

Strengthening Emergency Response Abilities
SERA Project

Vulnerability Profile: SUMMARY

Girawa Woreda (district)
East Harerge Zone
Oromiya Region

2000

Prepared with support from:
Disaster Prevention and Preparedness Commission (DPPC)
United States Agency for International Development (USAID)
(SOAG 663.0021.00)

A. SUMMARY OF MAJOR FINDINGS

1. Introduction

The vulnerability profile will be an information guide by which policy makers, planners, donors and relief and development practitioners are better informed about the nature, magnitude, and the factors that make people vulnerable to disaster. It will be used as a tool to understand the underlying and associated causes of vulnerability to disaster. This includes targeting for high-risk groups and areas by identifying causes and conditions that exist in each specific area.

In particular, the profile will answer the following leading research questions, which guided this research activity.

These are:

- Who are the vulnerable to a particular hazard and where do they live?
- What are the factors most highly associated with their vulnerability?
- What kind of coping strategies do they use in response to their vulnerability?
- Why/how do they become highly vulnerable?
- When do they face these hazards most frequently?

The answers to these research questions will lead to indicators of vulnerability. These indicators of vulnerability can be categorized into six major content areas. Each major content area has many specific indicators. These major content areas are: demographic and socio-cultural, physical and climatic, economic and agricultural, institutional or program, disease/ malnutrition, and disaster history.

Data utilized in the preparation of this vulnerability profile were collected from two major sources. These are the primary and secondary sources. Two common methods of primary data collection methods were employed in the primary data collection part. These were the household survey and the rapid rural appraisal techniques. In the household survey two sets of questionnaires: the household survey questionnaire and the individual women's questionnaire were used. In rapid rural appraisal, community group discussions and key informant interviews were conducted to gather opinions of community leaders and key informants. Secondary data were gathered from archives of various government offices, departments and other related sources.

The quality of these data varies from one type to another depending on a number of conditions. These conditions include the expertise of the collecting agency, time and the purpose for which they were gathered. Primary data are of much better quality than secondary data as the collection and management of the former were controlled by the SERA Project while those of the latter were outside the control of the project.

The organization of this vulnerability profile is such that different sections were written based entirely on data gathered from one source by one or two types of methods. Specifically, chapter four is based on data collected from secondary sources, chapters five and six are based on data collected by the rapid rural appraisal technique, and chapter seven is based on data from the household survey.

As the nature and quality of data collected from different sources and by different methods vary, it is expected that different figures for the same indicator can appear in this same profile. This forms the basis for the need to integrate and triangulate the different sources of data. In integrating these data an average was taken in cases where more than one, but fairly similar figures exist for one indicator. When there are large gaps among the different figures only one figure that appears reliable is chosen. The basis for choosing one and discarding the others is comparison with corresponding figures for zonal and regional levels. When a need arises for trend analysis, data from different sources were arranged in time sequence. In cases where most recent data are needed, the household survey data are utilized.

2. Population pressure, natural resources and environmental stresses

There are established theories that explain the relationship between population size, natural resources and environment. As population size increases natural resources are overexploited, land holding is fragmented, living trees are cut down for fuel, fallow periods are shortened, croplands are over ploughed, grasslands are over-grazed by livestock, the air is polluted and lakes and rivers are over-fished. Chopping down of trees and general deforestation will, in turn, contribute to unfavorable changes in climatic conditions. One of the outcomes of such changes is shortage of or irregularities in rainfall.

In the district of Gurawa observation of the physical environment shows that there has been great stress on the environment. But it is difficult to attribute all the stresses on the environment to population pressure although there has been rapid growth of population in the district. The population of the district increased from 194,986 in 1994 to 231,416 in the year 2000. This is an increase of about 19 percent in 6 years.

The total land area of the district is estimated at 4006.25 square kilometers. The crude density of population increased from about 49 persons per square kilometer of land to 58 persons per square kilometer of land in the 6 years between 1994 and 2000. This shows 18.4 percent increase. The pressure of population on land becomes more evident when density is limited to cultivated land. The agricultural density increased from 571 persons per one square kilometer of cultivated land to 606 persons per one square kilometer of cultivated land in the four years between 1995 and 1998. The reason behind the very large difference between crude density and agricultural density is the fact that there is little or no settlement in the southern part of the district, which is mainly lowland while the large majority of the population are concentrated in high and midland areas. This concentration of the majority of the population in a small portion of the district, which is suitable for settlement has had and will continue to have negative impact on natural resources of the settled areas.

Table 1 Indicators of population pressure, natural resources and Environmental stresses, Gurawa district (2000)

<i>Topics and indicators</i>	<i>Years</i>			<i>Total</i>
	<i>1994</i>	<i>1997</i>	<i>2000</i>	
<i>1. Population Pressure</i>				
<i>1.1 Dependency ratio (Rural)</i>	<i>90.04</i>	<i>-</i>	<i>90.02</i>	
<i>1.2 Crude density</i>	<i>49</i>	<i>53</i>	<i>58</i>	
<i>1.3 Agricultural density (rural persons per km² of cultivated land)</i>	<i>1995</i>	<i>1996</i>	<i>1998</i>	
	<i>571</i>	<i>578</i>	<i>606</i>	
	<i>Current levels by agro ecology</i>			
<i>2. Pressure on land</i>	<i>Highland</i>	<i>Midland</i>	<i>Lowland</i>	
<i>2.1 % HHs owning less than 0.5 ha</i>	<i>75.0</i>	<i>79.1</i>	<i>76.8</i>	<i>77.3</i>
<i>2.2 Grazing land (livestock head/ha)</i>	<i>1915</i>	<i>153</i>	<i>882</i>	<i>358</i>
<i>3. Migration (aged 15 – 49 years)</i>				
<i>3.1 % HH with permanent out migrants</i>	<i>8.9</i>	<i>7.5</i>	<i>11.5</i>	<i>9.3</i>
<i>3.2. % HH with seasonal out migrants</i>	<i>4.2</i>	<i>11.0</i>	<i>10.1</i>	<i>9.5</i>
<i>4. Land degradation</i>				
<i>4.1 % Severe change in soil fertility</i>	<i>51.0</i>	<i>56.3</i>	<i>50.0</i>	<i>52.2</i>
<i>4.2 % Severe change in level of erosion</i>	<i>49.0</i>	<i>63.3</i>	<i>51.3</i>	<i>54.9</i>
	<i>Years</i>			
<i>5. Environmental change (% Severe environmental stress)</i>	<i>Before 1974</i>	<i>1974-1991</i>	<i>1991-1999</i>	
	<i>7.7</i>	<i>69.3</i>	<i>56.0</i>	

This explains why there is shortage of cropland despite the large landmass of the district. About 77 percent of the sample households reported that the size of their land holding is less than half a hectare in the year 2000. Even in the lowland areas where there is vast area of unoccupied land, the average cultivable land holding size is very small. This is because of the fact that arable land is only that lies adjacent to the banks of major river valleys. That area is usually limited in size. When this small land is divided among the households, the average holding size becomes smaller.

This shortage of arable land certainly leads to over-cultivation of the available land, which in turn results in deterioration of soil fertility. More than half of the surveyed households responded that there has been fast increase in the level of soil erosion and fast decline in soil fertility on their main plots since they started farming. Opinion survey in the rapid rural appraisal revealed that 56 percent of the participants believe that there has been severe stress on the environmental in the study area.

The decrease in the size of farmland, over cultivation and the ever deteriorating soil fertility, associated with low level of modern technology, will continue to worsen the food security situation in the district.

3. Access to services, infrastructure and their quality

One of the basic social services for any society is education. Access to and quality of education are usually measured by a number of indicators. These indicators include primary school enrollment ratios, retention ratios, student-school ratios, student-

classroom ratios, and student-teacher ratios. General literacy rate of the community is also used as an indicator of the literacy status of the general society.

In the district of Gurawa, gross enrollment ratio for boys in primary schools increased from 15.9 percent in 1996 to 31.3 percent in 1999. Although the level is very small compared to other districts in Oromiya, the progress has been good. The corresponding figures for girls were 4.6 and 9.1 percent, respectively. School drop out ratio, that is, the difference between the number of students who entered grade 1 before four years and that of those who completed grade 4, remained at the level of 68 percent for boys while for girls it decreased from 90.4 percent in 1996 to 84.9 percent in 1999. The increase in the enrollment ratio and the corresponding none increase in retention ratios shows the weakness of enrollment ratio as an indicator by itself.

Another element in the provision of educational services is the number of schools in a given area. The number of primary schools in the district grew from 27 in 1995 to 33 in 1998. This is an increase of 22 percent in three years. The primary school density in 1998 was one school in 121 square kilometer area. In addition, there is one primary school for 1586 primary school age children in the same year (1998). Students-classroom and students-teacher ratios are the most commonly used indicators of the quality of education services. In Gurawa, these ratios increased from 49 to 61 and from 41 to 59, respectively, between 1995 and 1999. Besides the much lower level of the indicators, the numerical increase of the ratios shows deterioration in quality.

In general, the supply of educational services is far from adequate. The apparently low students-class room and students-teacher ratios make it appear that there is good quality education. When the enrollment and retention ratios are taken into account, however, it becomes clear that the number of boys and girls who come to schools affect these measures of quality negatively. As elsewhere in the country, girls are at a much more disadvantaged position than boys.

The health sector is another basic aspect of the life of society. The services provided in this sector play a determinant role in socio-economic development and their levels are often indicators of the level of development. In the district of Gurawa 57 percent of the population do not have access to any health institution. There is only one health center in the district, which is located in the capital of the district. On the other hand, the number of health stations or clinics increased from 3 to 7 between 1994 and 1998. The number of physicians decreased from 2 to 1 in the period specified. The number of front line health personnel is also minimal and showed little or no increase. Only two nurses were added to the existing 5 in the five years between 1994 and 1998. The numbers of health assistants were 28 in 1994, 32 in 1996 and decreased to 29 in 1998. The number of traditional birth attendants remained at the level of 30. These figures show that the number of health institutions and health personnel is very small particularly when the vastness of the district and the large size of its population are taken into account.

Another very important aspect of health service availability is the provision of preventive health services. The focus of this study is on the two most common preventive health programs. These are antenatal care for pregnant women and immunization for children. The proportion of pregnant women with at least two doses of TT2 never exceeded the

level of about 18 percent. It was 9.4 percent in 1995, 16.8 percent in 1996, 7.4 in 1997, and 13.1 percent in 1998. These figures show a very low level of antenatal care.

Table 2 Indicators of access to basic services and their quality, Gurawa District (2000)

<i>Topics and Indicators</i>		<i>Current levels by agro ecological zones</i>				
<i>1. Education</i>		<i>High land</i>	<i>Mid land</i>	<i>Low land</i>	<i>Total</i>	
<i>1.1 Percent literate (Pop aged 7yrs+) in year 2000</i>	<i>Males</i>	28.0	14.0	15.0	16.9	
	<i>Females</i>	3.9	2.1	3.1	2.9	
	<i>Both</i>	16.1	8.2	9.1	10.0	
<i>1.2 Trends in enrollment and dropout over years (in percent)</i>		<i>Years</i>				
		1996	1997	1998		
<i>Enrollment (Pop aged (7-14 years))</i>	<i>Males</i>	15.9	16.1	31.3		
	<i>Females</i>	4.6	4.9	9.1		
<i>Dropout (Grades 1 – 4)</i>	<i>Males</i>	68.0	48.7	68.4		
	<i>Females</i>	90.0	72.8	84.9		
<i>1.3 Number of students per teachers</i>		41	46	59		
<i>2. Agricultural Extension programs</i>						
<i>2.1 % Involved in Food crop extension</i>		1.55	2.80	9.73		
<i>2.2 Farmers-development agent ratios</i>		2747	1806	1346		
<i>2.3 % Received assistance for improving agriculture or livestock production in the previous 5 years</i>		<i>Agro ecological zones</i>				
		<i>High land</i>	<i>Mid land</i>	<i>Low land</i>		
		3.0	10.4	16.2		
<i>% Of households received credit services in last 5 years</i>		8.0	4.0	10.9		
<i>3. Basic services (Average weighted score as percent of total possible)</i>		47.4	48.6	27.2	37.3	
<i>4.1 % of Pregnant women immunized (TT2)</i>		9.1	8.9	17.4	13.1	
<i>4.2 % Of young children aged 12-23 months immunized</i>	<i>BCG</i>	29.4	10.3	11.9	13.9	
	<i>Polio</i>	82.4	87.2	74.6	80.0	
	<i>Polio (3)</i>	17.7	28.2	15.3	20.0	
	<i>DPT</i>	17.6	5.1	13.6	11.3	
		<i>DPT (3)</i>	11.8	0	6.8	5.2
<i>5.1 % Of ill women sought medical care in the previous 2 weeks</i>		8.7	17.9	13.3	14.0	
<i>5.2 % Of ill children sought medical care in the previous 2 weeks</i>		5.7	6.1	1.3	8.6	
<i>6. % Of (women aged 15-49 years ever used any family planning method</i>		1.4	0	0	0.2	
<i>7.1 Pop with access to potable water (%)</i>		27.1	0	1.6	4.7	
<i>7.2 Rural population with access to potable water(%)</i>		<i>Years</i>				
		1994	1996/97	1999/2000		
		19.3*	-	23.8**	4.4	

* Obtained from CSA, 1996

** Obtained from Mines and water resources development, 2000

Immunization of children is still at a very low level. An exception to this is the vaccination against polio. At the time of the household survey, 80 percent of children aged less than 5 years were reported to have had at least one shot of polio vaccine. But the corresponding proportion with three shots of polio vaccine was 20 percent. Polio vaccination is currently being carried out in campaigns and that is why vaccination against polio is more successful than the others.

The proportion of children that is with DPT3 is usually taken as a good indicator of the completeness of immunization against the common child diseases. Data gathered by the household survey in February 2000, revealed that the proportion of children aged 12 – 23 months who had three shots of DPT vaccination was only 5.2 percent. Among the same children the proportion with BCG vaccination was 13.9 percent.

In a rural, agriculture based economy efforts to develop the agricultural sector largely determine the overall development of the whole economy. Among the programs carried out in this sector, agricultural extension program is given special attention. This program has four components. These are the food crop extension, livestock development extension, natural resource conservation, and horticultural crop extension programs.

In Gurawa, only two, that is, food crop and natural resource conservation extension programs, are being conducted. Food crop extension program was started very recently. The number of agricultural households, involved in this program increased from 725 (1.55 percent) in 1994 to 4847(9.7 percent) in 1998. Although the increase is close to 7 fold, the level is still insignificant. The proportion of households involved in the program has not exceeded 10 percent. This is a good indicator of an inadequate effort that has been exerted in this sector. This becomes more evident when the number of development agents (DAs) is taken into account. There were 17 DAs in 1995, 26 in 1996, 32 in 1997, and 37 in 1998. In spite of the doubling in the number of extension agents in the four years specified, the level is still very low. The ratio of one development agent to total number of agricultural households was 2747 in 1995/96 and this number was slightly lowered to 1346 in the span of four years in 1998/99. This is a clear indicator of the workload of the development agents.

The other agricultural extension program under way in Gurawa is the natural resource conservation program. It appears that this program is not succeeding. At the beginning 10.5 percent of all agricultural households in the district participated in the program. This proportion decreased to 4.3 percent in 1998.

The proportion of the total area covered under the program also decreased from 0.43 percent at the beginning to 0.26 percent in 1998. All these observations support the statement that the agricultural extension programs in the district of Gurawa are of recent origin, at very low level, and with little success.

Other necessary services such as telecommunication, transportation, potable water supply, and electricity and similar others are either non-existent or inadequate. There is one semi-digital automatic telephone line in the capital town of the district. The length of all weather roads in the boundaries of the district is only 12 kilometers. There are few kilometers of dry-weather roads built by Food For Work program. The proportion of the rural population with potable water supply is very small. There is no electricity in the

whole district. All these facts indicate that the population of the district lives outside the realms of modern basic technology.

4. Malnutrition, epidemic diseases and mortality

The issues under this topic are closely interrelated. Malnutrition creates favorable atmosphere for epidemic diseases and the latter can also cause malnutrition. Mortality is often the outcome of the interaction between malnutrition and diseases. Level and trend analysis of each of the topics is as follows.

4.1 Malnutrition

In this study the analysis of malnutrition focuses on the nutritional status of children and women. Three separate but related indicators measure the nutritional status of children. These are proportion stunted, proportion wasted and proportion underweight. These three indices are expressed in standard deviation units (z-scores) from the median for a reference population. In all the three indicators, children whose standardized scores fall below minus two (- 2) standard deviations from the reference median are considered to be undernourished. Those whose similar scores fall below minus three (-3) standard deviations from the reference median are considered to be severely undernourished.

Stunting, which is the height-for-age index, measures linear growth retardation among children. Proportion stunted is an indicator of chronic undernourishment that is associated with inadequate food consumption resulting from poor feeding practices or lack of sufficient food.

Wasting, which is the index of weight for height, measures body mass in relation to body length. Proportion wasted is an indicator of the prevalence of acute undernourishment. This condition is associated with failure to receive adequate nutrition in the period immediately before measurement and it can also be the result of seasonal variations in food supply or recent episodes of illnesses. Weight, which is the weight-for-age index is a composite measure which takes into account both chronic and acute undernourishment.

In this study, children aged 3-36 months were measured and the results indicated that 54 percent of them are stunted, 17 percent of them are wasted, and 56 percent of them are underweight. Efforts were made to identify those children who were undernourished on the bases of some explanatory variables.

The final analysis shows that children from food insecure households, whose household heads are illiterate, female children, those from households of large family sizes, those whose mothers are currently out of wedlock, those whose mothers are undernourished, and those whose households experienced epidemic diseases in the previous 5 years are more undernourished compared to those from food secure households, from households headed by literate heads, male children, from small sized families, whose mothers are currently married, whose mothers are not undernourished, and those whose households did not experience epidemic diseases in the previous 5 years.

As mentioned earlier the other element in the analysis of malnutrition is the nutritional status of women. This is measured by taking the middle-upper-arm circumference of women aged 15 – 49 years. These women were then categorized into severely undernourished and not severely undernourished in one scenario. In another scenario,

they were divided into undernourished and not undernourished depending on their score on the measurement scale.

The results indicate that 21 percent of all the women in the sample are severely undernourished. Breakdown by age shows that adolescents (15 – 19) and the older women (45 – 49) are the groups with the largest proportion of severely undernourished women. Midland women are in the worst of nutritional conditions compared to their highland and lowland counterparts.

In the second scenario, it was found out that 43 percent of all women in the sample are undernourished. Lowland women are the most affected by undernourishment in this scenario. Similar to the first scenario, differentials by five-year age groups shows that adolescents and older women are the groups with the largest proportion of undernourished. In both scenarios, the relationship between age of women and their nutritional status assumes, in general terms, a U-shaped pattern.

Among the other variables that explain differentials in nutritional status of women, number of children ever born, food security, and literacy status are those with the strongest explanatory power and with statistically highly significant relationship with the dependent variable. As the number of children ever born increases, proportion undernourished increases. Food secure households have much less number of undernourished women than food insecure households. Literate women have much less chance of being undernourished than illiterate women.

4.2 Epidemic diseases

As most of the health facilities are located in highland and, to some extent, midland areas of the district, common highland diseases, such as pneumonia, dominate the reports of district health office. For example, pneumonia ranked 2nd and 3rd in the list of the top10 diseases in 1997 and in 1999, respectively. Malaria ranked 3rd in number of cases reported in the household survey. Lowland respondents reported Eighty percent of these cases. But malaria is not in list of the top ten diseases in 1997 and 1999. In any case the major epidemic diseases are not among diseases reported by health officials or respondents in the household survey.

4.3 Mortality

Mortality is one of the major components of population change. It is measured by various indicators. The basic measures include crude and age-specific death rates, infant and child mortality rates, and probabilities of dying at certain ages (including expectation of life at birth). The most common feature of these indices is that their computation involves relating of deaths in periods of time among particular categories of persons to the total numbers at risk in these categories in the same period of time.

In the present study, emphasis is given to under-five mortality. The reason for this is the fact that infant and child mortality rates are better indicators of the standards of life than any other measures of mortality. For the computation of under-five mortality rates data on children ever born, surviving and dead were gathered from women aged 15-49 years. These data were then utilized to provide estimates of infant, child and under five mortality rates and expectation of life at birth.

Table 3 Indicators of malnutrition, illnesses and mortality, Gurawa district (2000)

Topics and Indicators	Current levels by AEZ			District total	
	Highland	Midland	Lowland		
1. Child malnutrition in percent					
1.1 Stunted	47.9	56.0	54.0	53.8	
1.2 Severely stunted	25.0	29.6	32.4	30.1	
1.3 Wasted	16.7	19.2	15.1	17.0	
1.4 Severely wasted	4.2	3.2	5.0	4.2	
2. Women's nutrition in percent					
2.1 Thin	38.9	41.4	45.7	43.3	
2.2 Very thin	12.5	25.3	21.1	21.2	
3. General mortality measures					
3.1 Under five mortality per 1000	Males	227.3	233.7	283.7	258.0
	Females	152.0	201.7	344.0	277.0
	Both sexes	193.0	219.0	314.7	268.0
3.2 Life expectancy at birth	Males	44.4	43.8	39.2	41.4
	Females	53.3	47.5	33.8	39.8
	Both sexes	48.2	45.5	36.1	40.5
4. Diseases (percent reported)	Pneumonia	37.7	32.3	30.4	32.1
	Anemia	15.7	24.5	23.2	21.8
	Malaria	0.81	10.4	20.3	14.5
4.2. % Women sick last 2 wks	63.0	57.9	69.2	64.6	
4.3. % Young children sick last 2 weeks	66.3	60.7	67.8	65.0	
3. Specific mortality measures by sex	Sex				
	Males	Females	Both sexes		
3.1 Infant mortality per 1000	178.3	179.7	179.3		
3.2 Child mortality per 1000	98.7	119.0	108.7		
3.3 Under-five mortality (CSA, 1994)	160.0	166.0	163.0		
3.4 Life expectancy (CSA, 1994)	51.9	51.5	51.7		

The estimates of infant, child and under-five mortality rates in the district of Gurawa made from the household survey are much higher than those made by the Central Statistical Authority (CSA) for Oromiya region and East Hararge Zone in 1994. The expectation was that mortality would decrease in the years that followed the 1994 National Population and Housing Census. The infant and under-five mortality rates in 1994 were 117 and 171 for East Hararge Zone and 121 and 177 for Oromiya, respectively. The SERA Project survey conducted in the district of Gurawa in February 2000 revealed that these estimates are as high as 179 and 268, respectively.

These estimates mean that 179 infants die from among 1000 live births before celebrating their first birthday and 268 children die among 1000 children before celebrating their fifth birth date. These estimates may appear overestimates from the point of view of demographic developments in the last few decades. But death reports are rarely over reported. Mothers usually underreport deaths of their children. Thus, these estimates reflect the true situation in the district particularly when the severe drought and famine incidences in the last 10 years are taken into consideration.

Another analysis of mortality focused on deaths in the 5 years prior to the survey. Children who were alive and those who died in those 5 years were compared in terms of some prenatal and postnatal variables. With some surprise, all the children who were reported to have died belonged to mothers who did not take TT2 injection, who gave birth at home, and those whose births were assisted by untrained assistants. With some room for chance fluctuations in sampling, this point reveals the importance of these variables in determining the survival chance of children.

Among the postnatal variables, health status of the child at birth, birth weight, vaccination and treatment in times of sickness were cross-tabulated with survival status of children. The results indicate that comparatively less number of children died among those who were strong or healthy at birth, big in size, vaccinated against the major child diseases and those who were taken to or treated in health facilities when they fell sick.

5. Food insecurity and poverty

Food in security is a very critical issue facing East Hararge Zone in general and the district of Gurawa in particular. Debebe Habte-wold and S. Maxwell (1992) define the term food security or insecurity as follows: “Food security refers to the access by all people at all times to enough food for an active and healthy life. Food insecurity exists when members of a household have an inadequate diet for part or all of the year or face the possibility of an inadequate diet in the future.” Food insecurity is usually divided into chronic and transitory food insecurity. Chronic food insecurity implies inaccessibility to food for a relatively long period of time while transitory food insecurity implies seasonal inaccessibility to food.

All available data reveal that the people of Gurawa district have been food insecure for at least the last decade. The data obtained from the district agriculture office indicate that 30 percent of the population was food insecure in 1996.

This proportion rose to 48 percent in 1998 and further to 61 percent in 1998. This is obviously an alarming rate of increase. The proportion of the population that had received food aid rose from 4.4 percent in 1996 to 43.7 percent in 1998.

In the SERA project survey conducted in February 2000 a question on food stock status was posed to the respondents. Distribution of their responses is such that 7.5 percent responded that their food stock was empty; 91.7 percent responded that what they had in stock at the time of the survey (February) would not be sufficient until the next harvest. Only 0.8 percent responded that they had sufficient food in stock until the next harvest. Specifically, of those who responded that they had insufficient food in stock 39.3 percent had enough for one more month, 35.4 percent had enough for two more months, and 25.3 percent had enough for more than two more months.

In another analysis, food production for four years (1997 – 2000) was averaged and per capita food availability for a year was observed. The result indicated that 28.3 percent had enough per capita food available for three months or less, 34.7 had enough per capita food available for six months or less, 18.1 percent had enough per capita food available for more than six months and less or equal to nine months time, and the remaining 18.9 percent had enough per capita food available for more than nine months.

The food availability scenario was followed in analyzing the variables that explain differentials among households in the number of months in a year for which food is available. The analysis employed both the bivariate and multivariate levels of analysis. The results of both analyses consistently show that those households headed by males, by literate heads, and by younger heads have enough food for their members for many more months than those headed by females, illiterates and older heads. Family size is negatively associated with number of months for which food is available. Land holding size is positively associated with food availability. Those households that own domestic animals, oxen in particular, have food available for many more months than those who do not own domestic animals. Similarly, those households who use irrigation schemes for farming, those who own farm tools, practice crop rotation, plant trees, received credit to improve crop or livestock productivity, and received assistance or advice to prevent soil erosion have enough food to live on for more number of months than those households that do not use irrigation schemes, lack farm tools, do not practice crop rotation, do not plant trees, did not receive credit and assistance or advice to prevent soil erosion. Finally, lowland and midland households are found to have more chance of being food insecure compared to highland households.

All the above figures reveal the chronic and transitory food insecurity status of the district of Gurawa. This situation is the outcome of many interrelated factors. First agricultural production has been very low because of a number of causes. One most important element in this web of causes is rainfall. There has been erratic and inadequate rainfall in the district. In addition, the geographic setting of the district is such that the bulk of the district lies in the leeward side of the Gara Mulata Mountain and, as a result, gets little or no rainfall. Even the rainwater that falls on the highlands of the district is drained into Gobelle river valley. This river valley lies to the eastern extreme of the district and is far away from the majority of the people of the district. On the one hand, the deep valley of Gobelle is not suitable for traditional irrigation, and the people cannot afford modern irrigation technology by themselves.

Another element among the causes for low agricultural productivity is the low level of technology. One peculiar aspect of farming in the district is that a significant proportion of the households till their farm plots by hand. One can easily imagine the amount of yield the hand tillers will be able to harvest from their plots. Another insignificant proportion of the households uses oxen for farming, which is also part of the rudimentary traditional agriculture. Another aspect of the low level of agricultural technology is the recent introduction and low level of agricultural extension program. It was mentioned elsewhere in this chapter that the proportion of agricultural households that are involved in food crop extension programs is below 10 percent. The ratio of development agents to agricultural households involved in the program is 1 to 131.

Land holding size is also another essential element in agricultural production. About 77 percent of all the households covered by the survey reported that their individual land holding size is below half a hectare. On the other hand, the average land holding size per household has been decreasing. Agricultural density has been increasing. Grazing land has been shrinking. Arable land is limited by nature. Its size relative to population size is decreasing fast. These statements indicate the ever-increasing pressure on land and, thus, the negative impact on agricultural production. Another factor among the determinants of

agricultural production is crop loss due to a number of causes. Both pre-harvest and post-harvest factors contribute to crop losses.

Table 4 Indicators of food insecurity and poverty, Gurawa district (2000)

<i>Topics and Indicators</i>	<i>Current levels by AEZ</i>			<i>District total</i>
	<i>Highland</i>	<i>Midland</i>	<i>Lowland</i>	
<i>1. Land holding</i>				
<i>1.1 % Landless</i>	0	1	0	0.33
<i>1.2 Average crop land cultivated per HH (in ha)</i>	0.35	0.30	0.33	0.32
<i>1.3 Percent owned very small land (≤ 0.25 ha)</i>	49.0	59.2	53.0	54.39
<i>1.4 % with 2 or more plots</i>	57.0	20.1	57.6	45.1
<i>2. Animal ownership</i>				
<i>2.1 % Ox less</i>	80.0	96.0	90.1	90.4
<i>2.2 % Households owning one ox</i>	19.0	3.5	8.9	8.8
<i>2.3 TLU per capita</i>	0.34	0.28	0.29	0.29
<i>2.4 TLU per HH</i>	1.53	1.24	1.24	1.29
<i>3.1 % Ranked very poor</i>	20.0	35.0	23.6	26.3
<i>3.2 % < 600 Birr/HH</i>	52.0	53.7	46.4	49.8
<i>3.4 % < 1200 Birr/HH</i>	86.0	90.0	84.4	86.6
<i>4. Income and poverty</i>				
<i>4.1 % Income sufficient 3 months or less</i>	4.0	4.0	4.6	4.3
<i>4.2 % Much too small to make ends meet</i>	26.0	44.3	38.7	38.5
<i>4.3 % Poverty "faced" in last 5 years</i>	96.0	95.5	90.4	93.0
<i>4.4 Mean per capita (KGs) /year 2000/</i>	140.8	61.9	122.8	105.5
<i>6. Food Insecurity</i>				
<i>6.1 % Current food stock under 3 months</i>	71.0	79.6	76.8	76.8
<i>6.2% Chronic food insecurity perceived last 10 yrs</i>	100	100	99.7	99.8
<i>7. % FA within 3 hrs walking to weekly market</i>	100	100	33.3	66.6
<i>8. Trend over time</i>	<i>Years</i>			
	<i>1996</i>	<i>1997</i>	<i>1998</i>	
<i>8.1 Mean per capita food production</i>	118	88	66	
<i>8.2 TLU per capita</i>	0.52	0.50	0.49	
<i>8.3 TLU per household</i>	2.24	2.23	2.16	

As mentioned earlier, food insecurity is the result not only of low agricultural productivity. If people have other sources of income or accumulated wealth, they can change the wealth in to cash and purchase food from the market. In the district of Gurawa, however, the recurrent drought of the last few decades has led to wealth depletion and the majority of the households have little or no wealth. Even those who can be said to have some wealth had it in the form of livestock. At the time of the survey 12.3 percent of the households did not own any kind of livestock at all. About 27 percent had the equivalent of one or less in tropical livestock unit. Another 41 percent had 1-2 in the same unit. Livestock ownership in tropical livestock unit was 0.29 per capita and 1.29 per household.

Livestock ownership was changed to cash equivalents and the result indicated that 58.4 percent of the households could earn less than 500 Birr if they were to sell what they

owned. With an average family size of 5 persons per household, so many households would have less than 100 Birr for each of their members. Another 29.7 percent earn 500-1000 Birr. This shows that 88.1 percent of the households lie in the wealth category of less or equal to 1000 Birr.

Another element in food security is income status. Major sources of income include crop and livestock sale, payment for various off-farm and non-farm activities, and remittance. It appears that there are limited sources of income. Results of the household survey indicate that 13 percent of the households surveyed earned no income at all, 19 percent earned less than 100 Birr, and 29 percent earned between 100 and 200 Birr from crop sale, off-farm or non-farm activities. The households reported no other sources of income.

In summary, all the statements in the above paragraphs show that the people of the district of Gurawa are highly food insecure because of very low yield in agricultural production, lack of wealth and absence of income generating activities.

6. Disaster history and institutional responses

The combined effects of prolonged rainfall scarcity and its erratic nature, environmental degradation, recurrent drought, famine and epidemics have long history in Gurawa district. Data obtained from zonal DPPD revealed that the occurrence of drought had been every ten years between 1974 and 1994. Then it occurred after 5 years in 1999. Since 1999 it became a yearly occurrence. In recent years vulnerability induced by drought in the district is increasing with its high magnitude of negative impact. Quite a considerable part of the population has been dependent on external food aid for survival.

The number of needy population was 61986 in 1997, 101236 in 1998 and 132912 in 1999. Out of those needy population 2723(4.4%), 16549 (16.3 %) and 58093 (43.7%) received food aid in 1997, 1998 and 1999 respectively.

According to the perception of community elders assessed through rapid rural appraisal methods, vulnerability to famine has increased through time because of the variability and erratic nature of rainfall in all agro-ecological zones, decrease in agricultural output, loss of livestock due to diseases and prolonged drought, decrease in per capita land holding, and depletion of household assets.

Table 5 Indicators of disaster history, Gurawa district (2000)

<i>Topics and Indicators</i>	<i>Years</i>			
	<i>1974-1994</i>	<i>1994-1999</i>	<i>Since 1999</i>	<i>District total</i>
<i>1. Drought risk</i>				
<i>1.1 Average number of years between droughts</i>	<i>10</i>	<i>5</i>	<i>1</i>	
<i>1.2 % Expected disasters in the future</i>				
<i>1.3 Rainfall in MM</i>	<i>1993</i> <i>943.1</i>	<i>1995</i> <i>1000.9</i>	<i>1999</i> <i>1078.2</i>	
<i>2. Epidemic frequency</i>	<i>Before 1974</i>	<i>1974-1991</i>	<i>1991-1999</i>	
<i>2.1 Average number of years between severe human epidemics</i>	<i>10</i>	<i>8</i>	<i>6</i>	
<i>3. Disaster prevention</i>	<i>1996</i>	<i>1997</i>	<i>1998</i>	
<i>3.1 % aided with food from needy pop</i>	<i>4.4</i>	<i>16.3</i>	<i>43.7</i>	
<i>4. Types of epidemics</i>	<i>Current levels by AEZ</i>			
	<i>Highland</i>	<i>Midland</i>	<i>Lowland</i>	
<i>4.1 % HHs with epidemics in last 5 yrs</i>	<i>80.0</i>	<i>86.7</i>	<i>88.7</i>	<i>86.6</i>
<i>4.1.1 Percent reported diarrhea</i>	<i>13.0</i>	<i>47.9</i>	<i>76.7</i>	<i>56.6</i>
<i>4.1.2 Percent reported malaria</i>	<i>41.0</i>	<i>49.5</i>	<i>39.3</i>	<i>42.9</i>
<i>4.1.3 Percent reported typhus/fever</i>	<i>100</i>	<i>93.5</i>	<i>99.0</i>	<i>97.3</i>
<i>4.1.4 Percent reported measles</i>	<i>21.0</i>	<i>23.4</i>	<i>26.7</i>	<i>24.7</i>
<i>5. % Households participated in EGS/FFW in past year</i>	<i>5.0</i>	<i>89.1</i>	<i>78.8</i>	<i>70.0</i>

The three most important perceived causes of epidemics diseases, however, include shortage of safe drinking water, problem of personal hygiene and environmental sanitation and inadequacy of health facilities. Generally households with less awareness about environmental sanitation and hygiene, households who have less access to safe drinking water and households with low nutritional status are more vulnerable to epidemic disease.

Institutional responses can be direct and indirect in combating disaster in the long run. The direct and purposive institutional responses to disaster and the assistance rendered to the disaster prone population in the area were limited in their scope and mainly focused on delivery of food aid by both governmental and non-governmental organizations.

But there were a number of development activities that were undertaken by both government and NGOs in the area of agricultural production including extension program, natural resource conservation and strengthening rural institutions. In general these activities were not sufficient to mitigate disaster and recurrent famine in the district.

7. Resilience, coping strategies and local capacities

From the long history of disaster in the area and frequency and intensity of disaster of one or more types, people in this disaster prone area would develop different types of coping strategies or ways of responding to the stressful situations. The number and variety of coping and mitigation strategies mainly depend on the stock of food and income and

consumption habit, asset and wealth possession as well as the frequency and intensity or severity of the problem itself.

Timing of the coping strategies appears to have been made parallel to the logical sequences of events and whether the strategies are reversible or irreversible depends on income and stock of food as well as severity of the disaster itself. Strategies that are related to change in consumption patterns, sale of firewood, borrowing food, grain or cash are known as reversible strategies. Sale of productive assets and household effects, withdrawal of children from school and out migration are irreversible strategies as the effects they bring about are rarely reversed.

Reducing number of meals was frequently used by about twenty percent of the surveyed households in the 12 months prior to the survey and almost no household was reported to have never used this strategy in the last ten years prior to the survey.

Table 6 Percent distribution of households by use of reversible and irreversible coping strategies in the previous 10 years, Gurawa district (2000)

<i>Type of coping strategies</i>	<i>Frequency of use</i>	<i>Agro ecological zones</i>			<i>District total</i>
		<i>Highland</i>	<i>Midland</i>	<i>Lowland</i>	
<i>Irreversible</i>	<i>Frequently</i>	2.3	0.6	3.0	2.1
	<i>Some times</i>	23.8	27.6	28.3	27.4
	<i>Never used</i>	73.8	71.8	68.7	70.6
<i>Reversible</i>	<i>Frequently</i>	6.8	6.2	7.2	6.8
	<i>Some times</i>	53.1	77.1	72.8	71.0
	<i>Never used</i>	40.1	16.7	20.0	22.2

Generally about seven percent of the households used the reversible coping strategies frequently and about 22 percent never used these strategies in the last ten years prior to the survey. On the contrary, the irreversible strategies, which consist sale of household utilities, withdrawal of children from school and migration were frequently used by two percent of the households. In general, when the households were asked whether or not they use these coping strategies within the last twelve months prior to the survey, they responded that they used almost all and relatively small number of households used migration. The main reason behind this is that migration needs awareness or information on where and when to migrate in order to be used as a coping strategy.

B. CONCLUSIONS

The relationship between population, natural resources and environment is such that as population size increases natural resources are overexploited, land holding is fragmented, living trees are cut down for fuel and construction purposes, fallow periods are shortened, croplands are over ploughed, grasslands are overgrazed. Chopping down of trees will result in deforestation, which will in turn contribute to the unfavorable changes in climatic conditions. The bottom line of all these processes is that there will be severe stress on the environment. In the district of Gurawa there has been severe stress on the natural environment. But it is difficult to attribute all the stresses on the environment to population growth and the negative human activities that follow. Thus, it can be

concluded that shortage of rain or drought has been the most important factor among those that contributed to degradation of the environment in the midland and lowland areas of the district.

Access to basic socioeconomic services is very low in the district of Gurawa. The provision of educational services is so low that only 10 percent of the population aged 10 years and above can read and write at the present time. The corresponding figures for Oromiya and East Hararge were 22.4 and 12.2 percent, respectively, in 1999. Gross enrollment ratio is also very low. Only 31 percent of boys and 9 percent of girls in the primary school age population were enrolled in primary schools in 1999. The situation is even worse when retention ratios are considered. Only 32 percent of boys and 15 percent of girls who were enrolled in grade 1 in 1996 completed grade 4 in 1999.

The provision of health services is similarly low. 57 percent of the people do not have access to any health institution. There is only 1 health center in the whole district. The number of front line health personnel either remained the same or decreased in the 5 years prior the survey. This has resulted in a very low level of preventive health services. The proportion of pregnant women with at least two doses of TT2 never exceeded 18 percent. Child immunization, except against polio, which is carried out in large scale campaigns, is very low. Agricultural extension services were started very recently and are provided to less than 10 percent of the households. Other necessary services such as potable water supply, communication and transportation networks, and similar others are either non-existent or far from adequate.

Available data show that the people of Gurawa have been food insecure for at least the last 3 decades. The degree of both chronic and transitory food insecurity has been increasing rapidly. This has been the result of many interrelated causal factors. First and foremost, agricultural productivity has been very low because of inadequate rainfall, backward agricultural technology, soil infertility and other related factors. Second, the usually fragile wealth of the people has been depleted over the years leaving the people without anything to sell for the purchases of food. Thirdly, there are few sources of off-farm or non-farm income.

One of the outcomes of these situations is malnutrition, particularly that of children and their mothers. This study has shown a level of malnutrition of women and children that is unusually very high. 54 percent of children aged 3-36 months are stunted and 43 percent of women aged 15-49 years are undernourished. Epidemic diseases are rampant. Malnutrition and epidemic diseases appear to have joined arms to increase the level of mortality to very high levels. Infant and under five mortality rates were as high as 179 and 268, respectively, in 2000.

In general, this research exercise has shown to a large extent that the district of Gurawa has been repeatedly affected by recurrent drought in the last 3 decades. This has been followed by chronic food insecurity, severe malnutrition, an increase in the prevalence and incidence of epidemic diseases, and high mortality rates, particularly for infants and children. The life of the people has been deteriorating and reached a level where the majority of the households live in houses that do not have the usual features of a living place. Their wealth has been seriously depleted that they have little or nothing in the form of wealth or any other asset. They have few or no sources of income.

This grim reality makes the usual recommendations for improving the life of the people impractical. Whatever it takes, a lot of effort has to be made to bring the life of these people back to an acceptable standard. Otherwise, the vicious circle of poverty will continue and any effort of development will be far from success. The people will consume all of what is given to them in the form of credit or loan. The very essence of credit is that the person works with the money lent to him, improves his life with the profits from it and pays the credit back to the creditor. This is not the case with a person who has nothing to eat and to whom the difference between credit and assistance is blurred. That is why the person has to be brought back to where he/she can take credit as credit and can be able to make the back payment. All these require rehabilitation of the people in every aspect. This in turn needs a lot of resources that, however, are not impossible to pull together.