group discussions held at the sampled PAs.

As indicated in the CADs of the sampled PAs, resilience to disasters has improved in Dega or the high land and kolla or the low land but deteriorated in the intermediate high land or weina dega compared to their parents' time. Establishment of more service centers near the PAs, increased seasonal out migration in connection to off farm and non farm job opportunities, increased involvement in petty trade and daily labor, improved awareness as well as better access to information improved reporting system during disasters and strengthened relief and rehabilitation works were mentioned during the community focus group discussion as major reasons for improved resilience in the high land or Dega and kolla or low land parts of Lemo.

On the other hand rapid population growth, diminishing households' land holding size, soil depletion, deteriorated supply and quality of food, rising cost of living and increased poverty were mentioned to be the major reasons behind deteriorated resilience to disasters in the intermediate high land or weina dega part of Lemo.

However, information obtained from the key informants indicated that resilience to both drought and epidemic has deteriorated in all parts of the wereda due to various reasons except it has improved for epidemic in the low land. The major reasons forwarded by the key informants regarding deteriorated or improved resilience to drought and epidemic by agro ecological zones are summarized in the following table.

Table 8.6A: Major Reasons for Deteriorated/Improved Resilience to Drought and Epidemic by AEZ

AEZ	Type of Epidemic	Status of Resilience	Reasons Behind for Improvement, Staying the Same or Deterioration
Kolla	Drought	Deteriorated	- Less food production - Less livestock resources - Negative impacts of the past villegization - Increased poverty in general

AEZ	Type of Epidemic	Status of Resilience	Reasons Behind for Improvement, Staying the Same or Deterioration
	Epidemic	Improved	- Improved access to health services - Better access to education and awareness - Lowered cultural and religious expenses - Better copping strategies - Better awareness to seek timely help - Better supply of food aid
Interme diate High Land	Drought	Deteriorated	- Less land resources - Low food production - Less livestock resources - Poor water resources - Worse climatic change - Degraded physical environment - Negative impacts of the past villegization - Increased poverty in general - Less copping strategies
	Epidemic	Deteriorated	- Limited out migration - Worse copping strategies - Poor water resources - Low food production - Poor quality of drinking water - Impoverishment in general - Poor environmental hygiene - Poor education/awareness
High Land or Dega	Drought	Deteriorated	- Less land resources - Low food production - Worse climatic change - Degraded physical environment - Increased poverty - Less copping strategies - Less awareness to seek timely help
	Epidemic	Deteriorated	- Less awareness to seek timely help - Worse copping strategies - Impoverishment in general - High cultural and religious expenses - Poor environmental hygiene - Poor access to road and market - Poor education/awareness - Poor health services - Poor water resources - Less food production

Various coping mechanisms were undertaken during the occurrence of different types of disasters in the past by households, community at large, and the institutions. Information obtained from the CAD, key informants and the household survey are summarized in the

following table. As indicated in the household survey, skipping eating the whole day, renting own land and selling household assets are coping- strategies mainly practiced when the problem or disaster becomes more severe. Withdrawing children from schools was rarely practiced as a copping mechanism in Lemo.

Table 8.6B: Coping Strategies Practiced During Disasters at Various Levels ByAEZ -Lemo (1992)

AEZ	Coping Strategies Practiced		
	By the Households	**By the Community**	**By Institutions**
Kolla or Lower Weina Dega	- Petty trade - Labor selling - Borrowing cash and grain from others - Selling livestock - Using modern agricultural inputs - Selling livestock products - Depending on the better off - Constructing cut off drain - Constructing dikes - Eating less preferred or foul food - Selling fire- wood, charcoal, dung, etc. - Skipping eating the whole day - Reducing meal frequency and or quantity	- Reporting to the higher government body about the problem in time - Constructing cut off drain - Constructing dikes - Coordinate FFW programs - Requesting relief aid from GOs and NGOs in time when stress occurs - Supporting disaster victims with cash and food	- Providing relief food aid in time - Establishing health institutes - Providing small scale credit services and ox loan - Arranging FFW programs - Strengthening preventive vaccines
Weina Dega	- Petty trade - Labor selling - Borrowing cash and grain from others - Selling livestock - Selling livestock products - Depending on the better off, especially on relatives - By being member of local self help organization-*Edir* - Growing drought resistant crops like enset - Renting out own lands - Selling household assets - Selling wood - Reducing meal frequency and or quantity - Growing short maturing crops	- Supporting each other through local self help organization called Edir - Reporting to the higher government body about the problem in time - Requesting food aid in time - Coordinating FFW schemes - Initiating their members receive medicine and preventive vaccine - Supporting disaster victims with cash and food	- Providing relief food aid in time - Establishing health institutes - Providing ox for the very poor - Supplying pesticides - Arranging FFW schemes

	- Constructing cut of drains - Eating less preferred or foul food - Selling fire-wood, charcoal, dung, etc. - Skipping eating the whole day		
High Land *Dega*	- Selling household assets - Petty trade - Labor selling - Temporary out migration seeking job out side the PA - Borrowing cash and grain from others - Planting trees - Constructing soil bands - Depending on the better off, especially on relatives - Participating on FFW and EGS programs - Eating less preferred or foul food - Skipping eating the whole day - Reducing meal frequency and or quantity	- Supporting each other through local self help organization called Edir - Supplying food grain for the needy and orphans - Constructing residential houses upon incidence of fire	

Chapter 9

9. Conclusion and Recommendation

9.1. Conclusion

This profile is the first of its kind to be done at wereda level based on data collected from various sources. Attempt is made to answer the questions such as who are more vulnerable to various disasters? Why they are more vulnerable? When are they more vulnerable? And where do these vulnerable community live? In addition, background of the wereda is adequately described. Obviously, communities' vulnerability to various disasters is not the result of a single factor, rather it is the result of many interrelated factors. These interrelated factors behind communities' vulnerability to different risks regarding Lemo wereda is briefly summarized in this section.

Pressure of human population is among the major factors identified to be associated with vulnerability of Lemo's inhabitants. Both crude and agricultural densities of the wereda have estimated to be over 300 persons per square kilometer. Even though it depends on variation of the carrying capacity, for researchers like Easter Boserup, such areas are extremely densely populated. As a result of this high population pressure, both cultivation and grazing lands are the most- scarce resources in the wereda. Considerable proportions of the inhabitants are already land-less. Several others are with very small land holding size. However, land is most scarce resource for the dega or high land inhabitants compared to the remaining two AEZs. In fact, the intermediate high land is still more densely populated than kolla. According to the key informants, opportunities of out migration in order to get cultivation land are decreasing from time to time. Land holding is not only small but also depleted due to repeated cultivation. As a result, its natural productive capacity is very low and forces the farmers to continuously use chemical fertilizers. Thus, per capita food production, one of the major economic bases of the inhabitants, is already very low and further decreasing from time to time.

Lemo is also suffering from high livestock population pressure. Shortage of grazing land is almost every household's problem. The most recent Woody Bio Mass Study also indicated that the livestock carrying capacity of the wereda will reach its critical after 2006*. Moreover, the types of livestock in the wereda are mainly local breeds with low productivity.

Soil erosion, water logging, flooding, overgrazing, and deforestation were the major environmental problems identified in the area. Invasion of most fields by eucalyptus trees, regardless of the type of sites, is another potential environmental problem in the area. Soil erosion is more severe in the steep slopes mainly located in the high land and side slopes along the major rivers such as Gudar and Wera. Where as, flooding is more serious problem in areas commonly called Shashogo Plain where overflooding is common due to silt sedimentation of the major rivers. Overgrazing is problem through out the wereda. Using dung and crop residuals as fuel wood is also exacerbating depletion of soil's fertility. Productive capacity of the already small land holding is further deteriorated due to these and other environmental problems.

Provision of quality basic services at reasonable distance is believed to improve communities' livelihood and reduce level of vulnerability to various disasters. However, these are still in their infancy for most of the basic services. About 56 % of the PAs are still without primary schools. The existing schools are also suffering from shortage of qualified teachers and necessary materials. Adult literacy programs are almost non-existent. Absence of Kindergartens and child literacy places in almost all the rural areas are another weaknesses identified in connection to educational services.

Physical availability of health institutes is promising in the wereda. But, the functional adequacy of the existing health institutes are very weak due to shortage of trained health personnel, medical equipment, drugs, and logistic facilities. The intermediate high land is in a better status compared to that of the low land in terms of physical coverage of the health institutes due to the presence of one hospital and many private clinics at Hossana Town. The situation is the worst in the high land for there is no any health institute within the high land.

More than 90 % of the wereda's rural inhabitants are not supplied with clean drinking water. That is partly why water born diseases like diarrhea and intestinal problems are common in the area. Potable water supply status is better in the low land compared to the other two agro ecological zones according to the information obtained from wereda council.

About 45.3 % of the total agricultural households of Lemo are currently involved in the new agricultural extension program. Number of participants have been steadily increasing since the beginning of the new extension program in 1987, but the recently falling grain price in the area was found discouraging them from further participation. Even though their ratio to the agricultural households is still very low, DAs are assigned in most of the rural PAs except in the high land so as to assist the farmers. The extension program was found with great emphasis to production of cereals while other important extension programs like livestock and natural resource management are less emphasized. Despite large livestock population, there is only a single veterinary clinic at wereda capital another vet post at Bonesha. Development agents in the area are also criticized for their emphasis to tax collection and distribution of inputs and collecting back debts instead of giving enough time to orient and train the farmers in relevant extension activities.

Lemo has no considerable problem with regard to access to market and road net- work. Most PAs can be reached by vehicles during the dry months. About 77 % of the inhabitants are accessible to major weekly markets within two hours single trip while over 60 % of the inhabitants are accessible to all weather road within 15 kilometers radius.

Opinion surveys conducted both at sampled households and key informant level indicated that majority of Lemo's inhabitants are either poor or very poor unable to get sufficient food, proper shelter, reasonable health care besides difficulty to educate their children. According to our household survey, for about 86 % of the households, their total income as well as production is not sufficient to satisfy families' food requirement. About 13 % of the households do not own any livestock with about 11 % owning 1 TLU or less; 13 % of the households do not have any land; about 23 % do not have any stated cash income;

and for about 70 % of the total households, the reported cash income is less or equal to 50 Birr a month.

As summarized above, majority of the inhabitants in the wereda, are suffering from extreme poverty mainly due to scarcity and depletion of land resources which in turn is the result of high population pressure. As a result of all these, majority of the inhabitants are either temporarily or permanently food insecure. Our survey indicated that only 2 % of Lemo's inhabitants get the recommended amount of energy per day. On average only 43.5 % of the required energy is satisfied from own production at individual level. As realized from our multi level analysis, March to September in the low land, April to September in the intermediate high land and May to September were identified to be months of critical food shortage even in a normal year in Lemo.

Both poverty and food insecurity status are also reflected in the nutritional status of the inhabitants. Our anthropometric assessments indicated that about 25 % of the total women aged 15-49 years are malnourished. On the other hand 43.1 %, 13.2 %, and 46.5 % of total children aged 3 to 36 months were found stunted, wasted and under weight respectively. Even though it is too subjective, about 75 % of the total population were perceived to be malnourished by the key informants.

Drought, epidemic, flooding, and pest infestation are identified to have been repeatedly affecting the inhabitants in Lemo. Except for epidemic in Kolla, households' resilience to both drought and epidemic was found deteriorated due to various reasons in the wereda according to the key informants. Increasing population pressure and large family size; uneconomic use of resources and occasional extravagancy; diminishing land resources; degraded physical environment (especially severe deforestation and soil erosion); less food production; less copping strategies; less awareness to seek timely help; less livestock resources; negative impacts of the past villegization; poor water resources both for human being and the livestock and increasing poverty in general were among the causes known to deteriorate resilience to drought in Lemo. Even though some improvements were achieved with regard to resilience to epidemic, shortage of food, increasing malnutrition, lack of potable water, occasional flooding, poor health services, limited out migration, poor basic education and awareness creation programs, poor personal and environmental hygiene and increasing poverty in general are among the factors identified to deteriorate the inhabitants' resilience capacity to epidemics.

9.2. Remarks and Recommendation for Future Intervention

It is not easy to strongly recommend solutions for quite large number of interrelated problems identified through this multi level analysis. However, we proposed some suggestions depending on the identified problems, suggestions made by the local community and the local reality to practice recommended alternatives. Thus, our recommendations, briefly described in this section are subject to further improvement accordingly.

9.2.1 Family Planning

For population pressure was found among the major factors for exposing the inhabitants more vulnerable to various disasters, activities should be carried out so as to slow the current rapid population growth in one hand and feed the already extremely dense

population in the area on the other hand. Even though most of the inhabitants still need more children despite all the hardship, local and external organization should work hard to influence the inhabitants accept and pursue family planning measures. In fact there are considerable proportion of the households in favour of family planning if the organizations are able to educate the users better and provide contraceptives with lesser side effects. Relatively larger proportion of contraceptive users in the intermediate high land part of the wereda, which is the most closer to Hossana, indicates that there is promissing environment to implement family planning if proper family planning education is provided besides providing wide variety of contraceptives. Family planning education should be provided for both partners since some of the interviewed wives were found not using any contraceptive in fear of their hasbands.

9.2.2 Non- Farm Activities and Credit Facilities

Family planning could be taken as a long- term alternative. Other measures should be taken as an immediate alternative so as to improve communities' livelihood. Promoting and expanding chances of non- farm activities is not to be overlooked in this regard especially for the newly formed young families with no or little land for cultivation. The locally existing skills like wood- work, carpentry, poetry, etc. should be improved through training. Credit facilities should also be secured in order to run such activities as well as petty trade.

9.2.3 Agricultural Extension

Agricultural extension service in Lemo was found unevenly distributed. The dega inhabitants, mainly depending on enset and barley, are rarely involved in the new extension program. The coverage is still very low in the low land mainly due to the negative impacts of occasional flood. Even though there is great emphasis on cereals, experiences are encouraging in the intermediate high land. Thus, the new extension program should further be strengthened by incorporating lessons learned from experiences of the recent past. But, it should not be limited to extension of cereals. Extension programs like livestock and natural resource management should also be given emphasis. For the falling price of grain and ever increasing price of agricultural input were found discouraging the farmers from participation in the new extension program, both the government and NGOs should think about how to improve price for the produce. For instance, government can form organizations that purchase produces of the farmers for prices that can adequately cover their expences of various inputs especially when the market price is very low. Such organizations can also sell the grain to consumers for reasonable price when the price in the market goes up. Doing this, they can stabilize the market and improve the food security status of the inhabitants.

Development agents should not be burdened by additional responsibilities other than the extension work so as to enable them to get sufficient time to assist farmers and develop smooth relationship with the community whom they serve.

9.2.4 Research and Development

Experiences of the developed nations indicate that efforts for development should be supported by continuous research findings. Increasing agricultural productivity requires

careful selection of the better breeds as well as sound pest and disease controlling mechanisim through continous research. For instance, pests and diseases on some drought resistant crops like enset are disturbing the most important economic base of the community in the area. Yield per unit area for most crops is still very low compared to current achievement worldwide. Our survey indicated that the livestock in Lemo Wereda are entirely local breeds with relatively low yield. Hides and skins produced in the area are also of less quality due to poor livestock management. Such constraints can only be minimized by using outputs obtained from participatory research reflecting the local reality as much as possible. Thus, various organizations and government offices involved in agricultural activities should form strong link with the Agricultural Research Institutes in the country so that the farmers can be benefited from the increased productivity.

9.2.5 Basic Services

Despite large livestock population, there is extreme shortage of both veterinary clinic and personnel. Thus, attention should be given so as to improve physical availability of vet clinics and personnel especially in the low land where pasture problem is lesser.

Provision of quality basic education is believed to reduce population pressure on land resources by creating chances of non- farm jobs. Thus, factors identified to deteriorate quality of formal education in the wereda should be curbed. Absence of adult literacy program was found contributing for the increasing illiteracy while lack of kindergartens and child literacy places in most rural areas is making the children delay beginning of their primary education. This should also be given attention. Each PA should get at least one primary school within the PA since it is not easy for the young children to walk long distance to get the service.

For almost all the rural inhabitants are deprived of clean drinking water in Lemo, both GOs and NGOs should work hard in this regard.

Our study indicated a big difference between performance of polio and other vaccinations. This shows that performance can be improved for other vaccinations like that of polio if similar effort is made. Since the coverage is still low for all immunization vaccinations in the wereda except for polio, further effort should be made in this regard.

9.2.6 Flood Control

The Shashogo Plain with about one-third of Lemo's population is known to suffer from occasional flooding especially during heavy rain. Therefore dry time cultivation by irrigating rivers like Wera and Boyo Lake can be a good alternative since the plain is with fertile alluvial deposits. Another alternative is to construct physical structures that improve the drainage system by diverting the flood lines. In fact, further in- depth research should be conducted by interdisciplinary team before implementing such programs.

9.2.7 Natural Resource Management

It is obvious for every body that agricultural economy heavly 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, crop rotation and relay cropping are to be given emphasis in Lemo. In fact, physical structures like soil bands and terracing are not to be missed at the steep slopes mainly located in the high land and intermediate high land part of the wereda. In either of the cases, professional assistance is must to be fruitful with any conservation activity.

9.2.8 Resettlement and Out-Migration

Population pressure is not a problem throughout the country due to uneven distribution from place to place. For instance, according to the 1987th Statistical Abstract of Ethiopia, population density ranged from 7 perssons per square kilometer in Gambela to 92 perssons per square kilometer in the Southern Region with lack of data for Afar and Somale Region. Even in the Southern Region, population density ranged from about 3 persons per square kilometer in Selamago wereda of South Omo Zone to about 727 persons per square kilometer in Wenago Wereda of Gedeo Zone. Though the carrying capacity differs from place to place, the above data show that there are areas extremely underpopulated or sparsely populated despite some pockets extremely overpopulated. Therefore, population resettlement programs should carefully be designed so as to cope up with the population pressure observed especially in the high land part of Lemo. By careful design we mean not to repeat similar mistakes as that of the Derg regime where resettlers were not given enough protection from the attack of the former settlers besides inadequate study before the programe. Rather, it can be done by incorporating lessons learned from some of the successful resettlement programs such as the resettlement of the Kembata People around Gibe Valley or Tedele area. 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.

9.2.9 Strengthening Data Base

Copping with disasters requires learning from the past events and good learning also requires the availability of data indicating the events. Interventions can also be more fruitful if planning for intervention basis reliable data. But, the data- base of offices both at zone and wereda level is very weak as we realized during our survey. Even in some cases, data are available in the hands of individual experts instead of being documented in the respective offices. Such data can easily disappear following transfer of the experts. Thus, care should be taken to have reliable data at these levels. Regional offices with better human resource base should assist zones and weredas by providing relevant training in this regard.

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