

Strengthening Emergency Response Abilities
SERA Project

Vulnerability Profile: SUMMARY

Saesi Tsaedaemba (district)
Eastern Zone
Tigray Region

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A. SUMMARY of MAJOR FINDINGS

Population=12,552(1992E.C)

Agro ecologic zone: 40% Dega, 50%Weinadega and 10% Kolla

Average rainfall= 897 (292.5-1756mm) with great fluctuation around mean

1. Introduction

In this part of the vulnerability profile an attempt is made to summarize and integrate the finding with emphasis to answer the leading questions such as *who are vulnerable and where do they live? What are the factors associated with vulnerability and institutions to address vulnerability? Household's strategy to cope with disaster.*

Vulnerability refers to the full ranges of factors that place people at risk of becoming affected by disaster. It is the propensity of a society to experience substantial damage and disruption as the result of hazards (e.g. draught, floods) and difficulty (through lack of resources) to cope with, and recover from them. People or households can be highly exposed to specific hazard but the degree of vulnerability for an individual, household or group of person is determined by their exposure to the risk factors and their ability to cope with or withstand stressful situations. Vulnerability can lead to disaster, when the capacity of the households or community to cope with is eroded.

Therefore, Vulnerability in simple term is:

$$\text{Vulnerability} = \text{Hazard} + \text{Inability to cope}$$

The major content areas (under which have many specific indicators) to answer the leading question are categorized in to six areas as *demographic and socio cultural, physical and climatic, economic and agricultural, institutional and program, disease and malnutrition, and disaster history.* The information related to each category of indicators are collected from two major sources namely the primary and secondary sources ; the primary source includes data from household (both household and women questionnaires)and through RRA (key informant interview and focus group discussion). Data collected from different sources may vary both in quality and adequacy but maximum effort is made to keep the data quality and reliability. Chapters one to seven are discussed based on the source of the data and trend from secondary sources in Chapter four , Intra-wereda differences(Focusing more on agro-ecological differences) based on key informant interview and the community Focal group discussion in chapter 5 and the mass of becoming vulnerable through time in chapter six , and the current status exhaustively in chapter seven with emphasis in identifying the vulnerable groups to different disasters.

2. Population characteristics

The basic population processes are fertility, mortality and migration. These three basic processes produce changes or variations in the population growth rates, population size, population density, and population distribution. Some of the most commonly employed population variables are rate of births, deaths and migration. But two principal population characteristics are significant demographic variables. These are age and sex composition of populations.

When one speaks of the characteristics of a population, two characteristics have special demographic significance: Age and Sex. The age composition of a population is especially important for understanding demographic as well as social phenomena.

Because, having many adults in the population, or having many elders in the population can also greatly influence a variety of other social patterns. The sex composition of populations can also vary greatly from one population to another.

Results from secondary data show that in Tigray rapid population growth is closely associated with very young population structure. The 1994 census result confirms this for Sasie wereda with 45.4 percent of the population at the young age group (younger than 15 years). According the CSA (1994), 49.1 percent of the population in the wereda is in the working age group (15 - 64 years) and only 5.5 percent is older than 64 years.

In the household questionnaire of the SERA Survey, 2977 individuals are included in the study out of which 1618 (54.35%) are females. Results of the household questionnaire shows that 54.3 percent of the population in the wereda is younger than 15 years of age and only 6% are older than 65 years. Only 39.7% of the population is in the active workforce age group (15 - 64 years of age).

There is a rapid change in the age structure of the population mainly in the young age and working age. This may be due to two basic reasons. The first main reason may be the high fertility rate of the wereda or a significant reduction of mortality mainly infant and child mortality. Such a high fertility rate and/or reduction of under five mortality continuously increases the population at the younger age structure. The second possible reason is that there is a high rate of out migration of the population in the age of after 15 years. Such a high rate of out migration may result in the change of the age structure. The third possible reason is the high rate of death in the age group of 15 - 64 years. Many studies show that diseases such as HIV/AIDS and war affect this specific age group. In either case, be it out migration or high rate of mortality are indicating the living condition of the wereda; how vulnerable the people are to different socioeconomic and demographic conditions.

According to the census result, the dependency ratio of the wereda in 1994 was 103.7 (92.4 percent for the young ages and 11.3 percent for the old). But, according to the SERA household questionnaire results, the dependency ratio of the wereda is 152 percent. The factors that attribute this may also be consistent with the above one.

According to the 1994 census result, the sex ratio of Saesie wereda was 90.2, which is less than the common experiences of different populations. The study result of the household questionnaire also show that 60.6% of the active work force is females and only 46.4% of those that are older than 65 years are females. This result also shows that either males are more migratory than females or war is the main cause; since more males join the army than females.

According to the CSA (1994), 34.7 percent of the households in the wereda are female-headed households. But according to the household survey result, 44.2 percent of the households are female headed. This significant change within six years may also show that the factors that affect males (out migration and mortality) are increasing from time to time.

Results of the household survey show that the mean family size in Saesie is 4.6 and is more in male-headed households (5.5) than the female-headed households (3.4) by two persons. At least one of the following ideas may be the cause for this; i.e., fertility is lower for the female headed households may be due to marriage dissolution, mortality is higher for such households or there is high rate of out migration in the

female-headed households than the male headed households. In general, the mean number of children ever born (CEB) in the wereda of study is 3.59.

In 1994, More than 75 percent of the wereda population was illiterate. Illiteracy was also higher for females (89.9 percent) than the males (68.8 percent). The SERA household survey result also shows a consistent result. According to the result of the study, males are more literate than females. The literacy status of the household heads shows that 44.6% of the male household heads and 2.4% of the female household heads are literate. 73.4% of the heads and 61.3% of the household members of ages 7 years and above are illiterate. In addition, 52.1% of the males and 22.2% of the females of ages 7 years and above are literate.

The household survey (SERA 2000) shows that 56.1% of the household heads are currently married and 3.1% are never married. In addition, 16.7% of the heads are divorced and 12.7% are widowed. High percentage of male household heads are currently married than female household heads. 89.5 percent of the male and only 13.9 percent of the female household heads are currently married. Divorce rate is higher for female household heads (34%) than the male household heads (3%). 83.3% of all the female household heads and 6.1% of the male household heads are divorced, widowed or separated.

Of all the household members of ages 10 years and above, 45.9% of the males and 30.8% of the females are never married, 44.4% of the males and 36.1% of the females are currently married and 1.8% of the males and 11.4% of the females are divorced. Widowhood is also higher for the females (9.8%) than the males (0.3%). Females are exposed more to family dissolutions than males. Family dissolutions are highly influenced by literacy status. Divorce rate is higher for the illiterates (11.1%) than the literates (1.2%). 27% of the illiterates and 5% of the literates are divorced, widowed, or separated. Early marriage also seems to be higher for the illiterates than the literate ones. 65.5% of the literates and 19.5% of the illiterates are never married. For females, the impact of literacy is higher than that of the males. Divorce rate is higher for the illiterate females (14.8%) than the literate ones (0.8%).

The census result of 1994 shows that in Saesie, 9.71 percent of the total population were migrants and 89.9 percent were non-migrants. When studied by sex, it was 10.04 percent of the females and 9.42 percent of the males). The household survey result shows that 5.5% of the household members of ages 10 years and above are migrants; i.e., 90% of the males and 88.3% of the females in Saesie are non-migrants. 13.3% of the household members of ages 10 years and above have experienced seasonal migration. Seasonally, males are more migratory (16.3%) than females (11.5%).

33.3% of the males and 6.3% of the females who experienced seasonal migration experienced it for searching job or due to job transfer. Other 24.1% of the males and 40.6% of the females also explained that “chigger” [problem] forced them to move seasonally. 11.5% of the household members of ages 10 years and above are returnees. 19% of the males and 7% of the females are returnees. 52% of the returnees explained that it was because “chigger” [problem] forced them to move that they out-migrated.

3. Population Pressure, Natural Resource and Environmental stresses

3.1 Physical and climatic factors

The environmental factors are subdivided under physical aspect (mainly resource availability and quality) and climatic factors. Under the physical aspect, agroecological zone (length of growing period), topography (slope % and slope length), Soil (texture, organic matter and soil profile), vegetation cover (soil cover- evapo-transpiration process) and water resources (existing and potential for irrigation). Where as, the main variables under climatic factor are the following: annual/ critical months rainfall (effective), rainfall distribution (temporal and spatial), rainfall intensity (rainfall energy) and drought/ wet year return period.

The wereda has 40% high land ,50 5 %midland and 10 % low land. The length of growing period varies from 211-270, 151-210 and 90-150 respectively . There is no recent study on the slope and fertility characteristics however based on the perception of the community fertility Vs slope is summarized as follows.

TABLE 1:- Response of households on land fertility as per the different topographic classification

Topographic classification	Proportion of households with fertility of their main plot			Total respondents
	Fertile	Moderately fertile	Infertile	
Top of hill & upper slope	4.9%	9.8%	85.4%	41
Middle slope	5.4%	37.6%	57%	221
Lower slope	8.8%	51.8%	39.5%	114
Valley		27.3%	72.7%	22
Plateau		25%	75%	4
Plain	19.8%	46.9%	33.3%	546
Not sated		50%	50%	2

Source: SERA Survey

On the other hand although there is no well-documented data on climate and particularly a time series data on rainfall the following general future of climate as natural limiting factor of the wereda can be summarized.

- An erratic and unpredictable rainfall with greater annual fluctuation around the means.
- The main problems that affect crop production is the unpredictability of the start and finish of rainfall.
- A mean annual potential evapo-transpiration for most of the years much larger than the mean annual precipitation/ rainfall.
- The fact that large amounts of precipitation do not infiltrate in the soil, which is about 30% goes through runoff.

- As per the definition given by UNESCO (1977), the Precipitation falls within the characteristics of arid for summer rain (200-350 mm),
- Annual average rainfall for the nine years falls within the characteristics of semi-arid 300-800mm, and
- Inter-annual variability is within the range of 50-100%-arid to hyper-arid character.

3.2 Population pressure and Natural resources

Population pressure arises from the high number of people and its impact on environment. In Tigray in general and this wereda in particular the number of people living may not be too much. But since more than 80% of the population depend on agriculture, the population is doubling every 24 years while the size of land remaining the same and quality of the land is deteriorating from time to time.

The amount of land that belongs to a person now will belong to two persons after 20 years, at the same time, unless some preventive measures are taken, the quality of soil and other natural resources will deteriorate.

The high growth rate of population will influence the natural resources such as land, forest, water and others. Landholding size of the households is decreasing from time to time. At present the landless population in the wereda is as high as 11%. In general, there is rapid population growth and this has a negative effect on landholding sizes, man to land ratio increased significantly. Table 8.2 below shows the trends in some selected population and Natural resource indicators.

TABLE 2:- Trends In Some Selected Population And Natural Resource Indicator

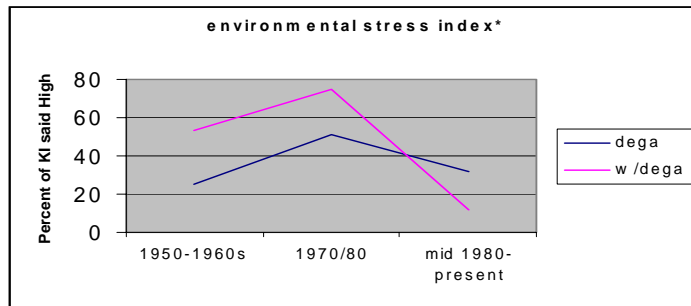
II	Population environmental relation ship	Trend over time		Chang over time
1	Crude population density	99.4 (CSA 1987)	105.88 (1991)	1.06X
2	Average Family size	4.32 (CSA 1987)	4.57 (1991)	1.06X
3	Dependency ratio	103 (1987)	152 (1991)	1.48X
4	Proportion of Out migrant(% of any of HH member age 10 Yrs and above out migrated)	9.71 (1987)	5.5 (1991 SERA Survey)	-0.56X
5	Proportion of Seasonal migrant (% of any of HH member age 10 Yrs and above seasonally out migrated)		13.3	
6	Average land holding size		0.51	
7	Proportion of landless	Increasing from almost Zero during land redistribution in 1981and now over 10 %		
8	Proportion of house holds < 0.5 Hectare			0.51
9	% of house holds said severe environmental stress(Dega /Winadega)	25%/ 53% 1950-1960s	51/75 1970-198s	32/12 Currently

10	Child ever born				
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Source: **SERA Survey**

On the other hand population pressure itself has induced the environmental stress. According to the community focal group discussion during 1950s the population size was small and rich in natural resources like share of plot of land size, forests etc. As the number of population increased rapidly and given little attention to environmental protection, the stress¹ become very high (this was particularly during 1970s). But the environmental stress; soil erosion, deforestation, pasture problem and flood declines significantly since mid 1985, the declining environmental stress due to integrated works in environmental rehabilitation like soil and water conservation, reforestation, etc. The following chart shows the percent key informants said the problem's trend is high in the three periods since 1950s.

CHART 1



Source: **SERA Survey**

4. Access to basic services and their quality and institutional response

The availability and accessibility of basic social and economic services to the community contributes in minimizing vulnerability to disasters. The coverage of services like primary schools, health services, agricultural extension services and availability of protected water sources has improved significantly in the past 10 years.

The accessibility and entitlement to institutional, organizational and programs, facilities and infrastructure, mainly at local level either prevent or mitigate disaster. Substantial improvements have been achieved since the fall of the military government i.e. 1983E.C.

The following are a brief summary of the major local capacities on institution, infrastructure and services:

One of the basic social services is *education*; the service of education can be measured interms of many indicators. There are 30 primary school accommodating 72.3 percent of the children in the wereda. The gross enrolment of both sex increased from 53.3% in 1988 to 72.3% in 1991 with a net increase of 19 percent, students drop

¹ *Environmental stress index as calculated from the percent of Key informants said very high for severity of soil erosion, deforestation, pasture problem and flood and averaged over the three periods as indicated in the

out (calculated as those who entered grade one and did not complete grade 4) for the year 1988-1991 was 6.1 percent for boys and 31.2 percent for girls. This very high drop out for girls is because of early marriage and economic reasons. This however is not consistent for the successive years, it was as high as 34.7 percent for both sex in 1988 and 15.5 percent in 1991, going up and down in between. Despite there is a general improvement both in enrollment and expansion of the service.

TABLE 3 Accessibility To Basic Service, Changes Over Time And Their Functional

Adequacy

I	Accessibility to basic services	Trend over time			Change over time
		%			
1	Enrolment in Primary School	53.3 (1988)		72.3 (1991)	1.35X
2	Student teacher ratio	54.8 (1988)		70.2 (1991)	1.28X
3	Literacy rate of population > 7 years			35.1 (1991)	
4	Population- health center ratio	?			
5	Population -Clinic ratio			1875.7 (1991)	
6	Population accessible to potable water	18.7 (1987)		37.7(If broken hand pumps maintained 47.7%)	2.01X
7	Agricultural extension coverage(Crop)	0.7 (1988)	5.3 (1989)	33.19 (1991)	47X
8	Agricultural extension coverage(Livestock)	0.42 (1988)	1 (1989)	13.4 (1991)	31.9X

Source: **SERA Survey**

The student /teacher ratio and student to class room ratio increasing from year to year i.e. from 85.4 and 54.8 in 1988 to 108.3 to 70.2 in 1991, This high enrollment is not accompanied by proportional increases in number of teachers and school class rooms.

The community from the focal group discussion although appreciates the expansion of school in to their localities, they evaluate the functional adequacy of the school is not sufficient (or it is medium) due to shortage of teachers, less number of class rooms, and some schools are not located at the center of the peasant association.

Almost all the rural population depend their livelihood on agriculture and an integrated activities in such area would mean a lot in addressing the food security of the households. Agricultural extension is one of the service expanded in the wereda to improve the crop production. The crop extension coverage grows up from 0.7 percent in 1988 to 33.19 percent in 1991 and livestock extension from 0.42 to 13.40 percent . This very quick growth in coverage however is not accompanied by corresponding increase in the number of extension agents which almost remained the same for more

than three years . This made the number of agricultural house holds per extension agent as high as 1875 which is a clear indicator of the work load of the extension agents.

The average TLU/Household is 2.91 and except 15.4 percent households, which do not own any type of livestock, the remaining own at least own one form of livestock, and the Livestock Extension coverage, however do not seem proportionally growing.

Households asked for the types of service received over the last 5 years. 91 percent of the households have received education /information related to agriculture and 21.6 percent assistances in pesticides or herbicide, 75.8 percent veterinary service. Despite all the above activities the production per hectare in the wereda do not show much change from the year 1989 to 1991 which is around 5 quintal per hectare.

The communities access to these basic services; school enrollment rate, vaccination coverage, agricultural extension coverage and clean drinking water coverage has improved in the wereda. Almost all PAs have primary schools and due to that improvement of school the number of students' enrollment rate increased. The communities' access to health services particularly vaccination converges has improved significantly.

The quality of these basic social and economic services can be measured or evaluated in terms of their utilization of these services such as agricultural extension coverage, vaccination coverage and school retention rates. In the past 10 years there was an improvement in both coverage and quality of these services but more works was done on maximizing coverage and the quality was not improved parallel to the coverage. The trend in agricultural extension coverage has improved since 1989. But the households who do not own an ox may not fully apply what the extension experts had advised to do, the prices of fertilizers and selected seeds and shortage of knowledge of the communities to apply it contributes in deteriorating the quality of the extension services. Besides there seemes communication gap between the experts in agricultural areas and the peasants .In some areas the application of modern input doesn't seem undertake locality differences and doesn't give due attention to the farmers indigenouse knowledge.

5. Illness, malnutrition and mortality

5.1 Illness and Health Service utilization

Nutritional well-being is determined by a number of inter-related factions, including food security; health; sanitation; safe and adequate water supply; education and caring capacity. For many reasons women and children are vulnerable to health and nutritional problems. The health and nutritional status of women and children are thus best indicators of the status of the population in general.

In this SERA profile development survey, the health and nutritional condition of the population in general and women of child-bearing age and under five children in particular was assessed. Moreover, the study also tried to identify factors influencing health and nutritional status and under five mortality.

Health service utilization was assessed for some indicators such as antenatal postnatal use of service. Antenatal check-ups and safe delivery services reduces the risk of maternal death and improves child survival as well . However, only less than half of pregnant women had received antenatal check-ups, and 45.8% had received two doses of tetanus toxoid injection.

Trying to identify factors influencing service utilization, bivariate analysis was done against selected background characteristics. Accordingly, though not statistically tested, a relatively higher proportion of young mothers; literate mothers and mothers residing in Dega tended to receive tetanus toxoid injection and safe delivery compared to their counter parts. However, more women from weynadegua received safe delivery (14%) compared to Dega(10%). The higher service utilization by young and literate mothers could be due to the fact that they are more likely to be aware of the importance of these services and also they might be less prone to traditional believes.

Family planning knowledge and use of women was also assessed and analysed. Invariably, except teenagers, the majority of women had information on family planning methods. The low family planning knowledge of teenagers could be due to the low exposure to information. However, despite the high knowledge, family planning up take is very low: current use and ever use rates were 3.1 and 7.3% respectively.

Similarly, immunization status of children of 12-24 months was assessed and analyzed. Only less than half of children had received full doses (i.e measles, BCG and three doses of polio and DPT). The bivariate analysis indicated that immunization status of children was associated with maternal age and literacy, household headship and Agro ecological zone. Though not statistically proven, a relatively higher proportion of children of middle age mothers; literate mothers; female headed households and children from Degua seemed to be favored of immunization compared to their counter parts(table2).

Almost all diseases emanate from the environment . Shortage and contaminated water and improper human water disposal are the two main sources of health problems. It is recommended that safe and adequate water supply should be available with in half hour walk. However, in this woreda it was found that only one third of households used drinking water from relatively safer sources, and about one third of households were with in the acceptable distance of source of drinking water. Similarly only one in ten households had pit latrine available

Two weeks disease prevalence was seen in one fourth of eligible women, and the magnitude of maternal malnutrition was 35.6%.. Two weeks childhood disease burden was seen in about half of children .ARI, Diarrhea, and febrile illness are among the common childhood illness.

5.2 Level of Maternal and child Malnutrition

Health and nutritional status are best indicators of the well being of a society. They are influenced by so many inter-related factors, besides access to and utilization of health services; safe and adequate water supply; and sanitary facilities; economic factors largely affect health and nutritional status.

The health, and nutritional status of women and children in the woreda is very low.. Level of maternal malnutrition seemed to be influenced by martial age and parity. A relatively higher

TABLE 3:- Comparative Summary Findings, SERA Project Profile , Tigrai, 2000

<i>Indicators</i>	<i>National</i>	<i>Regional</i>	<i>Sasie</i>	<i>Atsebi</i>	<i>Ahferom</i>	<i>Abergele</i>
<i>1.Maternal Health and nutrition</i> - ANC	30	36.9	49.5	48.5	35.9	30.4

<i>Indicators</i>	<i>National</i>	<i>Regional</i>	<i>Sasie</i>	<i>Atsebi</i>	<i>Ahferom</i>	<i>Abergele</i>
- TT ₂	17.2	14.3	45.8	15.4	29.7	21.1
-Delivery	9.7	10.9	104	14.1	2.7	4.5
-Family planing	8.1	10.2	31.0	3.0	1.2	1.9
-Disease prevalence	?	?	27.1	44.3	30.3	51.1
-Malnutrition (MUAC)	30.1	34.9	35.6	45.9	44.3	39.1
2.Child health and nutrition						
Immunization						
- BCG	45.6	79.5	90.7	88.2	95.0	86.5
-Measles	26.6	66.6	94.0	78.8	90.8	77.0
- DPT ₃	20.7	56.3	56.8	60.0	54.0	46.6
- Polio ₃	34.6	63.5	67.8	44.7	49.5	63.5
- All	14.3	43.5	45.8	29.4	31.2	33.8
Disease prevalence						
- ARI	24.4	29.2	17.2	23.9	22.8	51.6
- Diarrhea	23.6	17.2	6.7	9.7	9.6	15.2
- Febrile illness	28.4	36.6	14.6	23.9	22.4	41.2
- Any illness	?	?	25.2	30.2	34.5	49.9
Malnutrition						
- Stunting	51.5	55.3	57.0	56.8	59.2	56.5
- Wasting	10.5	11.1	11.3	5.6	11.0	7.0
- Underweight	47.2	47.9	50.8	49.5	52.0	46.6
Mortality (CSA Vs Current SERA survey)			157.5/130			
3 Water supply and latrine						
- Pit latrine	?	?	11.6	7.3	12.8	0.2
- Safe drinking water source	?	?	31.4	59	45.5	57.4
-Accessible drinking water source	?	?	33.0	27.7	41.2	22.8
4. Epidemic diseases trend Last 10 yr						
- any epidemic			96.7	92.3	90	97.5
- malaria			9.7	13.9	29.5	70.3
- diarrhea			2.9	5.8	3.0	24
- measles			7.5	3.0	3.6	3.6
- typhus			5.3	4.2	1.3	1.3
- others			3.88	4.7	1.7	1.7
Last 5 yr						
- any epidemic			17.1	22.5	33.7	80.5
- malaria			11.9	12.4	29.4	77.0
- diarrhea			29	6.9	1.8	25.7
- measles			3.1	1.07	0.6	5.8
- typhus			3.5	7.5	1.7	57.4
- others			2.9	4.6	1.9	4.9
Last 1 yr						
- any epidemic			13.3	2.8	8.2	86.0
- malaria			6.7	14.2	23.5	61.6
- diarrhea			-	0.5	-	-
- measles			1.5	-	2.0	17.9
- typhus			1.9	1.1	2.3	7.6
- others			3.5	8.4	2.4	0.8

Source: SERA Survey

proportion of younger mothers were malnourished compared to older mothers. However, findings on party are inconsistent, and a further stronger study is required to establish on association.

Chronic malnutrition (stunting) was prevalent in 57 % of children, and acute malnutrition (wasting) in about 11% of children .The magnitude of childhood disease burden seemed to be strongly related with age of the child, where disease prevalence is lower in early infancy and also after the age of 3 years old. It is likely that because of the high risk of infection during weaning period (6 months to 3 years) the disease burden in this age group could be high compared to the extreme ages.

Child nutritional status also seemed to be influenced by age of the child; mothers' age and Agro- ecological zone. A lower proportion of infants were more likely to be stunted compared to older children. The difference could be due to the breast-feeding effected. However, with respect to wasting and under weight there seems no significant variation. Similarly, children of younger mothers seemed to be less wasted and under weight. Unexpectedly in this wereda children of literate mothers were more likely to be stunted compared to illiterate mothers.

In conclusion maternal and child health service coverage and utilization is very low, similarly sanitary facilities; and safe and adequate water supply is very low. As a result, disease burden and magnitude of malnutrition is very high.

5.3 Levels of Infant and Child Mortality

In chapter seven an attempt is made to examine the levels of infant and child mortality rate based on two different techniques. The first technique deals with estimates of infants and child mortality calculated from the Coale-demeny west family of model life tables and the second one is logistic regression that investigate the linkage between child mortality and some selected explanatory variables.

Table 8.4 presents estimates of infant (age 0-1) and child mortality (age 1-4) calculated from the Coale-demeny west family of model life tables. According to the model life table, of 1000 children born 91 will die before age one; and 43 will die between age 1-5 and 130 will die before reaching age five.

TABLE 8.4:- Indirect estimates of infant and child mortality from model life-tables (Coale-Demeny West Family), by reference period

Mortality	Rate	Reference
Infant mortality rate	91	Feb, 1987 E.C
Child mortality rate	43	Feb, 1987 E.C
Under five mortality rate	130	Feb, 1987 E.C

Source: SERA Survey

Infant and children born in the five years preceding the survey period face many health risks. Five symptoms of illnesses that are important contributing to infant and child morbidity and mortality rate considered in this section. They are coughing, difficulty breathing, fever, diarrhea and vomiting.

One third (25.2 percent) of children under age five in the wereda were ill with one of the following diseases: coughing, breathing problems, fever, diarrhea or vomiting, in the two weeks preceding the survey. Illness of any kind is less common among male-headed households (22.0 % versus 30.3%) and varies across agro ecological zone. The illness is more common in Dega (26.7%) compared to weynadega area (19.7%). Children of illiterate household heads are more likely to be ill compared to children of literate mothers.

Logistic regression model was also applied to describe the relationship b/n the explanatory variables and the dichotomous dependent variables. The data are taken from the four pilot weredas so the finding presented below reflects the general characteristics of child mortality in the four study weredas. Using backward elimination among the 18 variables included in the model only seven variables were retained in the final model. The analysis generally suggest that health related variables such us condition of child during delivery and vaccination status are the most important predictors of child mortality. The relative importance of vaccination status

comes out as the most significant variable in the determination of child mortality. The risk of death in a vaccinated child is 75% times less as compared with an unvaccinated child.

In addition to the above findings the model supports children from male-headed households and formerly married mothers were at high risk of death in comparing to their counterparts. The final model indicates that the probability of dying a child from male-headed households is 4.132 times higher than female-headed households. Similarly it shows that the probability of dying a child from currently married women is less by 70.4% than a child of formerly married women. This indicates that marriage stability and sex of household head have their own contribution in reducing child mortality.

It is known that overcrowding of households due to large family size is an environmental risk factor that may promote child mortality. The logistics model also supports that the risk of child mortality decreases as the number of rooms owned by household increases (where number of rooms owned by households is taken as a proxy indicator of wealth and health). Similarly in an attempt to see the relationship of the dependent variable with selected demographic variables, the relative importance of educational status comes out as the most important variable in explaining child mortality. That is the risk of death from households headed by a literate one is 42.7% times less than households headed by an illiterate one.

In order to address the questions who are the vulnerable groups?, why are they vulnerable? and where they live?, it is important to analyze demographic, health, economic and environmental related factors with respect to their impact on child mortality. Among the variables considered in the study sex of household head, vaccination status, number of rooms owned by household, mother's marital status, condition of child during delivery and mother's age were found to be significant predictors of child mortality in that order.

In short sex of household head strongly influences a child's chances of survival. Children of male-headed households are at much higher risk of death. Similarly the risk of death in an unvaccinated child is much higher as compared with a vaccinated child. Likewise condition of child during delivery appears to have an association with child mortality, i.e. the risk of death to a child born healthy/strong is lower as compared to a child born sickly/weak. With regard to number of rooms owned by household, which is taken as a proxy indicator of wealth, the finding indicates that the risk of death decreases as the number of rooms owned by household increases. Regarding marital status, currently married mothers have a lower chance of child deaths than formerly married mothers and in the same manner age of mothers influences child deaths negatively. In view of this fact, an attempt is also made in this part of the analysis to examine the woreda dummies, which were found statistically significant to explain the variation in child mortality. That is the risk of death of a child born to a Sasie mother is much lesser than Aberege and Atsbi. In comparing Ahferom with Sasie though the difference is not statistically significant but the model odds ratio indicates that the problem is worse in Sasie. Generally regarding to the severity of the problem, the finding is in agreement with the result found from Coale Demeny west family model.

6. Food Gap and overall poverty

The community focal group discussion and the Key informants reported that the livelihood of the rural community depends on the job opportunity around them. Household income and overall wealth depends on land holding size, number of livestock owned (Particularly an ox). Thus the community used these as criteria for wealth ranking. Land size and land fertility was found to be less important for the KI and elders after the land redistribution in early 1980's. The number of oxen was given more weight to rank the wealth of the community. Although dependency on agriculture production is higher, income from other non agricultural sources have also been used to fill their food gap.

Food shortage is one of the indicators of vulnerability. There is food insecurity when households lack access to food fully and partly, at any given of time. Households face food shortages due to one or more of the following: Inadequate local agricultural production and low income obtained from non/off farm sources.

6.1 Inadequate Local Agricultural Production

I. Local Agricultural Production and Deficit by AEZ and Household Characteristics

Local Grain Production and Gap

Regardless of the length of the period of food deficit, over 99% of the sampled population have food shortages. While 86.6% of the sampled population have over nine months of food deficit, 7.7% have food deficit for 6-9 months. Based on the data obtained from the Wereda Office of Agriculture, average food production computed for three consecutive years was covered only for 21.8% of the Wereda's food requirement (showing 78.2% food deficit).

The Dega zone of the Saisie Tsaeda Emba Wereda has higher percent of households with over 9 months of food shortage compared to the Weyna Dega zone. In the Dega zone 87.9% of households with over 9 months of food deficit, which is higher compared to that of Weyna Dega zone with 81.5% of households. This could be due to one or more of the following:

- Dega zone of the Saisie Tsaeda Emba Wereda has higher percent of households with shortage of land compared to the Weyna Dega zone. In the Dega zone those households under 0.5 holding (including the land less) accounts for 75.9% of the sampled population in the zone while it is 44.6% in the Weyna Dega zone.
- Majority (51.6%) of the Dega zone are ox less while it is 40% of the households in Weyna Dega zone. While majority (50.8%) of the Weyna Dega zone have only 1 ox, it is 38.4% of those households in the Dega zone.
- The land degradation problem is higher in the Dega zone compared to that of Weyna Dega Zone.
- Weyna Dega zone has 15.1% of fertile and 55.6% of moderately fertile lands while the Dega zone has 13.7% and 46.7%, respectively;
- Dega zone has 39.6% of infertile lands while the Weyna Dega zone has 29.4%.

TABLE 5 Food Security and Poverty

No	Indicators		W/dega	Dega	Kolla
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No	Indicators		W/dega	Dega	Kolla
1	Land Owning/Utilization	% of landless	3.1	3.1	
		% landless and very small land holding (<= 0.5 hec)	44.6	75.9	
		Average land holding (hec)	0.65	0.47	
		% HHs with 2 or more parcels	34.9	36.9	
		% perceived infertile main plot	32.4	45.5	
		Crop diversification (>= 2 crops)	86.6	67	
2	Livestock ownership	% of oxenless	40	51.6	
		% of HH with one ox only	50.8	38.4	
		TLUs per capita	0.55	0.47	
		TLU per HH	2.4	1.92	
		% HH with no TLU	7.7	17.3	
3	Income and poverty	% < 920 birr HH Income	63.1	84.1	
		% involved in off-farm	18.5	3.1	
		% involved in non-farm	82.3	72.5	
		Mean income from off-farm (Birr)	49	6.2	
		Mean income from non-farm (Birr)	208.3	109.9	
		% Income sufficient 4 months or less	100	82.6	
		% HHs much too small to make ends meet	54.6	52.8	
		% perceived poverty last 10 years	96.9	99.6	
4	Food deficit	% of HH having above 3 months deficit	98.1	96.1	
		% of HHs having food deficit above 6 months deficit	95.2	90.7	
		% of HHs having food deficit >9 months	87.9	81.5	
5	Food production	Mean per HH (Qt)	3.17	2.2	
6	Market access	% PAs with in 3 hrs. radius walking to weekly mkt.			

Source: **SERA Survey**

Which households are having long period of food deficit (those having short of land, ox, and land degradation?) What are the association with those households having large family size, age of household heads, and sex?

To identify the major contributing factors of food shortage, it is necessary to characterize those households that have longer period of food deficit.

Those households with longer period of food gap have the highest proportion of small landholding size (less than 0.5 hectare). Those households with highest percent shortage of oxen are also having the highest percent of food gap. (See I.II for detail).

Households with larger family sizes are with higher percent of food deficit for more than 9 months than those having smaller family sizes. Of those households with 1 family size, 60% are having over 9 months of food deficit while 83.8% and 93% of the households with 2-4 and above 5 family sizes have over nine months of food

deficit, respectively. Those households above 5 family size accounts for 54% of the sampled population.

Households with smaller family sizes are having higher percent of land shortage than those having larger family sizes. The proportion of households with shortage of land is 98.3% of those having 1 family size, 79.3% of those having 2-4 and 56.1% of those with 5-8 family sizes. If households with small family size have higher shortage of land than those having large family size, what could be the reason then for those households with larger family sizes to have higher food gap?

Though households with large family size have comparatively bigger landholding, higher percent of these households are exposed to long period of food shortage than those having small family size. This could imply that households with large family sizes might have small landholding per person, though they appear to have bigger landholding at household level.

TABLE 6 --: Households of different age groups with percent shortages of land, ox, food, and family sizes.

	15-45		46-60		60+	
	%	Relative Ranking	%	Relative Ranking	%	Relative Ranking
% of HHs having less than 0.5 hectare	78.8	High Shortage	61.9	Low Shortage	64.2	Medium
% HHs Ox less	44.2	Low shortage	50.2	Medium	56.8	High shortage
% HHs with shortage of pair oxen	94.2	High Shortage	86.9	Low shortage	87.7	Medium
% HHs above 5 family size	48.5	Medium	62.3	High	35.8	Low
% HHs above 9 months of food shortage	92	High shortage	85.6	Medium	79	Low shortage

Source: SERA Household Survey

About 92% of households - with heads 15-45 age are having over nine months of food deficit. As one can see in the above table, this group has the highest percent of households with shortage of food because of highest percent of households with shortage of land and shortage of pair of oxen, but with lowest percent shortage of single ox.

Households with heads of 60 and above have the lowest percent of households with shortage of food. Though households in this group have shortages of land and oxen compared to those households with heads 46-60 age, the former have very small family size. Therefore, households with heads of 60 and above age have the smallest percent (79%) of households with over nine months of food deficit while 85.6% of those households with heads 45-60 have over nine months of food deficit, having medium status.

Higher percent of male headed households (87.9%) are with over 9 months of food deficit compared to that of female headed with 85.1%. It is difficult to justify that higher percent of male-headed households are with longer period of food deficit than the female-headed because of the following:

- While 55.6% of the female-headed households have less than 0.5 hectare, it is 87.1% of the female-headed households with the same landholding size;
- While 38.8% of the male-headed households are ox less, it is 62.5% of the female-headed;

- While the male-headed households possess 2.52 average TLU, it is 1.38 TLU of the female headed.

The landholding and oxen ownership is in favour of the male-headed households than the female headed. So what could be the reason for this? In fact, higher percent of the male-headed households (66.4%) are with above 5 family sizes while there is higher percent of the female-headed (70.9%) with less than 4 family size. Majority (56.6%) of the female heads are also between 15-45 age while majority of the male heads (69.4%) are above 45 of age.

Contribution of Livestock

Livestock production is the second most agricultural activity of the rural people, next to crop cultivation. Cattle are mainly reared for the purpose ploughing as well as milk and milk products while the small ruminants are for the purpose of cash income (from live sales) and for household meat requirement. The equine, particularly donkeys cover the transportation needs of the households. In addition, all livestock are serving as source of manure and as a security (for sale as a coping mechanism at times of food stress to fill in part the food deficit). In the last 10 years nearly 25% of the households frequently used to sale their livestock to cope up severe food deficit occurrences.

The household survey result shows average TLU per household in the Wereda is 2.02. About 15% of the households own no livestock at all and nearly half of the households own less than 3 TLU. The mean livestock ownership per household is equivalent to Birr 922.4 with standard deviation of 811.86. Based on the 1990E.C. data taken from Livestock Population Census of Tigray, the average TLU per household is computed 2.9.

Female-headed households have small TLU holding than the male headed. About 60% of the male-headed households and about 30% of the female-headed households own more than 5 TLU. While 62.7% of the literate own TLU more than 5, it is only 40% of the illiterate.

Households participated in Non-farm activities have better possession of livestock than those who did not participate indicated that those who diversified income are better in livestock ownership.

There is high possession of livestock in the Weyna Dega zone than in Dega zone.

II . The Main factors identified as affecting the size of agricultural production

A. Low Production Due to Resource Limitation

From looking in to some features of the households having longer period of food deficit and the AEZ where higher food shortages are prevailing, the following core reasons are identified. Shortage of landholding, shortage of oxen (and other livestock), and land degradation are the core reasons identified for low agricultural production, at normal production situation.

Shortage of land

Shortage of land is one of the major factors for decreasing local agricultural production. Among the households with landholding under 0.5 hectare, 89% have over 9 months of food deficit while the proportion of households is 85% and 58% of those households with landholding 0.5-1 and 1-2 hectares, respectively. Therefore, there is positive relationship between the size of landholding the length of food

sufficiency period. The following indicators could show why such food deficit exists in the Wereda.

- Though household survey result shows that the land less accounted for 4.8% of the sampled population, the data obtained from the Wereda Office of Food Security and from RRA sources shows that the land less households reached up to 13.55% and 11% of the rural households, respectively.
- Household survey result shows that 69.6% of households are having under 0.5 hectare and the total households having under 1 hectare of landholding reached 95.3% of the sampled population;
- According to the household survey result, the average landholding is 0.51 hectare while the average landholding is about 0.67 hectare (0.57 hectare of cropland and 0.1 of grassland) according to the Wereda Office of Agriculture. The gap between the two sources could be that the household responses might have ignored the grassland holding (0.1 hectare) as part of the landholding.

According to the data obtained from MOA, the average grassland per household is 0.1 hectare. Livestock stocking rate of Saisie Tsaeda Emba Wereda, in 1990E.C., was the highest (among the Wereda's understudy) reaching up to 17.49 TLU/Hectare. Though Saisie Tsaeda Emba Wereda has the highest shortage of grassland, the use-system of available grassland is better in Saisie for the grassland is distributed to each landholder like the croplands.

Shortage of ploughing oxen

Over 90.2% of the sampled population do not own a pair of oxen. While 49.3% are ox less, only about 9.8% of households own 2 and more oxen.

While 87.2 of those households having 1/0 ox are having over nine months of food deficit, 81.3% of those households having 2 and more oxen are with deficit over 9 months. But, there seems no significant difference between the proportion of households having food deficit over 9 months by size of oxen ownership. Even those households having 1 ox have higher proportion (88%) of food deficit than those households with no ox, of which 86.6% have food deficit. In reality, there should have been significant difference between the two. However, availability of oxen is only one of the factors. Availability of ox should be complemented by availability of landholding and other considerable factors.

TABLE 7 Household with heads of different age groups by shortages of land, ox, and tenure.

Description	Age group		
	15-45	46-60	60+
% of households with no ox	44.2%	50.2%	56.8%
% households having less than 0.5 hectare of land	78.8%	61.9%	(64.2%)
% households rented-out land	11.7%	16.3%	22.2%
% households rented-in land	14.2%	9.8%	7.4%

Source: SERA survey result

The above table tries to shows that the percent of households who rented out land is growing higher and higher with the increase the age of the household heads. Because, households with aged heads have comparative low shortage of land but on the other hand have higher percent of ox less households. Since those households of young age have comparative low shortage of ox and have high shortage of land, there is no

significant difference in the proportion of the households having longer period food deficit. The reverse is true with regards of rented-in land.

Land Degradation

The household survey result indicates that only 13.9% of the lands in the Wereda are fertile. The lands with moderately fertile status accounts for 48.5% while the infertile land accounts for 37.6% of the lands of the sampled households.

Low Production Due to Environmental Hazards and Others

Besides to the limitation of resources - as described in the above, there are also environmental and incidental causes which affects the agricultural production situation.

Based on the information gathered using the RRA method, pests, and flood hazards are causing crop loss. Production loss due to shortage of rain is high in the Wereda. The production variation between 1989-1991E.C is mainly attributed to rain status. On the top of the limited feed resources, shortage of rain causes to death of many livestock due to lack of feed. The occurrence of epidemics coupled with the poor veterinary service causes to decrease the livestock resources.

The post harvest loss of the region is estimated as high as 27% of the produce. Therefore, low agricultural production is not only caused due to lack of ploughing oxen, shortage of adequate and fertile land, but also due to many environmental and incidental causes as described above.

III Causes for shortage of land, shortage of ploughing oxen (and other livestock and land degradation

Population pressure is one of the main causes of shortage of land resource. Traditionally, giving birth to many children has been considered as a sign of power and strength of the family. Besides the high child mortality rate has been cited as one of the reasons, though the mortality rate is being improved.

Shortage of land caused by population pressure is affecting not only the crop output directly but also livestock production. Areas under grazing and other vegetation resources have been continually converted to cultivated lands to lessen the ever-increasing demand for cultivable lands. Shortage of grasslands and other resources of feed are the main reasons for small livestock/ox holding.

Based on the household survey, 38.1% of the Weyna Dega and 41.3% of the Dega zone are cultivated in sloping areas. Such types of lands could have been more productive and useful for other land-use types. The customary cultivation practice of annual crops, regardless of the slope, topography, soil type, and other site-specific details of the lands have been leading to degradation of the soil and other natural resources. This is one of the reasons for decreasing agricultural products.

The free grazing practice in the Wereda causes to misuse of the grasslands and as well as to erosion and land degradation. The free grazing practice, moreover, remains a problem in overall rural development interventions.

In sum, high population pressure, lack of appropriate land-use policy and regulating system, lack of adequate institutional support and extension are regarded as root causes for low agricultural production.

To summarize, food shortage is the major indicator of vulnerability. Households, in the Wereda, are exposed to food shortage mainly due to low agricultural production.

The agricultural data of three consecutive years (1989-1991E.C) showed an average production of only 21.8% of the Wereda's food requirement.

The Dega zone has higher percent of households with over 9 months of food deficit, and households with less than 0.5 hectare and ox less.

Households with over 9 months of food deficit are characterized by high percent of households having large family size and heads 15-45 age. Though male-headed households have relative larger size of land, ploughing oxen and other livestock, the percent of households with over 9 months of food deficit is higher than the female-headed.

The major causes identified for low agricultural production are small landholding, shortage of ploughing oxen, land degradation aggravated by drought, flood, pests, and epidemics. The root causes identified for low agricultural production are thus, population pressure, lack of appropriate land-use policy and regulating system, lack of adequate institutional support and extension system.

Income from off/non farm activities is the other factor, which determine the capability of households to buy food. Income from off-farm and non-farm activities obtained by households is so low that the total earned income from both activities amounted to only to Birr 9391.20 and 84359. 85, respectively.

Thus, the Wereda population has high food deficit problem mainly because the Wereda's local food supply is only covering one-fifth of the Wereda's food requirement and income from other than agriculture is very low.

Low Income From Other Than Agricultural Sources

*Non-farm and off farm income earning are the other activities that strengthen households' food security. In the Wereda however, we have found that while agricultural production is poor, off farm and non-farm also are limited. and food for work is the main source of non-farm employment. According to the survey result 6.1% and 74.7% of the households were involved in off-farm and non-farm activities in the last 12 months prior to the survey respectively. The main source of non-farm employment in the Wereda is food for work and around 71.3% of the surveyed households were engaged in the specified period. Despite the limitation such income sources have a role in enhancing the food security of household. It was found out that household involved in off-farm and non-farm activities in the last 12 months prior to the survey earned an average of 476.8 Birr and 173 Birr respectively. This being the fact, the possibility of earning income from non farm activities appear to have some relationship with some selected back ground variables. It seems to be more common in: literate headed households, male headed households, land less households, households composed of large family size and those reside in Weyna Dega area.

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Thus, the Wereda's local food supply is only covering one-fifth of the Wereda's food requirement and income from other than agriculture is very low, the Wereda population has high food deficit problem.

**The type of non-farm income earning activities mentioned in the questionnaire includes, weaving, milling, handcraft, trade in grain, trade in livestock, traditional healer, transport, local drink, food for work and other related activities and similarly the type of off-farm income earning activities includes weeding, harvesting, ploughing other plot, and other related activities.*

6.2 Determinant factors from the poverty model

Based on income from agricultural production ,income from off-farm and non-farm ,gift and remittance a multivariate analysis to determine the level of poverty , the following determinant factors are identified to have significant relationship for the welfare of households.

In this model, **out migration** (V31b) is positively contributing to improvement of welfare of the society as the coefficient of the migration dummy is positive and statistically significant. Households who have permanent migrant are better of than those who do not have migrant, possibly showing the coming of remittances or the less pressure on resource sharing at household level. As can be seen from the next probit estimates, this variable contributes significantly to the reduction of the probability of falling under absolute poverty. So there is consistency of the estimated results.

Similarly, **education status** and **family size** of the household (Family size) appear to contribute positively to improvement of welfare of the people in the study areas. There is positive sign of the coefficient and both variables are statistically significant at 5% and 1% levels of significance, respectively. Age, gender differences, and marriage status do not significantly explain the variation in the living standard of the population in the study areas.

Out of the economic variables, **landholding** (V101a hec) has as expected a positive sign, indicating that welfare of the farming population is dependent upon land holding. As the value of this coefficient indicates an increase in one hectare brings about an increase in Birr 212 in the disposable income of the population. As indicated in the 5th column of the P.values, this variable is statistically significant at 1% level of significance.

Like wise, *possession of livestock* (TLU), *participation in non-farm activities* (V229), and access to *rural credit* (v402a) have positive contribution and these variables are statistically significant at the conventionally accepted levels of significance. It is to be noted that the non-farm activities has the largest positive coefficient, signifying the participants in non farm activities are better off by Birr 258 than those who do not participate at all.

On the other hand, out of the felt problems of the respondents *lack of labor* (v01-4), *shortage of rain* (v01-9), and *lack of improved seeds* (v01-10), appear to significantly reduce the welfare of the respondents. Those who indicated the importance of these problems are worse compared to those who do not felt the significance of these constraints. The other reported constraints, though they have expected sign of the coefficients, reducing the income of the respondents they are not statistically significant to explain the variation in the income level of the respondents.

Moreover, the experience of food insecurity and epidemics appear to explain the variation in the level of income of the respondents. Though, these experiences can not be causes for low income themselves, the level of income of those who reported to experience these events in the past are affected somewhat. The experience of food insecurity as expected has negative sign indicating the experience of food insecurity is negatively related with level of income of the respondents.

The wereda dummies are all statistically significant to explain the variation in the level of income of respondents. Taking Ahferom wereda, as base respondents from Abergelle and Saesi are worse off while those in Atsbi are better off. These results show the existence of locality specific features that bring about a difference in the living standard of the population under investigation. Though not reported in the tables, an effort was made to incorporate agro-ecological variables, represented by Dega, Kolla and Weinadega. The variables were found to be irrelevant to bring about variation in the dependent variables in both the OLS and Probit models. Instead, the wereda dummies are found significant explanatory variables. For one thing there could be data problem to adequately represent variations in agro-ecological zones. Moreover, there could be other locality specific features that are picked up by the wereda dummies instead of the agro-ecological zones.

7. Resilience, Survival Coping Strategy and institutional response to disaster

Many victims of disaster mostly devise their own response and mechanisms to cope with disaster, based on their coping strategies, an index based on How households Strategies practiced over the last 10 years are analyzed to estimate the level of households to cope up with disaster. House holds applied irreversible coping strategies frequently over the last 10 years are more likely to erode their resource bases and thus incapable to cope, while those HHs applied the reversible ones have the chance to pass the risk season either with improvement of the disaster or with government mitigating intervention such as food aid and other means.

It is presumed that the practice of reversible type of coping strategies are the result of either the households have poor wealth states or the magnitude of the disaster is very severe beyond the capacity. It is important to recall that 15.4 percent house hold have us livestock at all and only 6.1 & have participated in off-farm and non farm activities. The crop production per households is 2.39 quintal thus there is high

probability for large proportion of the households to shift quickly from reversible type of coping strategy into the irreversible or to apply both.

Therefore, in saese'tsada'emba wereda over the last 10 years only 28.9 percent of the households used the reversible coping strategy alone and the remaining in combination with the irreversible type of coping strategy. This indicates that 71.1% percent of the households have exhausted their reversible type of coping strategy and shifted to the most severe or the irreversible type coping strategies.

House holds shifted from the reversible in to the mix of both the reversible and irreversible strategy according to the bivariate analysis with certain selected characteristics shows that landlessness and small land holding, male headed households, households with less annual income, oxen less ness, and amount of other livestock owned. Similarly from the focal group discussion the resilient house holds are those with diversified income other than agriculture, lesser family size have access to irrigation scheme and water diversion.

8. Disaster history and institutional response

Although there is not properly documented disaster history record in the wereda the community elderly and key informants revealed that the problem of draught induced famine, epidemics, flood and pest have a chronic nature.

The most commonly sited severe famine period were 1951,1977,1980 and 1986 and for epidemics 1951, 1962/63, 1977 and for pest 1951 and 1983, However although the severity and the number of people affected varies draught induced famine occurs almost every year. The recent records on proportion of needy population from DPPB indicates that even during the relatively better season over 40% of the population depends more on food aid and related programs. The inhabitants feel that vulnerability to draught is increasing since the last three decades because of the erratic and inadequate rainfall small land holding size and population pressure.

The RRA result shows that household withstand to shocks and risk of draught however varies depending on their resources. Better land holding, livestock possession and participation on non-farm and off-farm activities improve the households capacity to cope up with disaster. Those households vulnerable to famine according to the community are landless, female headed households who rent out their land, large family size, those do not own any livestock and households depending only on crop production for their livelihood. From the current situation on food gap shows that still above 85% of the households have food deficit more than 9 months indicating the chronic nature of the food insecurity in the area.

Vulnerability to epidemics has improved greatly in the last decades because of improved awareness to personal and environmental health and improved and expanded network in the health services.

From the food gap analysis above 85% of the house holds have food deficit more than 9 months and the proportion of needy population from DPPB also indicates even during the relatively better years more than 40 % of the households need critical food aid. The following table shows the proportion of needy population and food aid distributed.

TABLE 8:- Trend in population affected and food aid distributed in Saese tsada emba (1988-1991)

Year	Expected out put (Qt)	Actually produced	Producti on %	popula tion	Population affected	% of needy population	Food aid (Mt tone)
1988	87977	62777	71.4	95000	41600	43.7	6208.84
1989	123546	76090	62	97155	55462	57.1	8486
1990	134156	111663	83	100070	38885	38.8	3949.2
1991	173245	92996	54	105035	53371	50.8	7205.04

Source: **DPPB**

The food aid above which distributed as food for work for majority of the community seems far too low from the food deficit they faced.

Institutional response may act directly or indirectly to mitigate the vulnerability situation in the area. The provision of basic service are discussed in section 8.2 and other relief activities are associated with development and are although need be diversified and expanded, help the significant proportion of households to generate income.

Besides the above many of the development programs have been introduced in the last 10 years , overall the services and the infrastructure in general is improving from time but there seems a little change in the improvement of the households food security situation and thus large proportion of households start early most of the coping strategies such as reduction of number and quantity of meal , eating less preferred food and sale of livestock among others.

B. CONCLUSIONS

Rapid population growth in developing countries is closely associated with very young population structure and high age dependency ratio. The 1994 CSA census also confirms the reality for Saese' tsaeda'emba woreda. As can be seen from this situation, the population at young age group (< 15 years) make up 45.4 percent of the total and those at old age group (above 64) consists 5.5 percent. The proportion of the working age population (15-64) constitutes a little bit higher than the young age group, which is 49.1 percent of the total population. Generally the age structure of the wereda reflects the presence of high fertility due to the factor that large proportion of the population concentrated in younger age groups.

Due to long abuse of the environment, land degradation causes decline of land productivity in the wereda. Recurrent drought and famine exacerbated by the erratic rainfall and variable rainfall are the commonly experiences of the area. With these all situations, most farm households can only have food item that lasts less than 5 months in the wereda. Hence, the local people in bridging the critical food insecure of over 7 months. assume supplemental food aid and other off-farm employment opportunities.

Food production is a function of many interrelated factors. Land holding size, quality of land, availability of traction power, proper land management, appropriate extension services, provided that the rain fall pattern is regular with enough moisture. In addition, population is increasing tremendously that its impact on environment and natural resources manifested at its highest stage. There is high loss of soil fertility ,

over cultivation even in un recommended areas. The proportion of landless households is increasing quickly, the average land holding for the others is very small, pasture problem is critical, however important to mention is the environmental rehabilitation program in the wereda in the last decade was encouraging. Soil erosion and deforestation is decreasing from time to time, however the pasture problem remains there.

Household food security is attained when the households either produce or purchase to meet the family end through out the year. Based on the 1991/92 E.C crop production and with assumption of 2100 kcal per head per day and 4.57 average family size of the Woreda. Over 99 percent of the House Holds have food deficit that ranges from 1 month to 11 months of which 86.6 percent have food deficit over 9 months which clearly indicates the food produced hardly covers a quarter of the requirements. The food gap is severe beyond imagination. Therefore households adopt different strategies to cope up with such chronic food deficit by reducing the quality and quantity of food and other related to consumption besides searching job with in & out side PA, sale of Livestock, and other productive assets. However the contribution of Non Agricultural income is far small to fill the gap.

In Saesi Tsaeda Emba despite the exclusive dependency of Agricultural production on rainfall small land holding per house hold (0.5 ha), significant proportion of infertile main plot together with high shortage of ploughing oxen have among the few that contribute recurrent production shortfall.

Livestock production is also the second most agricultural activity next to crop cultivation. But due to population pressure, areas with grass cover (and vegetation) are decreasing because they are converted to cultivated areas to fulfill the increasing demand for food. Therefore the feed resources are decreasing. Based on the 1990E.C. Livestock Population Census of Tigray, total livestock population of the Wereda amounted to 192343. These livestock are equivalent to 57909.4 TLU, with an average of 2.9 TLU per household.

Non-Agricultural income is quite low that households were forced to apply severe coping strategies to cope up with chronic food deficit. Although in the poverty multivariate analysis doesn't show agroecology and gender is significant , the Bivariate analysis seemed to show that the dega have longer period of food deficit than their counter part in weinadega. Gender wise it doesn't indicate that the female headed households more vulnerable in terms of food deficit and total income than the male headed households , there seems a paradox that in terms of the individual indicators , they posses small land holding ,livestock ownership and labor etc... the food deficit and total annual income however is although small, is higher for the female headed households. There are two possible reasons for this ,one the family size for male headed households is higher by two person, and /or there is a tendency of male headed households to under report their annual income.

Besides the chronic food shortage other factors contributing to Vulnerability in the Wereda are the high prevalence of disease burden. The expansion of Health service is significantly improving in the last decade. Epidemics have significantly reduced, but still more has to be done on quality of the services.

Two-week disease prevalence indicated that quarter of mothers and nearly half of the children under five were ill. The most common disease-affecting children include Coughing, Breathing problem, Diarrhea are few among others. Such prevalence of

disease is by 1.3 times higher in Dega than the Weinadega. Only one third have had treatments. Only on third of the households have access to safe water sources and the use of pit latrine only one in ten Households.

The extremely very high food deficits in the Wereda together with high prevalence might have contributed to the level of Chronic Malnutrition (57%) Stunted and (11.2%) Wasting which is higher than the Regional and National Average.

The Infant and Child Mortality rate in the Wereda is 91 and 130 respectively. The Multivariate Analysis indicated that the conditions of the child during delivery and Vaccination status were found to be most predictors of Child mortality. Although child Immunization in the Wereda is high, the proportion of professionally assisted delivery in the Wereda is very low (10.4%). The economic factor is almost common to every household.

Economically over all poverty was assessed based on the House hold income (from Agriculture, Off-farm activity & Non-farm, Gift and remittance). The following were found to have positively contributing to the household welfare. Land holding size and livestock ownership, house holds with permanent out-migrant, literacy status, family size, and participation in non-agricultural income and beneficiary of credit. Out of the of respondents lack of labor, shortage of rain and lack of improved seeds significantly reduce the welfare of the respondents.

Generally over all Vulnerability to drought according to the Community group discussion in the Wereda is increasing and conversely Vulnerability to Epidemics and other disease burden is decreasing nevertheless the disease prevalence is still high.

As a result of recurrent drought and consequent food deficit, the Malnutrition level and Child Mortality remained high despite the improvement in the health and other risk factors.