

Strengthening Emergency Response Abilities
SERA Project

Vulnerability Profile: SUMMARY

Dera Woreda (district)
North Shewa Zone
Oromiya Region

2000

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A. SUMMARY OF MAJOR FINDINGS

1. Introduction

This profile tries to answer five major research questions related to vulnerability. These are who are the most vulnerable groups, where are they located and which agro ecologies or areas are vulnerable and why, what are the main vulnerability factors and their degree and when do vulnerability is most frequent and how do they become vulnerable.

To answer these five main leading questions an in-depth analysis and data collection works were made. The analytical methodologies were based both on descriptive and quantitative statistical (multivariate) models. In such a way the bivariate and multivariate as well as simple statistical tools such as means, frequencies were widely used. Most of the data used in the preparation of the profile were processed and analyzed by using SPPSS, Excel and word processing computer software.

The major objective of the vulnerability profile is to identify the major vulnerability indicators and vulnerable groups, which may be, categorized under five major groups: demographic and socio-cultural, physical and climatic, economic and agricultural, institutions, diseases, and malnutrition. Of these however, four main variables stand out as the most indicative vulnerability indicators which in one way or the other this VP focus on chronic food insecurity, child mortality, child and maternal malnutrition and epidemics.

In the preparation of this vulnerability profile three data sources were used (the primary household sample survey, secondary data and RRA). The secondary data comprise all demographic, physical, economic and social indicators collected from different zonal and wereda departments and offices, bureaus, and ministries using pre-designed data collection formats. These data in most cases show a time series trend of five years. The participatory rural appraisal methods were used through semi-structured questionnaires and filled through thorough discussions made with individuals, influential community leaders, and other concerned bodies who were more acquainted with the area and the community livelihood systems. This data mainly focuses on livelihood systems, access to social services, disaster history, coping and resilience. Most of these data sets show trends over three decades. The third set of data is households primary data sample survey using a multistage random sampling method comprising a sample of 600 households.

This data include all sorts of socio-economic and physical indicators particularly demographic, economic and social (land, income, agriculture, health and nutrition, food security, coping strategies and perception of hazards, and institutional responses. The data has three main components: The household survey of 600 sample households (irrespective of headship), the women's questionnaire administered to identify variations among gender mainly focusing on access to health, family planning, child care, perception of hazards, food security, nutrition, diseases and epidemics, and comprises 547 samples of women in the reproductive age group of 15-49. The third component has been the child related questionnaire used to identify mainly the nutritional status of children in the age group of 0-59 months and comprises 228 samples.

The objective of this chapter is to present the output of this study in concise and very analytical manner to the reader. Therefore, all the data sources were utilized as much as possible to deal with certain issues. However, not all data sources could be used as their

sources, time of collection, reference, collection methodologies, coverage, reliability, and consistency varies across same issues. Therefore, it is important to select the most important ones on subjective but expert grounds to make a particular factor analysis. Hence most of the secondary data were used to show trends, wereda level variables, land use patterns, that could not be easily available in consistent manner either from primary or RRA/PRA data sources.

The RRA data were used in areas where long term trends and community perceptions are needed particularly in trends in land holding, wealth, environmental stresses, and evolution of disasters over 30 years. Primary sample survey is used in areas where a detail analysis is needed and this data set comprises the core area of the VP on which the largest proportion of the vulnerability analysis is based. However all data sets were integrated where comparisons and trend analysis is required. Main findings that show current situations have been shown using tables and trends were narrated in the body part of the paper.

This chapter comprises six major sections. Section one treats concisely the inter-relationships between population and natural resources and the environment with major causes and consequence indicators. Section two deals with the level of access and quality of services as well as indicators of health and health service delivery system using the three sets of data sources. Child and maternal malnutrition, under-five child mortality and epidemics are explained in section three of the paper. In section four, a concise analysis of community livelihood systems and food security is made. This section integrates all the section of this chapter with analysis and presentation of main indicators of vulnerable households (food security, malnutrition, epidemics, production, levels of asset holding and irreversible coping strategies, famine and poverty prevalence, etc). In section five, disaster history and evolution were discussed using the RRA/PRA data with scope of over three decades with degree, intensity, duration and type of the disaster itself. Coping strategies and resilience is discussed briefly in section six of the paper. In all sections, the cause and effect relationship type of analysis is employed as much as possible using appropriate indicator.

2. Population Pressure, Natural Resources and Environment

The population of Darra district is projected to be 159605 by the end of year 2000. The population density and growth rate is relatively low as compared to other districts in the zone. The population growth rate of the district between 1984 and 1994 had been 1.8 per cent. But between 1994-2000 the annual growth rate is projected to be about 2.2 per cent (based on the 1994 CSA projected regional population growth rates using the ratio method). In view of resource depletion, recurrent drought and famine, and declining and low land carrying capacity and productivity since the last three decades, the growth rate of the population of the area is considered to be high.

Young age population characterizes the district. The CSA data shows that the proportion of the population below the age of 15 is about 46.3 per cent and the economically active ones about 50.4 per cent. The SERA household survey (Feb/March, 2000) shows nearly the same proportion of economically active population (about 49 per cent active and 47.1 per cent below the age of 15).

Fertility rate as measured in terms of MCEB for the district is about 3.9 children per woman. By the age of 45-49 a woman will have about 8.3 children, which is very high as compared to CSA's 1994 estimates of 6.2 for the district.

Rapid population growth rate can have a negative impact on the socio-economic development and the natural environment. The problem of population pressure most probably pronounced in third world countries where their economy mostly depends on traditional agriculture. In countries like Ethiopia, rapid population pressure is manifested in environmental degradation, low per capita income, low per capita food production, famine, epidemic and abject poverty. The population growth rate of the country is rapid compared to the socio-economic development stage and rate of growth. Land carrying capacity and the main stay of the country- agricultural sector performance and resource base is declining. The central and the northern highlands of the country were an example of such catastrophic areas of population pressure and environmental degradation.

The survey area –Darra district is also categorized as an area of high environmental degradation and relatively high population growth rates (as compared to the land carrying capacity and agro-ecological setting). Since the last one and half decade the population of the district grew by about 2.0 per cent and by 2.2 per cent after 1994. According to this rates (1994-2000) the population of the district will double within the coming 32 years. Such rapid growth has obviously resulted in high man-land ratio, declining resource base, low agricultural productivity, increasing number of vulnerable households and vulnerability factors, as well as poverty. The population density is about 105 people /km². The highlands and mid highlands were relatively highly densely populated. The agricultural density was 292 persons/km² increasing by 1.1 times between 1995 and 2000 alone.

The primary impact of population pressure is increased landlessness, fragmented small plots of land, cultivation of agriculturally unsuitable land surfaces, deforestation and severe environmental degradation. The survey result shows that 18.9 per cent of the farming households were landless (RRA data survey) and 47.1 per cent of them cultivate plots of land below one hectare. 19 per cent of the total area owned by the farmers is found on high slopes and 43.2 per cent of currently cultivated land is classified as infertile. Soil erosion hazard of severe degree is currently a problem for 77.3 per cent of the population. Soil depth is rapidly declining and thus land productivity is only 700 kg per hectare. Continued cultivation of such lands with increasing army of population with consequent fragmentation of land will further result in degradation of the agricultural resource base and productivity. The situation after the early 1980 is rapid and currently reached its maximum stage.

Deforestation is also high. Except in the lowlands where remnant bush and woody vegetation remained there was no as such significant forest cover in the area. Secondary data sources show that deforestation rate is about 44.5 percent per annum between 1989-1991 EC. Expansion of cultivated land at a rate of 13.1 per cent, pure organic energy source for almost over 98 percent of the population, high rate of over stocking in the order of 8.6 TLU/ha further accelerates the deforestation and environmental degradation processes. Yet there has not been significant intervention to tackle degradation of the environment except for the intervention made to boost food crop production which has insignificant share in the over all production and impact on the livelihood system of the population.

Livestock population is increasing by 12.3 percent and grazing land is declining at a rate of 14.3 per cent per annum. As a result over grazing is serious. Over grazing is manifested in complete removal of vegetation cover and exposes the land to grave water and wind erosion particularly in the lowland areas where the twin forces of moisture stress and drought collate to negatively threaten the human environment and livelihood system. Thus, the general picture in the future is gloomy and one of the hardest human realities one could expect. A

simple projection of the environment and human interaction shows that the human population within the next one-decade will reach 27 per cent more of the current population figures. Livestock populations will grow by more than 1.8 times and grazing land will decline by about 79 per cent and consequently rate of stocking will reach 60 TLU per hectare if current trends will continue in the future without major changes. Deforestation of forestland will continue to increase and 0.3 per cent of the current area will remain as wood and forest land. The combined effect of such growth and decline in human and natural resource base is that land holding will reduce from a current average of 1.00 hectare to 0.75 hectare and production per head at current state of farming system and yield will also be expected to decline rapidly than the current state. Degraded land is currently about 28 per cent of the total area of the *wereda* and increasing at a rate of six percent per annum since 1987 EC. At current rate of growth the proportion of degraded/unproductive land will increase to 50 percent of the total land surface of the district. The end result of such rapid decline in resource base is actually famine or food inadequacy, poverty and vulnerability to even minor physical stress and disasters.

Current land tenure and land use system usually exacerbates the problem. Landlessness is increasing rapidly. At the household level about 13 percent of the households were landless and at community level 18.9 per cent. Thus according to these two sources, the proportion of landless households could be approximated, on average, at about 15.9 percent. Land, which is agriculturally suitable is already occupied with little room for further redistribution (except in the lowlands) except in a situation where the use of production boosting agricultural technology will be improved in the long run. The opportunities for less expensive irrigated agriculture are rare due to the topographic nature of the area and limited water resources. Yet the number of agricultural households is increasing rapidly. These new entrants have little opportunity to have their own land with very few of them may rent in, share cropping or have from their parents as a gift or inheritance.

On the other hand, almost 99 per cent of the economy of the area is dominated by agriculture. Other sectors such as services, trade and industry were not developed and limited to small-scale grinding mills, retail shops and very few sub-standard 'hotels' mainly concentrated in the capital of the district. Thus, there was no opportunity for the young generation to be employed in these sectors and thereby relieve the pressure on limited land resources. The labor absorptive capacity of the agricultural sector is also gradually declining. Highest production is only achieved from large plots of land. Intensive agriculture both organic and inorganic is not well integrated into the existing farming system. Seasonal and permanent out migration is also very few. Permanent out migration is observed only in 9.5 percent of the households in the past 10 years. Seasonal long and short-term migration is limited to 6.6 and 4.8 percent of the households. Opportunities for off-farm and non-farm activities were also limited. Only 20 percent of the households were participating in such activities.

The cumulative effect of all variables (over stocking, deforestation, population growth, land shortage and dependence only on agriculture) is mainly manifested in soil erosion, fertility decline and stoniness. Currently over 77 percent of the households in the *wereda* have faced serious soil erosion, 67 serious soil fertility decline and 83 percent change in soil change. Furthermore, 56 percent of the households own highly stony land and 42 percent of the agricultural land is estimated to be infertile. About 17 percent of the households on the other hand cultivate high, medium slopes and escarpments. Land degradation is the highest in the high and mid highland agro-ecological zone.

That is why the district is characterized by high proportion of very poor and destitute households. Besides, the increasing number of food insecure and drought affected population and frequency of disaster is increasing.

Table below shows the main indicators of the results of the environmental degradation Resource base depletion and stresses and population interaction in the area.

Table 1: Some Indicators of Population pressure and Environmental Degradation and its Consequences

Indicator	Source	Unit of analysis	Trends, Rate or Levels			%change
			1984-1994	1994-2000	2000	
1. Population pressure						
Growth rate	CSA	rural wereda	1.8	2.2	2.0	1.2X
Residence	CSA	% rural population	98	97.7	97.6	99.6
			1984	1994	2000	%change
Dependency ratio	CSA/HHS	rural wereda		98	104	1.1X
Crude density	CSA	persons/km ²	76.2	91.4	110.7	1.5X
% under 15	CSA/HHS	% of total population		46.3	47.1	1.02X
% above 65	CSA/HHS	% of total population		2.3	3.9	1.7X
% 0-4	CSA/HHS	% of total population		17.1	17	99.4
% in reproductive age group	CSA/HHS	% of total population		21	21.3	1.01X
Total Fertility rate	CSA/HHS	Child ever born to a woman		6.2	8.3	1.3X
Sex ratio		Female: male ratio	0.92	1.04	1.06	1.2X
2. Land resources						
2.1. Land use pattern			1995	1998	2000(RR A)	%change
cultivable land	DAO/RRA	% of total land	33.1	47.8	48.2	1.5X
Grazing land	DAO/RRA	% of total	18.1	12.8	12.8	70.7
forest land	DAO/RRA	% of total	17.6	3.0	2.9	16.5
unproductive land	DAO/RRA	% of total	23.4	27.9	29.0	1.2X
others	DAO/RRA	% of total	8.0	8.5	7.0	87.5
2.2. Agricultural density	DAO/HHS	Person/km ² cultivated land	276.5	217.2	291.9	1.1X
2.3. Stocking rate	DAO/HHS	TLU/grazingland	5.7	6.8	18.4	3.2X
			Highland	Midland	Lowland	Total
2.4. Landlessness	RRA	% landless HHS	6.0	9.0	15.5	12.8
2.5. % land short (<0.5)	HHS	% of households	14.0	6.0	9.8	9.8
3. Migration						
3.1. Permanent migration	HHS	% of HHS	26.0	6.0	6.3	9.5
3.2. Seasonal migration (short)	HHS	% HHS	7.5	3.0	4.6	4.8
3.3. Seasonal migration (long)	HHS	% HHS	6.9	8.6	6.0	6.6
4. Land degradation		% HHS response				
4.1. Soil erosion	HHS	% HHS with severe	83.5	76.0	76.1	77.3

Indicator	Source	Unit of analysis	Trends, Rate or Levels			
4.2. Soil fertility decline	HHS	erosion % HHS severe decline	72	75	63.8	67
4.3 Change in soil depth	HHS	% HHS response	90.7	83.3	80.9	83
4.4. Level of stoniness	HHS	% HHS with high degree	59.0	55.0	55.3	55.8
4.5. Average plot number	HHS	plot/household	1.8	2.2	2.1	2
4.5. % with high slopes		% HHS with high , medium, escarpment	13.4	11.5	19.1	16.9

Source:- Compiled from tables in Chapter 4-7 in the main text

2. Access to basic services and quality

Ignorance, diseases and epidemics were other features, which characterize the area. Though in terms of the number of institutions the area is relatively in a better off position particularly at community level, the situation is clearer when reviewed in terms of quality, efficiency and the proportion of the population who have actually got the service.

About 76 percent of the peasant associations of the district have access to primary schools (or the ratio of PAs to schools is 1.32). The above figures have shown that there was relatively better access to these services. Yet the real condition of the area in terms of education is characterized by high rate of illiteracy, high proportion of primary school wastage, low proportion of enrollments, high disparities among gender and poor efficiency of the schooling system. In 1994 about 87 percent of the district population were illiterate and could not read and write. Only 15 percent of the school age population are enrolled. For girls the situation is worst. About 91 percent of girls were not attending any education. For boys however the condition is relatively better. Trends in primary school enrollments and literacy however showed progressive rates of growth for both boys and girls between 1994-2000. As indicated above, in 1994 the number of literate males was 12.9 percent and 2.5 percent for females. But according to the household survey, SERA 2000, male literacy rate grew to 33.2 percent and female literacy to 6.5 percent. Thus between these two periods literacy rate has increased by 1.8 times for males and 2.6 times for females. At the same time, primary school enrollments grew by 2.3 and 2.6 times in the same period for boys and girls respectively. Yet there still exist high proportion of population out of the formal educational system still with widening gap between genders. The lowland agro-ecologies, which were inaccessible in terms of transportation and information system, were the most to suffer both in terms of quality and availability of primary school education services.

Due to gender disparities, high level of poverty and the subsistence nature of the economy of the area, dropouts/ wastage is as high as 83 per cent. Only 17.1 percent of the children in the area could complete their primary school education (grade four). Adult literacy programs were poor both in terms of quality and availability and the scope of the program in tackling poverty, dissemination of modern technologies and increasing productivity. There was also no significant functional literacy programs aimed at changing the livelihood system of the community of the area. In terms of quality of education infrastructure the situation is worse in both formal and informal educational services. Most of the schools were suffering from shortage of teachers, furniture and maintenance.

Health infrastructure coverage is also on the same condition though the proportion of the population who has access to these services is increasing. At district level health coverage in terms of physical availability is about 46.1 per cent with only two clinics, one health center and one pharmacy in the area.

In terms of preventive health care and immunization about 15.1 percent of the women population in the reproductive age group have access to ANC services and 60 per cent of children to DPT/BCG child immunization. The reality however, is that the actual number of population who have got this service is only 2.2 and 18 percent by the end of 1991 EC respectively. Thus the theoretical access scenario and the actual condition vary widely across agro-ecologies and communities. According to the SERA household survey 2000, however, about 80.8 percent of children were fully immunized against polio, 15.1 percent against DPT and 12.5 percent against BCG. On the other hand, the number of women who have got ANC services were only 6.7 percent and women immunized against tetanus toxoid were six percent. The trend thus seems declining rapidly. In general, significant proportion of children and women remained unimmunized and without ANC services.

The health service system also suffers from critical shortage of trained manpower. Population- nurse ratio, population health assistance ratio is only 21712 and 18998 respectively. There was only one physician for the whole population of the wereda in 1998. Frontline health personnel gave most of the health services. However, the health services in terms of availability and functional adequacy are improving than in the past.

Thus, diseases and epidemics were prevalent in the area due to inefficiencies, the nature of the natural environment and the existence of high proportion of poor population. Over 50 percent of the population have easy exposure to malaria, over 13 percent to diarrhea and other sanitation-related diseases. One or more diseases affected most of the economically active age group of the population. Malaria incidence is increasing throughout the past five years with almost the same proportion for other diseases. Generally, disease incidence and morbidity is increasing from time to time on one hand and increasing availability of health institutions but with deteriorating efficiency and actual coverage on the other. The dire condition of health situation in the area combined with high level of chronic malnutrition, food insecurity and high under-five mortality further progressively erode the livelihood system and strategy of the communities and households. Poor health directly related to low human productivity and low labor participation, low agricultural yield and food availability. In the lowlands where health infrastructure availability and efficiency is poor vulnerability to diseases, in number, type and magnitude of impact increases. Thus, poor health condition has a multiplier effect in many aspects. As a result, trends in epidemics and diseases are increasing since the past five years. About 43 per cent of the households have reported that they have faced one or more types of epidemics. The trends in epidemics since the past three decades also progressively increasing due to continuous and persistent food insecurity, malnutrition and poor sanitary conditions. Food insecurity and malnutrition mostly associated with drought and failure in crop production and thus directly affected the volume of food available to an individual. As drought dwindles the food stocks and thereby the food intake, it reduces the humans defense mechanism and easily expose a person to epidemics and other various diseases.

Drinking water supply is another area of the problem. Both in terms of quality and availability water supply condition in the area is poor. At district level 89 per cent of the rural population use unsafe water supply sources such as rivers, ponds and unprotected

springs in 1994. For most of the population even such type of water sources were not available at nearest distance. The household level survey also shows that about 53 per cent of the households use unprotected water sources for drinking. Thus, the number of population who have direct contact to ailments from contaminated and unsanitary water sources, particularly women is large. Most of the communicable diseases prevailed in the area were caused by such contaminated and unsanitary water source environments. In general, however, due to significant intervention by *Menschen fur Menschen* in rural water supply development, the condition of safe drinking water has been improving and currently 46.8 percent of the wereda rural households have access to protected drinking water supply.

Road transportation networks is also at poor condition. Road density is only 16.4 km/1000 square kilometers or 15.7 centimeter per capita. Only 25 km of the road serves the entire population of the district until recently. In the lowlands, transport facilities were rare and most of this agro-ecology is inaccessible throughout the year. It is estimated that only 12.8 percent of the total population have access to roads within ten kilometers of radius. Thus, intra- district commodity flow is seriously hampered. Poor marketing conditions in the area is the result of inaccessibility to transport infrastructure and facilities. Therefore, production and services flow from surplus to deficit areas remained low. Poor transportation also resulted in highly fluctuating commodity prices, widening gap between the demand and supply for basic commodities. For the resource poor households such poor infrastructure has a multiple effect on their livelihood systems and productivity. In terms of physical accessibility the majority of the households have, however, access to weekly markets.

Agricultural extension service is a recent phenomenon. Extension services that were directed to boosting agricultural production and productivity through dissemination of modern technology have been started in the early 1990s. However, the impact of the program and its coverage in terms of area under the program and the volume of production is low. The major achievements were, however, in areas of rapidly increasing number of development agents and subsequently declining ratios of farmers to extension agents as well as increasing area under the extension program. The ratio of extension agents to farmers has declined from 1:15833 to 1:837 between 1996 and 1999. Consequently, the number of development agents at district level increased from a mere two to 41 by the end of 1999.

The proportion of area under major crops, which is under the direct impact of the extension program was only below one per cent and increased to 3.5 percent by the end of 1999. The number of participants in the crop extension program has also been increased from 5.5 percent in 1996/97 to 20 percent in 1998/99. Thus in the reference period area under the package program has increased by more than four folds and the number of participants by 3.6 times.

The contribution of the food crop production extension program to food security and increased income and productivity has been significant. Yield of major crops such as wheat and teff increased tremendously. However, since very few households use the service its impact on the general food security situation is low. On the other hand, the package of inputs used in the extension service is costly for most of the resource poor and landless households. According to the available data most of the participants were middle income and rich farmers who can afford to buy and pay down payment. For these households also timely availability of inputs at appropriate time and volume is a major constraint in the adoption of the program. The household survey result shows that only 15.2 percent of the households use fertilizer and 2.8 percent improved seed credit services in year 2000. At the same time the proportion of

households receiving any type of agricultural credit was 16.8 percent with the highest proportion in the highlands (41 percent).

Limitation of the extension services to few crops is another problem of the service in the area. Only three crops have major importance in the area. In terms of food security and in view of moisture stress in the lowlands and fluctuation of rain on the highlands the program intervention have insignificant contribution. The program also purely depends on rain and thus there was no guarantee for the adopters in times of rainfall failures.

Table 2: Summary Indicators of Basic Services

Indicator	Source	Unit of analysis	Trends, Rates and Levels			
			1994	1998	2000	%change
1. Primary education						
Literacy	CSA/HHS	% literate (M=male, F=female)	M=12.9 F=2.5 T=7.6		M=33.3 F=7.1 T=14.6	2.6X 2.8X 1.9X
Enrollment	DOE/RRA	% enrolled(7-14) (M=male, F=female)	1995 M=9.6 F=4.0 T=6.8	1996 M=14.0 F=7.0 T=10.5	1998 M=20.6 F=9.4 T=15.0	% change 2.1X 2.4X 2.2X
Drop outs	DOE	% entered grade 1 not completed grade 4	M=-- F=-- T=--	M=85.9 F=93.2 T=88.9	M=81.6 F=85.9 T=82.9	95.0 92.2 93.3
Student teachers ratio	DOE	No students/teacher	24	34	34	1.4X
Student classroom ratio	DOE	No students/class	36	45	44	1.2X
Ratio of PAs to school	DOE	No of PA/school	1.32	1.32	1.32	0.0
Functional adequacy	RRA		adequat e	adequat e	adequat e	improving
Quality of service	RRA		poor	poor	poor	declining
2. Agricultural extension			1996/97	1997/98	1998/99	%change
Households covered	DAO/RRA	% of households	5.5	8.4	20	3.6X
%of area under package	DAO	%area of extension	0.8	1.1	3.5	4.4X
DA farmers ratio	DAO	Number of HHS/DA	15833	2323	837	5.3
			Highland	Midland	Lowland	Total
get agricultural assistance	HHS	% of HHS	12.0	13.0	5.8	8.0
get agricultural credit	HHS	% of HHS	41.0	42.0	4.5	16.8
3. Road access			1994	1996	1998	%change
population access to road	Z PEDD	% population within 7.5 km radius	12.5	12.5	12.8	1.02X
Road density	Z PEDD	km of road/1000 km ² road/capita (cm)	16.4 17.9	16.4 16.8	16.4 15.7	0.0 87.7
4. Health services						
pop/ health institutions	DHO	pop/health institution	46554	48406	50661	1.1X
PA/health institution	DHO	PAS/health institution	11	11	11	0.0
Population/physician	DHO	No. of pop/physician	no	no	151982	-

Indicator	Source	Unit of analysis	Trends, Rates and Levels			
			1994	1998	2000	%change
population nurse ratio	DHO	number of pop/nurse	139661	145219	21712	15.5
population saniterian ratio	DHO	no. of pop/saniterian	no	no	151982	
population/ assistant	DHO	pop/health assistance	15518	8542	18998	1.2X
Health coverage	DHO	%population access	10.7	10.1	46.1	4.3X
Preventive health	DHO/HHS	% TT2 coverage	3.2	2.2	6.0	1.9X
		%BCG/DPT	74.0	18.0	15.1	20.4
Environmental health	CSA/HHS	% access potable water	10.8	-	35.1	3.3X
			Highland	Midland	Lowland	Total
source of water	HHS	unprotected wells, springs(%)	59.1	19.7	49.8	47.4
	HHS	River, ponds(%)	15.2	1.6	5.5	5.8
	HHS	protected sources(%)	25.7	78.7	44.7	46.8
	HHS	% having toilet	0.0	4.9	1.2	1.6

Note: figures under year 2000 were from SERA's surveys either HHS or RRA, DWHO is District Health Office

Source: Condensed from various tables from chapter 4-7 in the main text.

3. Malnutrition, under-five mortality and epidemics

High prevalence of poverty, food insecurity, depletion of resources and poor access to basic services usually resulted in high degree of women and child malnutrition, child mortality, epidemics and diseases. The most affected part of the population are landless and land short households, generally resource poor households, those who reside in environmentally degraded areas, communities in the lowlands, children and women.

3.1. Child Malnutrition

A detail analysis accounts of women and child malnutrition has been made in chapter seven using both descriptive and quantitative methods. As discussed in that chapter about 55 percent of children under five years of age were under weight, 49.8 percent stunted and 28.4 percent wasted. The proportion of malnourished children is the highest in the mid highlands and in children from female headed households. In mid highland agro-ecology child stunting is about 61 percent while in the lowlands it is 50 percent. Chronic child malnutrition is a result of many socio-economic and bio-demographic characteristics of the child, the mother, the household, the community and the environment.

The overall findings of this study is that chronic malnutrition is mainly caused by abject poverty, manifested in landlessness, low cash income, chronic food insecurity, low production per head, low wealth holding, poor sanitation and health conditions.

Particularly wealth of the household determines the level of chronic under-five child malnutrition. Child malnutrition is the highest in the households who have no/few plots of land. In these households, child malnutrition is as high as 58 per cent, of which 79 per cent were severely malnourished (stunted). Thus as land holding increases the level of child malnutrition decreases abruptly. Livestock holding including oxen have the same effect on chronic child malnutrition. As the wealth status of the household, in general, declines child

malnutrition increases. Thus, most of child malnutrition is a result of the low status of asset and wealth holding.

Those households who have faced chronic food insecurity have also high proportion of stunted children. For example while child stunting in households who have faced chronic food insecurity was 52 per cent, it was 42 per cent in food secured households. Food security of the household has therefore strong effect on child malnutrition, as it determines the level of food intake.

Occupation of the household has also significant effect on child malnutrition. The highest proportion of chronically undernourished children is found in households subsisting themselves in farming. Child malnutrition (stunting) is 67 percent as compared to 56 percent for non-farming households.

Headship pattern of the households is another indicator that brought about significant variation in child malnutrition. Female-headed households comprise the largest proportion of chronically undernourished children than male headed households. Child malnutrition (stunting) is about 57 percent and 49 percent in female and male-headed households respectively. This is more explained in terms of the variation in access to land resources, rural credit and level of agricultural productivity and production.

It was also found out that as family size increases the proportion of stunted children decreases. As discussed in many parts of the paper, families with large number of members were in a better off-position in terms of land and animal holding, cash income, agricultural production, wealth and educational status. Thus they have better opportunities to feed their children adequately than families with few members. Families with few members, on the other hand, were the newly married, most often they were landless or own few plots of land. In general, in those families with members of 1-4 about 56 per cent of their children were stunted as compared to 39 percent for families with more than eight members.

Mother's nutritional status also determines the level of child stunting. Most of the children from malnourished mothers were found to be more stunted than those from well fed mothers. Likewise high labor participation in economic activities also resulted in high proportion of stunted children due to variations in childcare and feeding practices.

In general, malnutrition (stunting) is the highest in female children (55 percent) than males (42 percent). Most of the above determinants of stunting have the same effect on child under weight and wasting (refer to chapter seven).

3.2. Women Malnutrition

Women's malnutrition is also closely related to chronic poverty, heavy work load, access to productive and non-productive household and community resources, level of food security, age, age at first marriage, etc.

According to the community perceptions about 68 per cent of women were estimated to be malnourished (thin) with high proportion in the lowland areas (RRA survey, 2000). The household survey results also show almost the same proportion of undernourished women. According to this information, women malnutrition is about 41 percent of females in reproductive age group, with about 31.2 percent of them estimated to be severely malnourished. As indicated above, the determinants of women malnutrition are associated with asset holding (land and animals), family size, age and age at first marriage.

The highest proportion of malnourished women was found in the age category of 35-49, and also malnutrition is progressive with increasing age of the woman. For example, malnutrition is about 68 per cent for those women in the age group of below 21 years and 74 percent in the age group of 35-49 years. At the same time, women malnutrition will decrease as age at first marriage increases. In the age marital category of below 10 almost 54 percent of women were malnourished. Whereas, this proportion declines to a quarter of the population above the age of 20. In both cases the reason behind high proportion of undernourished women at the older age is associated with poverty, high rate of birth, workload and physiological retardation.

Other variables, which have strong contribution to women malnutrition, are the status of sanitation (in terms of window and toilet) facilities. High proportion of undernourished women was observed in households who have no toilet or ventilation facilities. About 48 percent of women in houses without windows were malnourished as compared to 28 per cent for those who live in houses with windows. At the same time the proportion of undernourished women was 41 and 65 percent for women in households with and without toilet facilities respectively. These two sanitary conditions were indicators of wealth in rural areas and therefore not the presence of these services but the wealth of the household that indirectly determines the nutritional status of women in this area.

3.3. Child Mortality

Under five child mortality is also high mainly induced by poverty, unsanitary environmental conditions, poor childcare and health, and malnutrition. Currently under-five child mortality is about 283 per thousand-reference population. Infant mortality rate is about 122 children per 1000. Under-five mortality rate is very high among the age groups of 6-11 months. In the CSA 1994 survey, under-five child mortality was 225 per 1000 children. According to these two estimates, child mortality has increased by about 25.8 percent in the past half decade.

Most of child deaths were observed among poor households who have few plots of land and animals. As holding sizes of these resources decline, child mortality increases.

Vaccination of child has an important contribution in controlling child mortality. The survey result shows that there were no observed deaths among children who were vaccinated against major child hood preventable diseases. The same holds true for children who were breast fed and whose mothers have received antenatal care services.

Mother's literacy status, occupation and labor participation in economically gainful activities have also strong contribution to child mortality. Under-five child mortality is lower among mothers who were literate. Mortality is also high among families who were chronically food insecure and affected by repeated epidemics. In general, high child mortality is a result of household wealth status, environmental condition, and access to health and education services and food security position of a household.

3.4. Epidemic Prevalence

Various epidemics were reported to affect a little below half of the population of Darra district. Epidemic is the result of poor environmental sanitation, unsafe drinking water supply, poor hygiene, poor health facilities and famine and poverty.

According to the survey result, about 43 per cent of the households have faced epidemics in the past five years. The most common epidemics in the district was malaria, affecting about

28.3 per cent of the households who have reported to have faced epidemics in the past five years. Diarrhea, typhoid fever, measles, Tuberculosis, and hepatitis were other epidemics commonly prevalent in the area in that order. Epidemics are most common in the lowlands where the agro-ecology and the condition of health favor prevalence of epidemics. In this ecology, malaria affects about 39 per cent of the lowlands. Except for few epidemics, the lowland areas rank the first with the most common epidemics

Epidemics have also direct relation with the level of poverty, family size, status of the food security and sex of the household heads. The findings of the survey show that, as the degree of wealth holding increases prevalence of epidemics decreases. At the same time, the male headed households and the food secure households were the most affected by epidemics, which may directly related with the agro-ecological setting than poverty, where malaria prevalence is the highest. In general, epidemics are the third most important disaster, which threatened the livelihood of the population in the past five years.

Table 3: Condition and trends of child and women Malnutrition, Mortality, and Epidemics

Indicators	Source	Unit of Analysis	Trends, Rates and Levels			
			Highland	Midland	Lowland	Total
1. Child malnutrition	HHS	% stunted (-2SD/-3SD)	40.5/24.3	61.3/35.5	49.4/36.3	49.6/34.2
		% wasted (-2SD/-3SD)	37.8/16.2	35.5/6.5	25/10.6	28.5/11.0
		% under weight (-2SD/-3SD)	59.4/32.4	67.8/32.3	51.2/33.1	54.8/32.9
2. Women's malnutrition	HHS	% very thin and thin	5.3/31.6	3.2/48.4	16.5/41.8	12.8/41.0
3. Under five mortality	CSA/HHS	< 5 children died/1000	1994		2000	%change
		M=male, F= Female T=total	M=239 F=211 T=225		M=307 F=259 T=283	1.3X 1.2X 1.3X
4. Life expectancy	CSA/HHS	life expectancy at birth (M/F)	M=43.1		M=34.6	80.2
			F=46.4		F=41.6	89.7
			T=44.8		T=38.1	85.0
5. Diseases	DHO/HHS	% top five diseases	1994	1996	1998	%change
		Malaria	11.5	16.4	31.9	2.8X
		Intestinal parasites	16	17	13.8	86.3
		Rheumatic pain	10.4	11.1	8.1	77.9
		Skin disease	11.3	11.7	5.8	51.3
		STD	6.6	6.6	6	90.9
	5.1 Prevalence	HHS	%top five epidemics	Highland	Midland	Lowland
Malaria	10.0	6.0	38.5	28.3		

Indicators	Source	Unit of Analysis	Trends, Rates and Levels			
		Diarrhea	12.0	6.0	14.5	12.7
		Typhus fever	6.0	3.0	9.0	7.5
		Measles	3.0	1.0	7.8	5.8
		Tuberculosis	4.0	3.0	3.5	3.5
5.4. Family planning	HHS	% ever used	2.9	0.0	2.0	1.8
	HHS	% currently using	0.0	0.0	0.5	0.3

Note: All figures under 2000 are either from household survey or RRA

Source: Compiled from tables in Chapter 4-7 in main text.

4. Community livelihoods and food security

The economy of the area is dominated by subsistence agriculture. Agricultural production purely depends on rainfall with insignificant use of irrigation. The volume of production depends on the pattern of rainfall in particular season. Modern agricultural input use is also very low. By 1999 the area under fertilizer is only 10.6 percent of the total area under crop. Adoption rate was only 0.03 kg of fertilizer and 0.7 percent of the farmers at district level used improved seeds. Above all rainfall plays a determinant role in agricultural production than any other natural and artificial agricultural input.

Production level highly fluctuates from time to time depending on the adequacy and distribution of rainfall. The district level secondary data show that production of major food crops is growing at a rate of 8.5 percent per annum between 1995 and 1999. This shows that growth rate of production at district level is significant and food availability is high. However, between years there has been significant variation. In 1998 production has been declined by about two-third than in previous year due to rainfall shortages. In this year, local production could only fulfill 54 percent of consumption demand. On average, production per head in the reference period is 296 kg and the food available for consumption was 255 kg of grain equivalent. Yet at household level about 10.8 per cent were out of stock and 74.2 percent have insufficient food to subsist themselves until the next harvest. The household survey also showed that production per capita was 120 kg that could subsist an individual only for two-thirds of the year.

Off-farm and non-farm activities as well as other cash income generating activities were rarely available. Income from these sources is only Birr 22 per capita or 111 per household. Most of the cash income (47.2 percent) was generated from crop sales. In general, cash income per capita is only Birr 41.4. Crop sales though dominant in the household cash economy the proportion of crops sold was 12 per cent of the total production. Cash crop production was not available as mainly constrained by limited irrigation and poor marketing infrastructure in the area.

Therefore, about 62 per cent of the total population were estimated to be malnourished with high proportion in the lowlands. In almost 50 per cent of disaster years food consumption has been twice a day for 54 percent of the households. In addition, about 39.8 percent of mothers and 50.2 percent of under-five children were malnourished. Rainfall shortages and fluctuations cause an immense loss of food crops. Thus about 83.3 percent of the total population is believed to be under chronic food insecurity in the past ten years.

Besides fluctuation of rainfall, declining landholding sizes, increased proportion of landlessness and oxlessness have contributed to low agricultural productivity and declining

food security situation in the area. The long-term period income and production sufficiency indicator also shows that about 10.8 percent of the households could feed themselves only for less than three months a year from what they earn or produce (household survey). Only one percent of the households perceived that they could adequately feed themselves throughout the year.

Landlessness has increased from 2.5 percent before the 1967 to 18.9 percent currently (community informants). The household survey also shows that about 13 percent of the households were landless with high proportion of landless households in the lowlands. About 47.1 percent of the households owned less than one hectare of land (household survey). Large and medium size holdings (greater than one hectare) constitute only 40.1 percent of the total households. According to the community informant survey (RRA) not only increasing landlessness but also the size of plots a farmer owned progressively declined in the past three decades. Accordingly, the size of large plots declined by about 79 per cent and at the same time the proportion of households who were considered large-scale owners declined by 31.4 per cent between the period before 1967 and in 1990s. The size of large holdings declined from 12.6 hectare before the 1967 to 2.7 hectare in 1990s for large holdings. In all land holding categories, the trend in the size of holdings and the proportion of households entitled to it declined at higher rate. It is only the landlessness that increased in these periods. Landlessness increased by more than eight times than the period before the 1967. Therefore, the situation as a major cause of food insecurity is increasing from time to time. According to household perception, 65 per cent of responses to the food shortage is attributed to shortage of land and 58.3 percent to shortage of oxen.

Not only land and oxen shortage but also shortage of seeds that have serious impact on the food security, nutritional status and coping abilities of the households. A number of resource poor households particularly female headed households, ox and land short households suffer most of the time from lack of seeds and planting materials. This could be one of the major reasons for renting out the land and prevalence of share cropping in the area. Shortage of oxen has strong impact on the level of production and food security of the resource poor households.

This tenure system though has contribution in alleviating immediate problems the long-term consequences could, however, be worse for them as they could not break the vicious circle of resource poverty. Therefore, the fewer the number of oxen the higher the probability of being food insecure and vulnerable to shocks such as low production, high incidence of famine, epidemics and low cash income and agricultural production.

Animal holding is 0.5 TLU per head. However 28 per cent of the households have no animals and the majority of the households (44 per cent) have less than three TLU of animals. Livestock holding is the hedge against disasters and food security as well as a measure of wealth. The larger the holding of animals the better will be the food crop production, food security condition, low child and maternal malnutrition and high per capita income. Families with large animal holding were resilient and better cope up with disasters. This resource however gradually declining than in the past due to shortage of grazing land and long term poverty that gradually erodes the agricultural resource base of the area. Grazing land is shrinking at a rate of 14.5 percent per annum. Overstocking almost has reached 8.6 TLU/hectare. About 34.2 percent of the households have already faced shortage of grazing land. For the mid highlands the proportion of households who have grazing land shortage have reached about 79 percent. In this agro-ecology most of the available land is already

under crop cultivation. Improved animal breeding is not well developed. Thus the contribution of animal resources in household economy will decline in the future unless major interventions will be made.

The poverty level is also increasing in the area since the last three decades together with landlessness and declining wealth status of the community. According to the community perceptions, 71 percent of the population is classified as very poor and poor, 19 per cent middle income and only 10 per cent wealthy households. The proportion of poor and very poor households has been increasing from time to time while the number of the wealthy farm households is decreasing gradually. Together with declining wealth status and shift from the wealthy to the poor, the number of households who were food insecure increases. The proportion of poor people is the highest in the lowlands. Due to the combined effect of deterioration of wealth, coping ability, land resources, and climatic change, the number of people who can adequately feed themselves is rapidly declining. According to community perception 54 percent of the households could not adequately feed themselves. For these households the self-sufficiency period is only six months. Months from June to November were critical periods when households have little stock or cash to feed themselves.

The household survey result also reveals that about 11 percent of the households have no food in their stock, 74.2 per cent very few and only 12.5 percent adequate/ sufficient stock. Wealth status in terms of monetary value is very low. The majority of the households, about 23 percent owned a wealth valued at below 600 birr and 39 percent above 1800. Thus the per capita asset/wealth holding is only 328 birr which is worth of two quintals of wheat. In general, transitory and chronic food insecurity, child and maternal malnutrition were closely associated with land holding, fixed assets, animals, labor and climatic conditions. The deterioration of the size of land, animal holding, crop production, other cash incomes have direct consequences on the four major vulnerability indicators-malnutrition, chronic food insecurity, epidemics and child mortality.

Most of the income of the households comes from crop production. Crop sales comprise 47.2 percent of the annual cash income and 43.7 percent of the wealth of the households. At the same time livestock holding contribute to about 37.9 percent of household wealth. Thus slight deviation in the volume and size of these resources due to man made and natural calamities will seriously deteriorate the household economy and coping ability.

The general review of livelihood system and household economy in the area showed that production in terms of animal and crops as well as cash income is low and at subsistence level. The number of vulnerable households and vulnerability factors was increasing from time to time since the 1960s with high frequency since the 1980s. Vulnerability in terms of food insecurity, malnutrition, epidemics, famine and poverty also increasing in line with resource depletion and increasing population pressure.

Table 4: Some General Indicators of Poverty, Chronic Food Insecurity and Deprivation by Headship (%)

Indicator	Source	Unit of analysis	Trends, rates and Levels			%change over base yr
			before 1974	1974-1990	after 1990	
1. Land holding	RRA	% landless	2.3	5.1	18.9	8.2X
		% very small holding	23.3	19.2	17.3	74.2

Indicator	Source	Unit of analysis	Trends, rates and Levels			%change	
			51.7	48.7	43.1		
		% very small/small holding				83.3	
			Highland	Midland	Lowland	Total	
	HHS	% with =< 0.5 ha	14.0	6.0	9.8	9.8	
		% landless	6.0	9.0	15.5	12.8	
		% with =<2 plots	86.6	71.9	71.3	74.0	
		% perceived land shortage	70.0	69.0	51.5	57.5	
	HHS	land/capita(ha)	0.30	0.24	0.35	0.32	
	HHS	Cultivated land/HHs (ha)	1.24	1.32	1.96	1.73	
		% with no grazing land	85.0	99.0	96.0	92.0	
2. Livestock population	HHS	% with no animal	32.0	28.0	27.0	28.0	
		% with =< 3 TLU	74.0	76.0	70.3	71.8	
		% of oxless households	54.0	45.0	43.3	45.3	
		% with one & no ox	78.0	74.0	71.5	72.6	
		% perceived ox shortage	64.0	64.0	55.5	58.3	
	HHS	% value of TLU in total wealth	42.1	47.4	49.1	47.8	
Livestock population	DAO/H H	TLU/capita	1994 1.12	1998 0.87	2000(SER A) 0.47	% change 42	
3. Wealth	RRA	Wealth category	Highland	Midland	Lowland	Total	
		% Very poor	19.5	25.9	20.5	21.3	
			% poor and very poor	64.5	74.3	71.6	49.6
	HHS	% < 600 Birr	22.0	27.0	22.0	22.8	
		% <1200	39.0	45.0	39.8	40.5	
		% with no wealth	0.0	1.0	1.3	0.8	
		% share of fixed assets	13.1	11.2	10.8	11.2	
		value of wealth/capita	382.0	373.0	411.0	400.0	
4. Income and Poverty	HHS	% with no cash income	26.0	42.0	32.8	33.2	
	HHS	% < 200 and no cash income	65.0	83.0	73.0	73.3	
	HHS	mean cash income	258.7	111.7	183.8	184.3	
	HHS	Income sufficiency					
	HHS	much too small	34.0	29.0	34.1	33.2	
	HHS	much too small and small	78.0	81.0	76.2	77.3	
	HHS	% perceived poverty	66.0	79.0	58.3	63.0	
5. production			1996	1998	2000	%change	
	DAO/H H	production/capita(kg)	303	371	119.9	39.2	
	DAO/H	surplus/deficit (%)	80.4	120.8	-40.0	-250	

Indicator	Source	Unit of analysis	Trends, rates and Levels			%change
	H DAO/H	% of cereal in total production	90.4	90.9	92	1.02X
	H DAO/H	Yield/ha (kg)	826	1004	343	41.5
	H HHS	% marketed	NA	NA	12.0	-
	H HHS	% with no production	NA	NA	8.8	-
	H HHS	% of crop in total cash income	NA	NA	47.2	-

			Highland	Midland	Lowland	Total
6. Food security	HHS	% chronically food insecure	76.0	84.0	85.0	83.3
	HHS	% with no food stock	8.0	8.0	12.3	10.8
	HHS	% insufficient & no food stock	88.0	89.0	83.3	85.0
	HHS	% with <4 months sufficiency	6.0	4.0	13.8	10.8
	HHS	% < 7 months of sufficiency	27.0	25.0	31.1	29.3
	HHS	mean self-sufficiency period	8	8	8	8
	HHS	% labor short households	20.0	38.0	27.5	28.0
	HHS	% perceived famine	74.0	75.0	69.3	71.0
7. Market access	HHS	% with market problem	-	-	3.2	2.2
	RRA	% of PAs with access	all	all	all	all
			1994	1996	1998	%change
	DAO	prices of crops (birr/qt)	124	141	176	1.4X
	DAO	prices of animals (birr/unit)	428	427	446	1.04X
	DAO	crop price variation (%)	18.6	65.1	60.0	3.2X
	DAO	rural wage rate (birr/day)	2.75	3.25	4.00	1.5X
DAO	urban wage rate (birr/day)	3.75	4.50	6.00	1.6X	

Source: Condensed from Tables in Chapter 4-7 in main text.

In general, the poverty level, the food security situation and the most vulnerable groups of the households, communities and individuals could be made from the general summary of numerous variables discussed in chapter seven and eight of this paper. The major indicators which most likely reflect vulnerability are chronic food insecurity, long-term average food/income self-sufficiency period, production and food availability per capita, child and maternal malnutrition, food stock sufficiency, famine, epidemics and poverty incidence. These indicators at least help to identify the most vulnerable households and treated against the most wealth indicators such as land holding, oxen and other livestock holding, headship, literacy and family size as well as wealth of the households. These variables also treated against major problems faced by the households and causes of food insecurity. Those

households with the largest score of all dependent variables could be categorized based on their ranks as the most vulnerable.

As indicated in Table 5 the most vulnerable households were the landless and the ox-less households. The oxless households were characterized by mean production of 83 kg per capita, 93.8 per cent of them chronically food insecure, net food availability for consumption of only 61 kg/capita, mean income/food self-sufficiency period of six months, for 22.1 per cent of them the food was out of stock, 83.5 per cent face famine, 17.3 per cent epidemics, and 77.2 per cent considered as poor and 41 per cent of their women and 63 per cent of children were malnourished. The same holds true for the landless and those who own below one hectare of land with slight variation along the groups of ox-less households. Refer to table 5 below.

Table 5: Distribution of Households by Major Vulnerability Indicators

Indicators	Food insecure	Epidemic	Famine	Poverty	prod/capita	mean sufficiency period	women malnour.	Child		
								stunting	wasting	mortality
AEZ										
Highland	76.0	39.0	74.0	66.0	104.4	8.1	11.8	40.5	37.8	16.7
Midland	84.0	19.0	75.0	79.0	103.1	8.1	29.7	61.3	35.5	4.8
Lowland	85.3	49.5	69.3	58.3	127.9	7.8	22.7	49.4	25.0	2.1
Land holding										
none	88.3	40.3	81.8	76.6	80.2	6.5		58.3	16.7	2.3
0.1-1.0	85.9	39.8	73.3	69.9	90.3	7.5		51.5	26.5	3.8
1.1-2.0	81.3	43.2	69.8	60.9	124.6	8.3		50.0	30.3	7.9
2.1+	80.0	48.0	62.4	46.4	185.8	8.7		43.3	33.3	2.2
Headship										
male	81.8	43.9	68.4	58.3	133.0	8.4	21.9	49.5	30.2	-
female	91.5	36.8	83.0	84.9	58.7	5.6	23.5	50.1	6.3	-
Wealth										
<600	95.6	45.8	83.6	78.2	81.7	6.5	22.7	-	-	-
600-1200	81.6	38.3	69.5	63.1	117.3	7.8	24.8	-	-	-
1200+	73.1	42.3	59.8	48.3	158.1	9.2	20.3	-	-	-
Family size										
1-4	86.2	43.7	73.9	66.8	124.5	7.4	21.4	55.1	18.4	2.2
5-8	81.6	39.9	69.4	62.2	118	8.2	22.8	50.3	30.8	5.3
9+	79.5	54.5	63.6	45.5	104.4	8.6	21.1	38.9	33.3	7.0
Other animals										

<0.500	96.0	46.5	86.4	78.3	77.1	6.1	23.6	72.6	27.8	6.0
0.501-1.000	89.1	34.5	80.0	69.1	114.0	7.8	22.7	31.8	31.8	4.1
1.001+	75.5	41.8	60.8	53.3	145.2	8.9	8.6	50	50	4.7
Literacy										
literate	79.6	49.3	65.5	57.0	141.0	8.9		41.9	27.0	5.3
illiterate	84.7	40.6	72.7	64.8	113.3	7.6		53.2	29.2	4.6
Food stock										
sufficient	24	34.7	10.7	5.3	215.7	11.7	23.2	44.1	44.0	1.9
insufficient	90.8	43.7	76.9	68.4	119.0	8.0	22	53.5	26.9	5.1
out of stock	98.7	44.3	94.9	87.3	33.8	3.4	21	34.8	31.3	6.5
sufficiency period										
< 6 month	98.1	38.0	93.0	86.1	117.5	4.3	23.1	48.1	32.7	7.2
6-12	78.5	43.8	63.2	55	176.6	9.2	21.9	49.1	26.9	4.2
12+	33.3	33.3				13.5	20.0	75.0	50.0	
Oxen holding										
none	93.8	44.0	83.3	78.4	79.9	6.4	20.8	51.4	27.8	
1-2	82.1	39.7	68.6	59.7	131.3	8.6	30.5	54.4	25	
3+	53.6	50.7	36.2	23.2	211.6	10.1	17.6	44.3	31.8	
Total	83.3	42.7	71.0	63.0	119.9	7.9	22.2	47.6	28.5	4.8

Indicators of problem perceptions and causes for food shortages and epidemics have also shown the same result. However, these variables indicate the general picture of the vulnerable households and did not enable to make differentiation among households depending on their asset holding, gender, and other demographic and economic indicators that distinguish them one from the other. For example, shortage of land could be a problem for those households who owned two hectares and they feel the same as those who have below one hectare depending on their family size, the quality of land they cultivate, and the agro-ecology and cropping pattern experienced by the household. In spite of these shortcomings these variables have significant contributions in the identification of the major dependent vulnerability indicators. Among this land shortage, landlessness, poor land quality was highly associated with food security, production per agricultural inputs, food/capita, poverty and famine prevalence and the volume of food stocks as well as income/food self-sufficiency periods.

Accordingly, those households who perceived to have faced shortage of land, for 93.5 percent of them their annual income is not sufficient, 43 per cent affected by epidemics in the past five years, 81 and 43 percent poor and affected by famine, 39.6 percent of their women were malnourished, 58 percent of them chronically food insecure and subsist themselves for seven months in a year and their production per capita is 84 percent of the average per capita production of the whole population. For other indicators refer to Table 6. Thus land shortage and quality mostly determine the level of household vulnerability and ranks the first followed

by shortage of rain and pests in that order. Shortage of oxen, credit and agricultural inputs, shortage of labor and farm implements were other groups of constraints that contribute to household vulnerability and food insecurity. In general, vulnerability of households is highly associated with land, ox, labor, agricultural credits and inputs, access to health infrastructure and rainfall pattern. The fewer the possession of these resources the higher the probability of being vulnerable to poverty, food insecurity, famine and epidemics as well as maternal and child malnutrition.

Classification of vulnerable groups/communities by their geographic location and common problems affecting their livelihood did not have as such many variables for categorization as that of households. For classification of the vulnerable communities' environmental variables and access as well as agro-ecological settings seem appropriate.

As discussed above, the lowland areas, though affected by frequent drought they were found to be in a better off position in many respects than other agro-ecological zones. This is because this agro-ecology is sparsely populated, has large land holding per capita, large number of animals population which were a guarantee against many disasters occurring in the area. In the mid highlands and the highlands, land shortage is critical, production is dwindling, population pressure is high and consequently the food available at household level is low.

In general, the lowland communities were better in per capita wealth, land and animal holding, production and prevalence of famine and poverty but the worst in epidemics, food security and food stock availability. However, in terms of the trends, intensity and typology of vulnerability factors the lowland areas were most susceptible areas with rapid progress of dwindling human and natural resources. Hence the lowland areas and communities will be the most vulnerable with increasing trends in the future than other agro-ecological zones. Crop failures, drought, prevalence of crop pests were more frequent with high impact on the livelihood strategies and systems. Inaccessibility to most of economic and social infrastructure exacerbates the existing problems than in any areas in the district. In terms of religious and ethnic communities, there were no significant variations with regard to vulnerability to stresses.

Table 6: Distribution of Households/communities by Major Vulnerability factors and Agro-ecological zones

Indicators	Highland		mid highland		Lowland		Total	
	No.	%	No.	%	No.	%	No.	%
Food insecure households	76	76.0	84	84.0	340	85.0	500	83.3
Self-sufficiency period								
<4 month	6	6.0	4	4.0	55	13.8	65	10.8
4-6	21	21.0	21	21	69	17.3	111	18.5
7-9	40	40.0	45	45	159	39.8	244	40.7
10-12	33	33.0	30	30	111	27.8	174	29.0
12+	-	-	-	-	6	1.5	6	1.0
Wealth category								
<600	23	23.0	26	26	88	22.0	137	22.8
600-1200	20	20.0	20	20	78	19.5	118	19.7
1200-1800	24	24.0	16	16	71	17.8	111	18.5
1800+	33	33.0	38	38	163	40.8	234	39.0
Sufficiency of food stock								

Insufficient	80	80.0	81	81	284	71.0	445	74.2
Out of stock	8	8.0	8	8	49	12.3	65	10.8
Production/capita (kg)	104.7	-	103.2		127.9	-	119.9	-
Food availability/capita (geq)	76.5	-	80.8		94.5	-	89.2	-
Epidemic incidence	39	39.0	19	19	198	49.5	256	42.7
Famine incidence	74	74.0	75	75	277	69.3	426	71.0
Poverty incidence	66	66.0	79	79	233	58.3	378	63.0
Landless households	6	6.0	9	9	62	15.5	77	12.8
Households with <1 ha	55	55.0	52	52	99	24.8	206	34.3
Households with no ox	54	54.0	45	45	173	43.3	272	45.3
Households with one ox	24	24.0	29	29	113	28.2	166	27.7
Sufficiency of income								
Much too small	34	34.0	29	29	136	34.1	199	33.2
Too small	44	44.0	52	52	168	42.1	264	44.1
Women malnourished	21	30.0	37	50.0	120	38.8	178	39.5
Child stunting								
Moderate/sever	16	42.1	19	61.3	79	50.0	114	50.3
Severe	10	26.3	11	35.5	57	36.1	78	34.4
Mean sufficiency period (month)	100	8.0	100	8.0	400	8.0	600	8.0
Land/capita (ha)	100	0.31	100	0.24	400	0.35	600	0.32
Animals/capita (TLU)	100	0.36	100	0.37	400	0.45	600	0.42
Wealth/capita (Birr)	100	381.8	100	373.2	400	411.5	600	400.1

5. Disaster History and Institutional Responses

Uncontrolled population growth and consequently declining land resources, environmental degradation, recurrent drought, famine and epidemics have long history in affecting the population of Darra district. As discussed above, land degradation in terms of soil erosion and deforestation has been high. The resultant effect of the multiple forces of land degradation, drought and population pressure has been food insecurity, prevalence of diseases and epidemics, malnutrition, and asset depletion. Environmental degradation mostly manifested in drought, declining sub-terranean and sub-surface water resources, high animal and human mortality, low land and human productivity. Drought which has been the most important type of disaster both in its magnitude of impact and intensity has most probably been an effect of long-term persistent environmental degradation and natural resource depletion which directly lead to climatic change.

The community perceptions survey depicts that environmental degradation and drought as well as epidemics have been increasing since the 1950s (EC) due to population pressure and gradual shift of population settlement and deforestation to the lowlands. Drought has been a repeated episode since then in the area. In general, drought, human and livestock epidemics, crop diseases and pests, as well as landslide were the main disaster types occurring since the 1950s which have been affecting most of the population.

Drought occurrence has been reported since the 1950s with high frequency in all agro-ecological zones. Since the 1950s about 15 droughts were observed with significant impact on crop and animal production and on the livelihood strategy of the community. Drought is responsible for failure of crop production and declining food security situation in the area. Sometimes it has been reported to contribute to the total collapse of crop production. Available information showed that crop failure is one out of three years and for some of the crops every year. The community particularly in the lowland areas has already stopped

production of some crops. Despite the frequency of 15 out of 41 years for drought, the intensity of occurrence has been increasing since the 1984 major drought year in the whole country. After this period, frequency of drought with major crop and livelihood failure is observed in 12 years (i.e., 86 percent of the period). In general, three main periods could be identified in drought history of Darra district. The 1950-1980 period which was characterized by two major and five minor droughts but with significant impact on the communities livelihood system. In this period, the frequency of drought had been 20 percent (or one in half a decade). The second period corresponds to major socio-economic policy changes in the country and covers a period between 1980-1990 EC. This period is characterized by high prevalence of drought with one major drought year. The frequency of occurrence and intensity of impact was higher than the previous period and the community reported that the frequency was about 70 per cent (seven out of a decade). This was a period with high human migration from one agro-ecology to the other and from the adjacent areas to the district and mobilization of the majority of the community members either due to various disasters, policy changes, natural calamities, political reasons and war. The third period has been the period after the 1990s. Though much concise information was not available after the 1990 EC (the data set focuses only on needy population and lack of capacity to collect an accurate data on disaster affected population) drought become a common phenomenon every year.

Drought is most frequent in the lowlands than in the highlands. Moisture stress, rapid environmental degradation, and declining land holding sizes and increasing land less households and low level of agricultural diversification characterize this agro-ecology as the most drought prone area in the district. The frequency and intensity of the impact of the drought in the area is higher than in any other agro-ecological zones.

In general the above discussions and figures show that drought occurrence is increasing from time to time from 20 percent in 1950-1980s to almost 100 percent between 1990-1992 EC. This directly corresponds with the trend figures in land holding size, environmental conditions and population pressure since the 1950s. Thus, the general conclusion is that drought is highly associated with population pressure and declining resource base.

Human epidemics are the major disaster episode since the 1950s in the lowlands. The hot lowland area of the district (about 50 percent of the total land mass of the area) are the host of many vector born diseases and one of the major reasons for the high prevalence of human epidemics. The rapid environmental degradation processes, malnutrition and food insecurity were other reasons for the prevalence of diseases and epidemics of various types. Malaria and diarrhea were the most frequently occurring epidemics affecting the majority of the population. Epidemic prevalence is increasing from time to time with high morbidity in the lowland areas where the natural and human environments favor its occurrence.

Epidemics as a major disaster have been reported since the 1966 together with the major drought and famine in the area. In the highlands epidemics has occurred in 1976. Since 1966 there were about 16 epidemic periods. Epidemic prevalence increasing from time to time from 43 per cent (6 out of 14 years) between 1966-1980 to 70 percent in 1980-1990 and then every year since 1990 EC. The lowlands were the most frequently affected areas. Malaria is the most debilitating epidemics every year expanding from the lowlands to some parts of the mid highland areas of the district. Human mobility in the form of seasonal migration is one of the reasons for the incidence of malaria in some high and mid highland agro-ecological zone.

Animal epidemics are rare and observed since 1978 EC and four years of epidemics were reported since then.

Crop pests were other forms of disaster that affect the majority of the population and cause for food insecurity in the area. Since 1976 there were about 14 years of high degree of pest infestation in the district. The probability of pest occurrence in the highlands is seven out of 16 and in the lowlands 12 out of 16 years. Trends in pest infestation are also increasing from time to time. Between 1976-1980 and after 1990 pest occurrence has been every year.

Landslide is another new phenomenon in the area since 1983 though its occurrence is rare. After 1988, flooding in the highlands is added as another category of disasters in the area.

From the long-term trends and evolution of disasters in the area, it is expected that vulnerability factors and typology, frequency and intensity of disaster will increase in the future. These long-term increasing trends of disasters gradually erode the resilience and coping ability of the households and therefore the number of population to be affected and vulnerable to disaster will increase altogether.

Trends in the number of population affected by one of the above disasters were not well documented. Data regarding this issue is found only after 1985 EC on scanty and unreliable basis. Even these data were limited to the needy population and those who have got relief food through DPPB. The same holds true also for food aid distributed.

Regardless of these major bottlenecks, the number of population who were recorded as vulnerable to disaster is highly fluctuating and ranges between 7.9 to 15 percent of the district population. Data from secondary sources have shown that the number of population affected ranges from 10.7 percent in 1994 to 2.1 percent in 1999 GC. In the same period the proportion of the population of the district who were affected by disaster has 73 percent of the share in total affected population of the zone in 1994 and declined to 5.6 percent in 1999. In general, Darra district comprises 28.2 percent of the affected population and 17.4 percent of the total food distributed to the zone between 1994-1999. This does not mean however, the number of vulnerable population is decreasing. Rather the weak database and collection methods as well as the focus of the EWS only on 'the needy population' undermined the proportion of vulnerable population in the period.

Most of the institutional responses to disaster and disaster prone population in the area were limited to delivery of food aid by DPPB but there were a lot of activities, which have been done by the government and NGO in areas of agricultural production and extension, natural resources conservation, strengthening rural institutions, rural credit, water supply and health service delivery. Though these activities were not directly targeted to help the disaster prone households, they have an indirect impact on the well being of the resource poor and prone population. As such, there were no significant activities targeted to help these people and strengthen their capacity to cope up with disasters particularly to drought and epidemics as there were no programs and projects aimed at improving the livelihoods of the poor and vulnerable populations. The early warning system, relief and development activities were very poor. The EWS is function on committee basis usually deficient of skilled manpower to appropriately monitor, register and report the disaster situation and affected population in the area. Besides such weaknesses, timely reporting, meetings and surveys, establishing a data base is lacking due to the very nature of committees organized from various institutions at wereda level. On the other hand, budget, transport and logistic facilities as well as shortage

of skilled manpower seriously constrained the overall disaster prevention and preparedness activities.

Table 7: Disaster and Risk trends and Institutional Responses

Indicators	Source	Specific unit of analysis	Trends, Rate/current level			%change	
			1950-80	1980-1990	1990-92		
1. Drought Risk							
1.1. Drought frequency	RRA	Frequency of occurrence	1 in 5 yrs	7 in 10	every year	5 X	
1.2. Perception of risk	RRA	% expected disaster in the future	-	-	85.2		
1.3. Rainfall			1994	1996	1998	%change	
population affected by drought	NMSA	ratio of annual to long term average	92.8	112.8	103.3	1.1X	
	EWS/DPPB	total rainfall mm	961	1168.2	1069.6	1.1X	
		% of population affected	17.2	3.3	2.10	12.2	
2. Epidemics			1966-80	1980-1990	1990-1991	%change	
2.1. Epidemic frequency	RRA	Frequency of occurrence	6 in 14 Yrs	7 in 10	every year	2.3X	
2.2. epidemic experience in the past 5 yrs (%)	HHS		Highland	midland	lowland	Total	
			39.0	19.0	49.5	42.7	
			10.0	6.0	38.5	28.3	
			12.0	6.0	14.5	12.7	
			6.0	3.0	9.0	7.5	
2.3. Type of epidemics	HHS	malaria	3.0	1.0	7.8	5.8	
		diarrhea	4.0	3.0	3.5	3.5	
		typhoid fever					
		measles					
		tuberculosis					
3. Crop pests			1976-1980	1980-1990	1990-1992	%change	
3.1. Pest frequency	RRA	Frequency of occurrence	every year	every year	every year	-	
3. Relative severity of disasters	RRA	Very high=4, high=3, medium=2, low=1, (max score=4)					
3.1. Drought	RRA	severity score		3.8		increase	
3.2. Epidemics	RRA	severity score		3.5		increase	
3.3. Crop pests	RRA	severity score		2.3		increase	
3.4. Landslide	RRA	severity score		3.0		increase	
3.5. Hailstorm	RRA	severity score		3.0		increase	
4. Disaster preparedness & response			1994	1996	1998	%change	
4.1.. EWS	EWS	% population affected	17.2	3.3	2.1	12.2	
	RRA	efficiency of EWS	weak	weak	weak	-	
4.2. EGS/EWS	HHS	% households participated	Highland	Midland	Lowland	Total	
			0.0	0.0	3.8	2.5	
4.4. Off-farm	HHS	% of households participated	23.0	17.0	19.8	19.8	
4.5. Assistance and credits	HHS	% of households	12.0	13.0	5.8	8.0	
			41.0	42.0	4.5	16.8	
Crop/livestock assistance	HHS	% of households	71.0	58.0	59.8	61.3	
4.5. Coping strategies							
use irreversible ones	HHS	% used frequently and never in last 10 Yrs			frequently	never	
			sale of farm tools			1.1	92.8
			sale of house utensils			0.6	94
			sale animal			7.7	53.6
			withdraw children			4.5	91.1
			migration for food			0.4	93.8
timing of use	HHS	% used at start and severe stage			at start	severe	
			sale of farm tools			23.5	52.9
			sale of house utensils			14.3	75
			sale animals			19.3	57.8
			withdraw children			28.6	54.8
			migration for food			34.5	48.3
			all strategies			33.1	44.7
	HHS	%used any one coping strategy					

Irrespective of their proneness to disasters, only eight per cent of the households have got assistance to improve their livestock and crop production 15.1 percent fertilizer and 61.3 per cent health services. Usually agricultural assistance and credits were targeted to the middle and rich farm households. At district level, however, about 15-20 percent of the households was estimated to have access to agricultural credits mainly for purchase of fertilizer, improved seeds and pesticides. For resource poor and disaster prone households, this credit was unaffordable due to high prices and shortage of money for down payments. Particularly, for the landless and land shortage households who have little or no opportunities for further investment and fulfil their basic necessities credits geared towards promoting off-farm and non-farm activities, commerce and petty trading was not started yet. Besides, the number of households who have participated in employment generation schemes or food for work programs is only 2.5 percent. Thus, in general, the institutional response in tackling problems related to disasters is weak in every aspect in the area.

6. Resilience and coping strategies

Communities and households who were prone to various disasters and experienced one or more drought or disaster episode would develop a number of coping strategies. These coping strategies usually range from a simple diet adjustment to sale of personal effects and out right migration from the area. Resilience and mitigation strategies mainly depend on the asset and wealth position of the households, income and stock of food and their consumption habit as well as the frequency and intensity/ severity of the disaster itself. In areas where the majority are poor and disaster is repeated and persistent, resilience is so difficult for the majority of the households as they gradually lose their possessions through repeated sales and transactions for survival. In general, households who have large plots of land and oxen and could produce more were more resilient than those who have no or few plots of land, no/few oxen and other animals, shortage of labor and other assets. Agro-ecologically households in the high and mid highland areas were more resilient than those in the lowland areas. In the lowland areas frequency of drought is high and persistent and the environment is highly responsive to simple moisture stress. In the highlands, however, the type of disasters and the degree of severity is lower and as a result a one season good rains enables a farm household to produce more to subsist itself.

On the other hand, the lowlands not only prone to drought but also to high prevalence of epidemics, communicable diseases and rapid environmental degradation though the environment has still some reserve of potential carrying capacity. Thus, resilience depends on the type of ecology, the level of asset and wealth possession of the households and intensity of the disaster in the reference. However, households in the high and mid highlands and the better off were more resilient than those in the lowlands and resource poor households.

In general, the coping ability of the households has been gradually deteriorated in the past three decades as most of the households gradually loss their land, animals and other basic economic assets. Landlessness has been increased by more than eight times, small plots increased at rapid rate together with the ultra poor and poor households, environmental degradation is increasing rapidly and land productivity is declining. Thus, resilience in the area is declining together with the livelihood systems and strategies.

The community through time has developed numerous coping strategies as they face one or more economic or physical stresses. Coping strategies related to diet adjustment (reducing

the number, quality and quantity of meals) were usually experienced by almost all households frequently during stress. In times when the disaster is prolonged the next step of the community is to sell their animals (small ruminants and in extreme cases oxen and other productive animals). This strategy is a medium term strategy and usually used at the middle or last stage of the disaster. The third set of coping strategy is those related to selling personal effects, productive assets, migration to find food and withdrawing children from school. These strategies are mainly used at the severe stage of the disaster and for resource poor households migration and withdrawing children from school is the best strategy as they have no asset to sale as they have already exhausted them in the first and second stage as well as repeated sale of assets through persistent and prolonged drought and other disasters.

Those strategies, which are irreversible and related to asset depletion were mostly used by resource poor households, the lowland communities particularly at the initial and middle stage of the disaster. However, these strategies were also used by resource rich households at the severe stage of the disaster when the disaster period is prolonged. These strategies were, on average used by about 20.7 percent of the total sample households or by 26.4 percent of households who have ever used one or more coping strategies in the past ten years. In general coping strategies that have been used by the households in the past ten years varied depending on the socio-economic, socio-cultural, the physical environment, economic conditions (land, oxen and other animal holding, labor), and demographic characteristics particularly (headship pattern, family size and sex) as well as access to health, education and other socio-economic infrastructures.

The type of vulnerable population, groups, communities and individuals depend on their geographical location, their wealth status, individual characteristics and the type of vulnerable factors. Usually in areas where the majority of the population were poor and dominated by subsistence agriculture the female headed households, the land less and land short, the ox-less and ox-short households, those who have no significant cash income or economic assets, young children, women, the old age and those communities who reside in lowlands and environmentally degraded areas are the most affected population categories.

B. CONCLUSIONS

The identification of the socio-economic characteristics, type of vulnerability, vulnerable groups and locations as well as some vulnerability factors were made as much as the available data allow to undertake an exhaustive analysis. Identification of vulnerable groups and vulnerability factors as such is not an easy task. It needs an in depth analysis and need to establish a relationship between factors that contribute to susceptibility to various disasters and risks. It is not as such also an easy task even to identify these factors in specific socio-economic and individual characteristics.

Extreme variations and inequalities in land holdings, oxen and other livestock resources, variations in agro-ecological setting, socio-cultural and socio-economic, and physical conditions particularly distribution and pattern of rainfall, environmental calamities (soil degradation and deforestation), the spatial distribution of population pressure, socio-political conditions prevailed in the area since the last three and four decades brings about erosion of the livelihood system of the population and increased vulnerability to disaster.

The major causes of vulnerability were closely related to these factors. The specific vulnerability factors were rainfall that is usually characterized by high variations in

distribution, pattern and duration. The pattern of rainfall is also location specific and unreliable. Drought (short or long period) is the outcome of this condition and consequently crop failure in the order of one in three years. Furthermore dependency on relief food, the number of dependent population and the proportion of food aid in total local production is increasing or fluctuating. Thus in terms of its magnitude drought caused by erratic rainfall distribution is the top disaster factor in the area. On the other hand, landslide due to geological formation and long term human intervention on the environment has become another important vulnerability factor for the significant number of the population with increasing magnitude from time to time. For such disaster there would not be short-term mitigation measures except in case of resettlement, engineering works and some soil and land conservation activities. Human and livestock epidemics though minor have significance in the category of vulnerability factors. In general vulnerability caused by physical conditions are more important than others. These physical conditions could however be second order variables derived from economic and social, political and cultural factors that are highly correlated to physical conditions. The other variable is population pressure. Population pressure lead to over cultivation of land, deforestation and soil erosion with a cumulative effect with severe environmental degradation, drought and famine.

What are the origins and causes of these vulnerability factors? Some of the causes were first order and others were second order causative agents. The major factors identified in this study were economic which include landlessness, shortage of land, shortage of oxen, low income and asset holding and low production and weak access to food and entitlement. The low possession of these economic assets and their deterioration from time to time is the direct cause for weak capacity to cope up with disaster, environmental change and declining livelihood system in the area. Land holding and oxen holding are the two most important indicators of vulnerability and food availability. The lesser the number of holdings the weaker would be the coping ability of the population. Even in drought periods these two economic factors were the main characterizing factors between the relatively food surplus or deficit households. At macro/ district level, however, they were not clearly apparent together with most of the vulnerability factors.

Social factors include accessibility to health and education, transport and communication, and markets. In all cases, the district is characterized by low access to most of the services and considered to be the remotest part of the zone. Thus vulnerability to epidemics (animals and humans) and diseases, price shocks and shortage of food and basic industrial commodities, illiteracy and low adoption of production technologies, access to basic services were the main results of such social factors.

Political factors mostly related to policies and programs, administration of public and private resources and rights. Land reform policies, agricultural and other sectoral policies and programs were mostly formulated with little emphasis on the fundamental and root causes and problems that generate poverty, malnutrition and food insecurity. For resource poor households who are considered to be vulnerable to drought, famine, epidemics and poverty related factors macro level general policies and programs and/or recommendations have little to do in improving their current state of livelihood. Agricultural policies and programs adopted since the early 1960s were integrated to tackle specific rural development problems and at the same time misguided from the objective realities and circumstances of the vulnerable poor farm communities. They also served either the resource rich or middle income farmers. Yet the condition of all groups of farm population is gradually deteriorating.

It is only recently that emphasis has been given to food security and other targeted programs. Yet, very little has been done in view of still increasing vulnerability to drought. In general the main conclusion of this chapter is that vulnerability to shocks and disasters as well as vulnerability factors are increasing with increasing type, frequency and impact.

Vulnerable households, communities and individual were identified in terms of four major indicators-food insecurity, child and maternal malnutrition, under-five mortality and epidemic prevalence. These were a direct effect of deterioration of livelihood systems and strategies, declining agricultural production, poor access to social infrastructure, prevalence of drought, environmental degradation and lack of employment opportunities. Though vulnerability to disasters was an effect of these factors all of them boils down to abject and chronic poverty. Thus the most vulnerable groups to the four vulnerability indicators were those households, individuals (children, women, the disabled, etc) and communities, who owned no or less amount of resources or indicators of wealth below subsistence level (land, ox, other animals, labor and cash income), young children, poor women, unemployed, as well as those who live in highly degraded environment and lowland agro-ecological zones.

Though access to social services and some other economic assets is improving through time, vulnerability to disasters is increasing from time to time. Population pressure dwindles land holding sizes and increased landlessness; drought frequency is almost every year since the 1990s, pest incidence is of high magnitude and malaria prevalence is increasing significantly. Since the 1950s the number, type and intensity of disasters were increasing each eroding the rural livelihood system and increasing susceptibility to disasters. Yet what has been done up to now will never be comparable to the ever increasing disaster in the area.