

Strengthening Emergency Response Abilities
SERA Project

Vulnerability Profile: SUMMARY

Lemo Woreda (district)

Hadiya Zone

Southern Nations, Nationalities and Peoples Region

2000

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1. Background of the Project

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 for the problems by providing food aid and relief mainly obtained from external donors. Recently, the government has realized that providing food aid and relief will not be a sustainable solution to 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 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 in-depth research so as to follow all the routine procedures of a 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 and the Vulnerability Profile

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

- Develop vulnerability profiles of selected disaster prone areas of the country
- Conduct relevant vulnerability research and special studies on root causes of vulnerability.
- 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 SERA objectives will have the following major objectives:

- It will be an information guide by which policy makers, planners, donors, relief and development practitioners are better informed about the nature, magnitude and the factors that makes people vulnerable to disaster in the wereda.
- 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 and Users of the profile

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

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.

2. Methodology

2.1 Sources of data

- ◆ Secondary documents, literatures and maps
- ◆ Primary from the Key informants, focus group discussion and households

2.2 Determination of sampling units & procedures of primary data collection

Sampling Units

- ◆ The wereda is stratified into three traditional agro- climatic zones namely kolla with 24 Pas, Weina dega with 47 PAs and dega or high land with 7 PAs.
- ◆ Then 3 PAs from kolla, 3 PAs from weina dega and one PA from dega were randomly selected for the household survey. The number of sample PAs between kolla and weina dega were deliberately made equal despite larger number of PAs in weina dega due to repeated occurrence of disasters in kolla part of the wereda.

Household Survey

- ◆ One EA is randomly selected from each sampled PA
- ◆ All of the household heads of the selected EAs were recorded so as to use it as a frame book
- ◆ 100 household heads were sampled from each EA. Fortunately, all the 700 household heads responded in Lemo.
- ◆ Included are all eligible women aged 15-49 years in the selected households to fill the women's questionnaires. Out of the 909 women identified to be eligible in the wereda, all of them responded and 891 of them were measured for anthropometric purpose.
- ◆ Attempt was made to include all children aged 3 to 36 months in the anthropometric surveying. Accordingly, out of the 327 children identified to be eligible in the 7 sample PAs, 297 of them were measured.

Key Informant's Interview

- ◆ A minimum of 15 knowledgeable key informants were carefully selected from each of the sampled PAs and interviewed in specific topics. Among these are knowledgeable and influential youth, women, elders, PA leaders, DAs, school principals and health workers
- ◆ Two to three wereda officials were also interviewed to get ideas on some topics

Community Focus Group Discussion

- ◆ A day- long community focus group discussion was conducted in each sample PA. 6 to 8 knowledgeable elders were carefully selected from each sample PA to freely give their views on common issues and problems. Two of the focus group members were made women in each sample PA so as not to miss gender sensitive issues.

2.3. Analytical Methods

- ◆ Qualitative analysis
- ◆ Univariate analysis
- ◆ Bivariate analysis across AEZ and sex (bivariate cross tabulation tables are widely applied)
- ◆ Multivariate analysis (multivariate cross tabulation tables and binary logistic regression)

2.4. Training

Different types of training were organized at various levels so as to enable successful data collection, analysis and report writing. Accordingly two weeks training accompanied with practical exercises was provided to enumerators, supervisors and RRA team members at zonal level besides provision of SPSS for DOS and WIN at Federal level mainly for SERA staff. In addition, various discussion forums were organized at Federal level in order to improve capacity of vulnerability analysis.

2.5. Limitations/Constraints

For such profile is the first of its type to be prepared at local level with locally available experts, lack of well established experiences in the preparation of such profiles and scarcity of related literature can be considered as the major limitation of this study. In fact, various efforts were made by the stakeholders at every level so as to minimize the negative impacts of such limitations.

3. Background of the study area

Name of the study wereda

Lemo

Geographical location

Between 7⁰ 23' 02" to 7⁰ 56' 00" North Latitude and 37⁰ 50'00" to 38⁰ 07' 00" East Longitude

Relative location

Lemo is bounded by former KAT Zone in the south, former Guraghe Zone in the north east, Misha Wereda of Hadiya Zone in the North West Soro weredas of Hadiya Zone in the south west. Its capital Hossana, located at about 230 kilometers away to the south of Addis on the gravel road running from Addis to Welayta Sodo through Butajira is found at the southern tip of the wereda.

Table 1: Some background Characteristics of Lemo Wereda

Major category	Sub category	Number/%
Total population in 1992	Male	147190 (49.2 %)
	Female	151976 (50.8 %)
	Total	354910 (100.0 %)
	Rural	301270 (84.9 %)
	Urban	53640 (15.1 %)
	Total	354910 (100.0 %)
population density in 1992 (persons/km²)	Crude	351
	Agricultural	342
Ethnic Composition (1987)	Hadiya	62.1 %
	Silti	30.3 %
	Amahara	3.1 %
	Kembata	2.7 %
	Guraghe	1.1 %
	Others	0.9 %
	Total	100.0 %
Religious Composition	Muslim	58.5 %
	Christian	40.4 %
	Others	1.1 %
	Total	100.0 %
Mother Tongue Language (1987)	Hadiyagna	57.8 %
	Silegna	30.3 %
	Amaharic	6.6 %
	Kembategna	3.4 %
	Others	0.9 %

Major category	Sub category	Number/%
	Total	100.0 %
Mean Annual Rainfall in mm	Kolla	953.4
	Weina Dega	1205.8
Mean Annual Temperature in Degree Celsius	Kolla	17.1-20.0
	Weina Dega	15.1-17.5
	Dega	12.6-15.0
Range of Elevation m.a.m.s.l	Wereda	1780-2780
Total Area (km²)	Wereda	1010.3

4. Summary of Findings

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 anthropometric 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. The agricultural density in Lemo was found less than the crude density due to the fact that most of its arable land is already cultivated besides exclusion of the urban population including Hossana Town from calculation of agricultural density. 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 has 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 does 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 coping 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.

5. Population, 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 351 persons per square kilometer while the agricultural density was found 342 persons per square kilometer. For Hossana Town, with about 40,000 populations 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 was 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 is 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 2: Environmental Problems and Their Consequences -Lemo (1992)

Type of Environmental problem.	Root causes.	Consequences in the livelihoods.
Soil erosion and depletion	<ul style="list-style-type: none"> - Deforestation. - Mono cultural practices. - Over cultivation. - Planting Eucalyptus trees near and in the farming lands. 	<ul style="list-style-type: none"> - Decreased productivity of the land.
Deforestation	<ul style="list-style-type: none"> - Rapid population growth. - Expansions of farm lands. - Search for fuel and construction 	<ul style="list-style-type: none"> - Exposure of top soils for erosion. - Formation of

Type of Environmental problem.	Root causes.	Consequences in the livelihoods.
	woods.	gullies.
Stress on pasture	<ul style="list-style-type: none"> - Rapid population growth. - Expansions of farm lands. - Flooding and water logging problems. 	<ul style="list-style-type: none"> - Forced reduction of livestock. - Reduced livestock products.
Flooding and water logging	<ul style="list-style-type: none"> - Deforestation/poor land cover in the upper courses of some rivers - Non-integrated soil and water conservation works. - Flat topography. - Heavy clay soil. - Over flowing of Weira River. - Changed old route of Guder River. - Diverted routes of seasonal rivers. 	<ul style="list-style-type: none"> - Destruction of crops and grazing fields. - Favored conditions for the reproduction of vector insects.

Source: CADs in the sample PAs of the wereda.

Table 3 provides data from selected sources at wereda level with trend and table 4 provides current level of some selected indicators mainly from household survey result across the three agro-ecological zones.

Table 3: Selected Indicators Showing Population-Environment Relationship with Trend

Wereda Level Indicators with Trend	Year in E.C.		
	1977	1987	1992
Crude population density	231	290	344
Agricultural density	236	278	325
Average family size	4.7	5.3	5.6
Dependency ratio		95.2	
Average land holding size		1.2	1.1
Proportion households land less			12.6
Proportion of households with average land holding size of 0.5 ha or less			73.4
Proportion of arable land already cultivated			87.2

Source: Various Secondary Documents

Table 4: 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	
Average family size	5.4	5.9	5.6	5.7
Mean number of children ever born per woman aged 15-49 years	2.1	2.5	2.6	2.3
Mean number of children ever born per woman aged 45-49 years	5.1	6.2	4.6	5.6

SERA Vulnerability Profile

12

Lemo Woreda Hadiya Zone Southern Nations, Nationalities and Peoples Region (2000)

Current Level of Indicators from Selected Source	AEZ			Wereda Total
	Kolla	W/Dega	Dega	
Average land holding of the household in hectare	0.9	0.8	0.5	0.8
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

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

5.1 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 upon 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, and 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 is 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 5: 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
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
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 6: 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
Primary school drop out in girls	30.1	17.7	16.3	19.1
Primary school drop out in boys	31.7	12.9	14.9	20.8
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

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

5.2 Food Insecurity and Poverty

These are more or less interrelated concepts affecting each other since poor people are usually food insecure and vice 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 is the scarcest resource in the high land or *Dega*. Accordingly, the current average land holding size of the households is 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 is 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 family's 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. All these indirect indicators indicate that most of the inhabitants in Lemo are suffering from chronic food insecurity. We said chronic since food insecurity caused by poverty related problems are usually chronic. Some of the selected food insecurity and poverty indicators are summarized in the following table.

Table 7: 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
Proportion of households with out any reported cash income	16.7	17.7	56.0	22.7

Current Level of Indicators from Selected Source by AEZ	AEZ			Wereda Total
	Kolla	W/Dega	Dega	
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.

5.3 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: 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 aged 5 years & below with Vaccination card	33.5	59.5	40.5	46.1
Proportion of Children 12-23 months with polio Vaccination	89.2	77.8	53.8	79.2
Proportion of Children 12-23 months with BCG Vaccination	37.8	69.2	23.1	46.1
Proportion of Children 12-23 months with DPT Vaccination	35.1	69.2	38.5	47.4
Proportion of Children 12-23 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 delivery	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 wasted				13.2
Proportion of Children 3 to 36 months under weight				46.5
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

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

5.4 Disasters and Disaster Proneness

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 9: Type of Households More Vulnerable to Major Disasters

Type of Disaster	Type of Households Becoming More Vulnerable
Drought/Famine	<ul style="list-style-type: none"> - 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

Type of Disaster	Type of Households Becoming More Vulnerable
	<ul style="list-style-type: none"> - Households depending only on agriculture - Households with no or little number of cattle
Epidemic	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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

Source: CADs in the sampled PAs

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 10: Selected Indicators Showing Current Status of Disaster Proneness by AEZ

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

Proportion of disaster affected population 1990				6.6
Proportion of disaster affected population 1991				19.3
Proportion of disaster affected population 1992				2.0
Annual average disaster affected population				7.5

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

5.5 Resilience to Disasters 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 11: 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	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - Improved access to health services - Better access to education and awareness - Lowered cultural and religious expenses - Better coping strategies - Better awareness to seek timely help - Better supply of food aid
Intermediate High Land	Drought	Deteriorated	<ul style="list-style-type: none"> - 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 coping strategies
	Epidemic	Deteriorated	<ul style="list-style-type: none"> - Limited out migration - Worse coping 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	<ul style="list-style-type: none"> - Less land resources - Low food production - Worse climatic change - Degraded physical environment - Increased poverty - Less coping strategies - Less awareness to seek timely help
	Epidemic	Deteriorated	<ul style="list-style-type: none"> - Less awareness to seek timely help - Worse coping 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

Source: CADs in the sampled PAs

Various coping mechanisms were undertaken during the occurrence of different types of disasters in the past by the households, community at large, and the institutions. Information obtained from the various sources are summarized in the following table.

Table 12: Coping Strategies Practiced During Disasters at Various Levels by AEZ

AEZ	Coping Strategies Practiced		
	By the Households	By the Community	By Institutions
Kolla or Lower Weina Dega	<ul style="list-style-type: none"> - 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 	<ul style="list-style-type: none"> - 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 	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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-<i>Edir</i> - 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 - Constructing cut of drains - Eating less preferred or foul food - Selling fire-wood, charcoal, dung, etc. - Skipping eating the whole day 	<ul style="list-style-type: none"> - Supporting each other through local self help organization called <i>Edir</i> - Reporting to the higher government body about the problem in time - Requesting food aid in time - Coordinating FFW chemes - Initiating their members receive medicine and preventive vaccine - Supporting disaster victims with cash and food 	<ul style="list-style-type: none"> - Providing relief food aid in time - Establishing health institutes - Providing ox for the very poor - Supplying pesticides - Arranging FFW schemes
High Land Dega	<ul style="list-style-type: none"> - 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 	<ul style="list-style-type: none"> - Supporting each other through local self help organization called <i>Edir</i> - Supplying food grain for the needy and orphans - Constructing residential houses upon incidence of fire 	

Source: KIs, Household Survey and CADs conducted by SERA, Feb. & March, 1992

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 coping mechanism in Lemo. Those coping mechanisms undertaken at the beginning and middle of disasters may indicate that there is possibility to reverse the negative impacts of disaster while those taken when the hazards became severe could indicate that there is little chance to reverse the negative consequences of disaster. Thus, organizations to be involved in disaster prevention should strictly follow the coping mechanisms practiced by the inhabitants so as to be more effective in their responses.

Table 13: Coping Strategies Practiced During Various Stages of Disasters Lemo (1992)

Time	Coping Strategies Practiced		
	By the Households	By the Community	By Institutions
At normal time	<ul style="list-style-type: none"> - Petty trade - Selling livestock & livestock products - Using modern agricultural inputs - By being member of local self help organization-<i>Edir</i> - Growing drought resistant crops - Growing short maturing crops 	<ul style="list-style-type: none"> - Supporting each other through local self help organization called <i>Edir</i> - Replacing cattle when died at normal time 	<ul style="list-style-type: none"> - Coordinating soil and water conservation works - Constructing rural roads - Developing and protecting springs - Distributing seedlings - Establishing health institutes - Providing small scale credit services - Providing ox for the very poor
At the beginning of disaster	<ul style="list-style-type: none"> - Reducing meal frequency and or quantity - Depending on the better of Household members seeking work within the PA 		
At the middle of disaster	<ul style="list-style-type: none"> - Selling fire- wood, charcoal, dung, etc. - Eating less preferred or foul food - Constructing cut of drains - Household members seeking work outside the PA - Increased livestock sale 	<ul style="list-style-type: none"> - Reporting to the higher government body about the problem in time - Reporting to the higher government body about the problem 	Organizing EGS
When the problem becomes more severe	<ul style="list-style-type: none"> - Renting out lands - Selling household assets - Skipping eating the whole day - Borrowing cash and grain from others - Withdrawing children from schools - Increased livestock sale even at cheaper price 	<ul style="list-style-type: none"> - Taking patients to the health institutes by carrying on shoulder in group - Contributing cash, grain and labor for disaster victim families 	<ul style="list-style-type: none"> - Providing relief food aid

Source: The CADs, KIs and Sampled households in sample PAs of the Wereda.

5.6 Who are the most vulnerable groups? and where are they?

The majority of the inhabitants of 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 of the wereda are either temporarily or permanently food insecure. Food insecurity in the wereda is mainly related to poverty. Thus, effective interventions are not taken to reverse the observed poverty, the chance is very high for the identified food insecurity to remain chronic in the area. As realized in our survey, March to September in lower weina dega, April to September in upper weina dega and May to September in dega were identified to months of critical food shortage even in a normal year in Lemo.

Besides this state of livelihood, disasters such as drought, epidemic, flooding and water logging and pest infestation are identified to have been repeatedly affecting the inhabitants in Lemo. Except for epidemic in lower weina dega, the households' resilience to both drought and epidemic was found deteriorating due to various reasons in the wereda. Children, pregnant women, mothers, and old age group were highly affected by the occurrence of the above mentioned types of disasters. In addition to these groups of population, the identified types of households to have been affected by and most vulnerable to the above mentioned types of disasters are summarized in the following table.

The identified types of households to have been most vulnerable to drought and pest infestation are found in the wereda scattered elsewhere. But households who are identified to have been most vulnerable to epidemic are those living in flat plains and overcrowded settlements in upper and lower weina dega AEZs. Besides, the areas with poor infrastructures like road net work, potable water and health institutes were also identified to be more vulnerable to epidemics. Whereas, the households identified to have been most vulnerable to flooding and water logging problems are those living in PAs with flat topography and heavy clay soils. About 20 PAs in lower weina dega (Shashogo area) have continuously been affected every year by this risk during heavy rains since 1971.

6. Remarks and Recommendations for Future Interventions

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.

6.1 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 favor 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 promising 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 husbands.

6.2 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.

6.3 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 expenses 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.

6.4 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 mechanism through continuous 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.

6.5 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.

6.6 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 or Boyo Lake may 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.

6.7 Natural Resource Management

It is obvious for every body that agricultural economy heavily depends on the natural resources. Thus, enhancing conservation of soils, water and land cover is among the priority areas to obtain sustainable yield from the land resources. For physical structures could compete for the already scarce land resources, biological conservation methods like agro-forestry, inter cropping, 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.

6.8 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 persons per square kilometer in Gambela to 92 persons 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 under populated 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 resettles were not given enough protection from the attack of the former settlers besides inadequate study before the program. 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.

6.9 Strengthening the Data Base

Coping 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.